JANUARY, 1961

RSGB BULLETIN

VOL. 36, No. 7

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Volume 36 No. 7

January 1961

2/6 Monthly

R.S.G.B. BULLETIN

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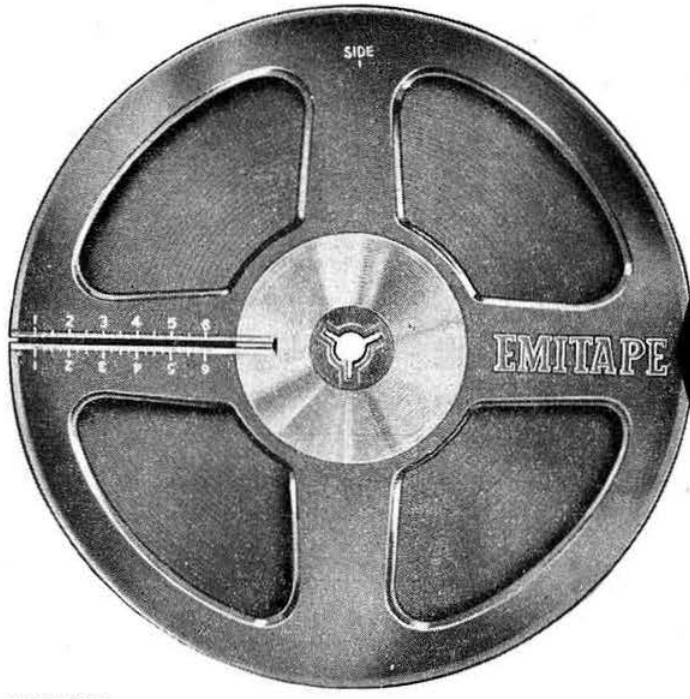

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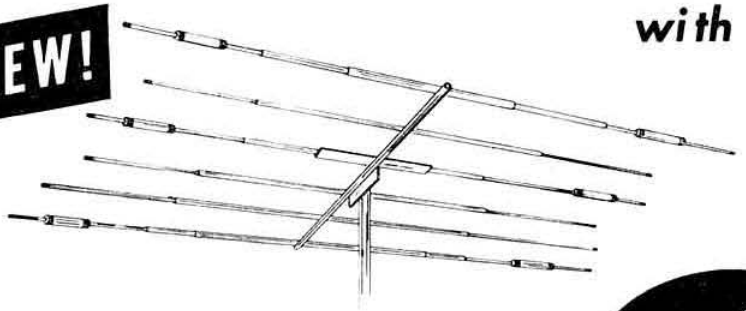

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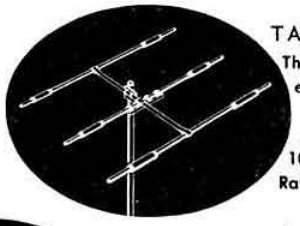

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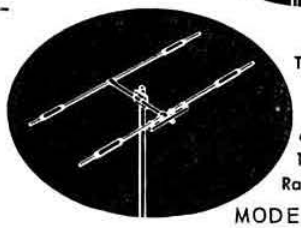

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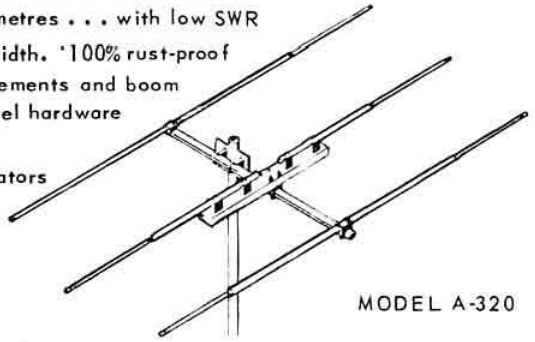

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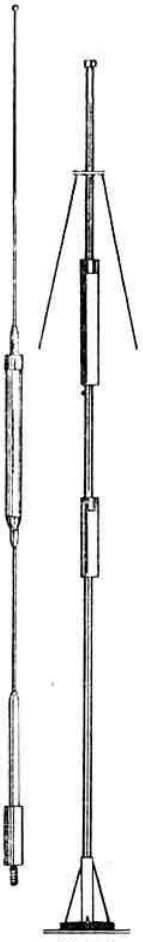

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Silent Key

W. R. METCALFE, G3DQ

IT is with great sorrow that we record the passing, on Christmas Day, 1960, of Mr. William Radcliffe Metcalfe, G3DQ, who was President of the Society during 1960.

Cliffe Metcalfe's progression to the Presidential Chair was remarkable. He became a member of the Council in January 1955 upon his election to the office of Zonal Representative for Northern England. Two years later, he was elected Honorary Treasurer, an office he held whilst still acting as a Zonal Representative. In January 1958 he became Executive Vice-President. A year ago on January 1, 1960, he succeeded Dr. Smith-Rose as President.

W. R. Metcalfe, G3DQ, President, 1960.

In November 1959 Mr. Metcalfe was taken ill and there was at that time some doubt as to whether he would be able to undertake the duties of President. However by March of 1960 he was able once again to participate in Society affairs.

In June 1960 Mr. Metcalfe attended the I.A.R.U. Region I Division Conference in Folkestone where he acted as host at the Reception given by the R.S.G.B. to visiting delegates. Later he presided at the end of Conference Dinner. In September he attended the Society's National Convention in Cambridge and took the chair at the dinner.

Visitors to the R.S.G.B. Radio Hobbies Exhibition in November 1960 were happy to greet Mr. Metcalfe on the Society's stand, during which time he met countless members and helped to enrol many newcomers to the Society. Shortly after the Exhibition ended Mr. Metcalfe entered St. George's Hospital, Hyde Park Corner, London, but with the knowledge that the Council was due to meet on December 15 and the Annual General Meeting was to be held on December 16 he insisted upon leaving hospital during the morning of the 15th. Few who attended the December Council meeting, which began at 6 p.m. and ended at 10.15 p.m., could have guessed that a few hours earlier their President had been in a hospital bed. Members who were present at the Annual General Meeting on the following evening must, however, have realized that Mr. Metcalfe was far from well and it may well have been because of that fact that the meeting progressed smoothly and briefly to the presentation of trophies which Mr. Metcalfe carried out in a cheerful and happy manner.

On the Tuesday before Christmas Mr. Metcalfe made what was to be his last visit to Headquarters. That he was ill was obvious to all but he spoke then with enthusiasm of his journey to Flamborough, Yorkshire, on the following day where he and Mrs. Metcalfe were to spend Christmas with their two sons.

Cliffe Metcalfe was a most enthusiastic radio amateur. Licensed before the last war he was a first class telegraphist but during recent years he used telephony a good deal on 3·5 Mc/s. For some time he was a member of the team of R.S.G.B. News Bulletin readers, helping to provide a service for listeners in the north-east of England.

Cliffe Metcalfe had many business interests ranging from marine engineering to the operation of a travel agency. He had travelled extensively and shortly before his death he had undertaken a business trip to Luxembourg. A jovial, kindly man, the Amateur Radio movement has lost much by his passing. The news of his death—first received on Boxing Day—came as a great shock to his many friends in the Society.

The funeral took place at Flamborough Church, Yorkshire, on Thursday, December 29, 1960, when the Council was represented by Mr. Philip H. Wade, G2BPJ (Zone A Representative) and Mr. F. K. Parker, G3FUR (Zone B Representative).

Mr. D. A. Findlay, D.F.C (G3BZG), Past President, and the General Secretary (Mr. John Clarricoats, O.B.E., G6CL), together with many local radio amateurs including Lt.-Col. A. C. Dunn (G2ACD), Mr. J. W. Swinnerton (G2YS), Mr. H. M. Rix (G5GX) and Mr. J. Hargreaves (G5VO) were also present.

The sympathies of all members are offered to Mrs. Eileen Metcalfe and to her sons, John and Richard. Letters for Mrs. Metcalfe can be sent via Lt.-Col. Dunn, 57 Promenade, Bridlington.—J.C.

A Top Band Transmitter using Power Transistors

By R. E. WOLPERS (G3LCB)*

ALTHOUGH transistors are being widely used in portable receivers and test equipment, little attention seems to have been given to their use for transmitting. This may be due to the fact that the h.f. type transistors so far available have only low power ratings and the output from a transmitter using these types will be very small. With such low power many stations can be contacted but communication with the more distant stations requires an efficient radiating system. If a system of only moderate efficiency is available, as may be the case when operating from a temporary location, then a more powerful transmitter would be an advantage.

With this idea in mind the development of such a transmitter was commenced, the resulting circuit being that shown in Fig. 1.

Circuit

The oscillator stage (TR1) uses a Reinartz v.f.o. circuit but by removing the short circuiting link from SK1 and inserting a crystal instead it becomes crystal controlled. Output is taken to the following stage from the emitter tap.

The first amplifier (TR2) operates as a class B common emitter amplifier with pre-set tuning in the collector circuit. Output is taken by the low impedance link winding L4 to the input of the next amplifier, a pair of XA104 transistors (TR3, TR4) in parallel for increased power.

This stage in turn feeds the first power amplifier in which an h.f. power transistor is employed as a common base amplifier. Due to the f_α of this type of transistor being only 2·5 Mc/s best efficiency is obtained by using it in this manner. It will give higher output power if used as a common emitter amplifier but with a much increased drain on the power supply. As in the previous stages output is taken by a link winding, in this case centre tapped, to the final stage, which operates as a common base class B push pull amplifier employing a pair of h.f. power transistors (TR6, TR7). The collector coupling windings remove d.c. from the tank circuit, permitting direct connection to the load.

Modulation

Adequate amplitude modulation, of communication quality, is provided by TR8. This is a class A common emitter amplifier choke coupled to the collector circuit of TR3 and TR4 and is brought into circuit by S1. For simplicity a carbon microphone is used although with a suitable pre-amplifier other types could be used.

A simpler method of transmitting speech (eliminating the need for TR8 and S1) is by the use of frequency modulation

* 19 Cedar Avenue, Sidcup, Kent.

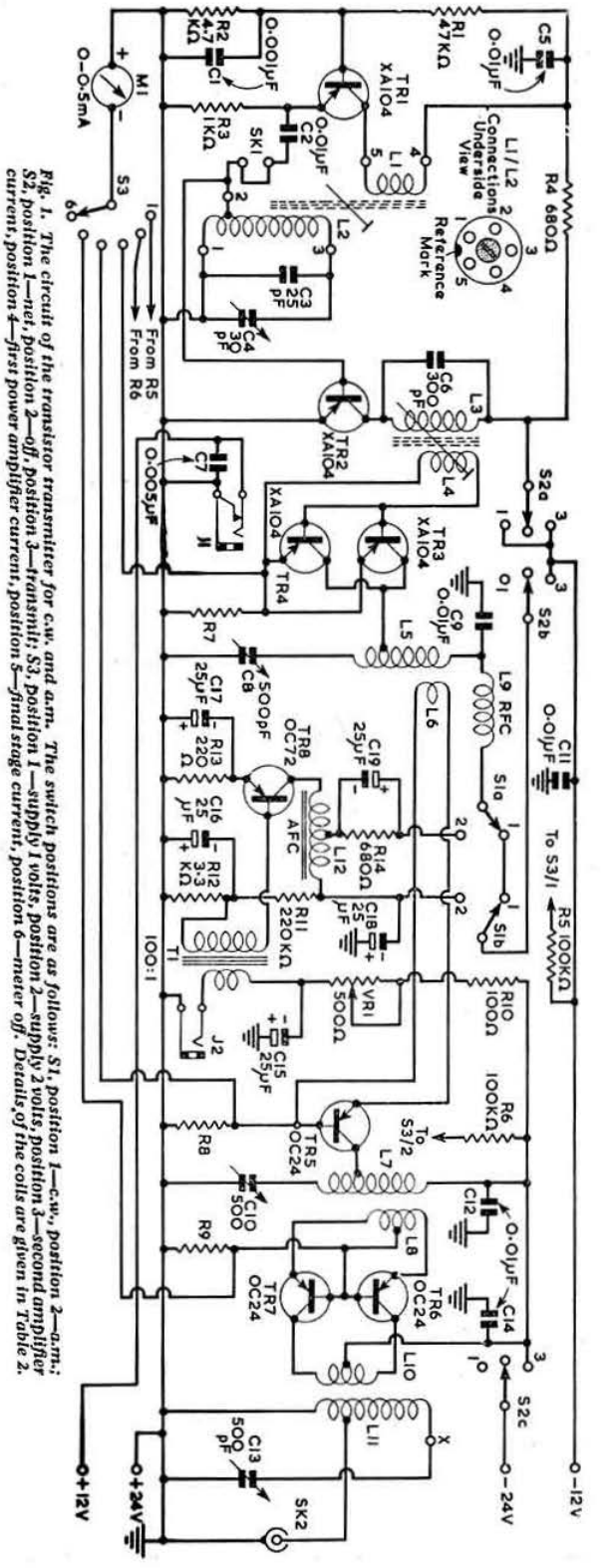


Fig. 1. The circuit of the transistor transmitter for c.w. and a.m. The switch positions are as follows: S1, position 1—c.w., position 2—a.m.; S2, position 1—net, position 2—off, position 3—transmit; S3, position 1—supply 1 volts, position 2—supply 2 volts, position 3—second amplifier current, position 4—first power amplifier current, position 5—final stage current, position 6—meter off. Details of the coils are given in Table 2.

with the alternative oscillator circuit shown in Fig. 2. In this case only v.f.o. control is possible.

Whichever phone system is used the key must be removed from J1 while on c.w. the microphone must be removed from J2 to prevent unwanted f.m. and unnecessary drain on the power supply.

Metering

A system of switched metering has been incorporated, enabling battery voltages and currents through the last three stages to be easily checked. The values of the meter shunts and multipliers depend on the meter used and are best determined experimentally by comparison readings on a

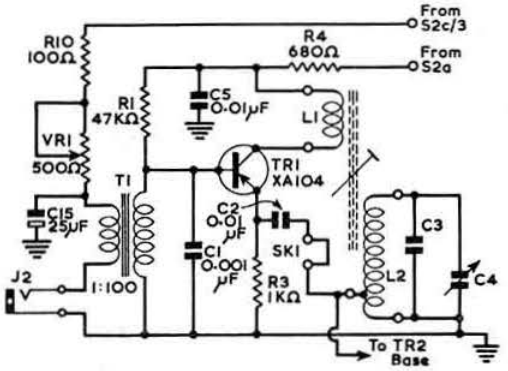


Fig. 2. Alternative oscillator circuit for n.b.f.m.

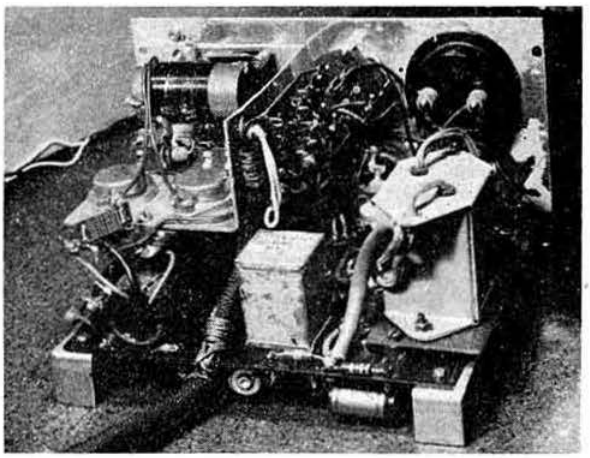
calibrated meter. It will be noted that R7-R9 are not decoupled.

An alternative method of metering would be to replace the meter shunts with closed circuit jacks and use a plug-in meter.

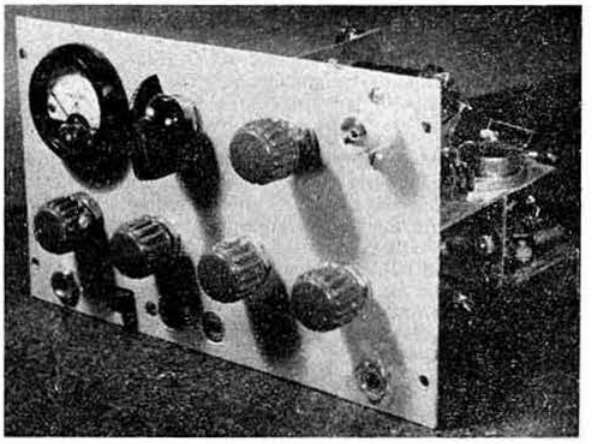
Power Supplies

It will be seen that two separate supplies of different voltages are used. The first three stages have a common 12 volt supply, the maximum permissible for the type of transistor used. On c.w., keying is carried out in the positive side of this supply at J1.

The second, 24 volts maximum, supplies the power amplifier and microphone circuits. If only crystal controlled



A rear view of the transmitter. Note the mounting of the power transistors on their heat sink.



The Top Band transmitter using power transistors.

operation is required then the whole transmitter may be operated from a single supply of 12 volts although output will be reduced.

Tuning

Before commencing to tune up the transmitter, an artificial load comprising a 1 watt 75 ohm non-inductive resistor in series with a thermo-couple r.f. ammeter should

TABLE I

Typical current readings obtained when operating the transmitter on 1900 kc/s into an artificial aerial.

Stage	Condition	
	A.M.	C.W.
Second amplifier	10 mA	16 mA
First p.a.	15 mA	30 mA
Final p.a.	40 mA	120 mA
75 ohm load	0·06 A	0·1 A

be connected across the output socket SK2. Currents up to 0·1A may be expected. Initial line up is carried out in the c.w. condition on 1950 kc/s. The second amplifier (TR3, TR4) should also be metered and the operating frequency monitored on a nearby receiver.

Providing the oscillator coil connections have been made correctly the cireuit will oscillate. Using the values given, and with suitable adjustment of the dust core, complete coverage of the band will be obtained with tuning capacitor C4. (When using crystal control C4 should be adjusted for maximum output.)

Tuning of the first amplifier (TR2) is pre-set by means of the variable dust core of L3 and is adjusted to give maximum output at 1950 kc/s, indicated by maximum emitter current in the following stage.

The second amplifier is tuned by C8 for maximum dip, i.e. minimum meter reading.

The two power amplifiers, tuned by C10 and C13 respectively, are adjusted to give maximum output into the load.

To check operation on a.m. telephony the modulator is brought into operation by S1. Emitter currents of the last three stages will drop and the output will be reduced. A sustained whistle into the microphone should produce a noticeable increase in output. If the output decreases then the value of R14 may need adjustment, depending on the characteristics of the a.f. choke L12. In the transmitter described this choke is centre tapped but the tapped primary winding of an output transformer would also be suitable.

The important feature is that the d.c. resistance should be low in order to prevent excessive reduction of power.

Typical current readings are set out in Table 1. Having obtained a satisfactory alignment into an artificial load a radiating load can be substituted.

Aerials

The low impedance tap brought out at SK2 is suitable for link coupling to an aerial tuner or for direct connection to a quarter wave Marconi aerial. If an end fed aerial of about a half wavelength long is available it may be connected to the top end of the tuned circuit L11/C13 at the point marked X. A centre fed half wave aerial would require a separate link wound over the earthy end of L11. An r.f. indicator, or absorption wavemeter, placed near the aerial, is the most suitable means of adjusting for maximum output whatever type of aerial is used.

Construction

Whilst it is not intended to give a detailed account of the construction a few brief notes may be useful.

The transmitter is built on a sheet of paxolin measuring 6 in. by 4¾ in. supported by two metal brackets which are fixed to the 6⅝ in. by 4⅛ in. metal front panel by clamping under the fixing bushes of J1 and J2. Paxolin was chosen in order to make possible a more convenient method of mounting components than if a conventional metal chassis were used. Anchorage poins for the smaller components are necessary. In the interests of compactness, it is also useful to be able to mount components both above and below the paxolin sheet. An easy way of doing this is to push a short piece of 16 s.w.g. tinned copper wire into a 1/16 in. diameter hole drilled in the paxolin so that it projects above and below. " Tags " made in this fashion can be used at any point where a soldered connection is to be made and will permit a layout similar to that found in printed circuit construction to be adopted. The oscillator coil has only short connection pins on the base and is intended for use in a printed circuit but if 1/16 in. paxolin is used and 1/16 in. diameter holes drilled in the same pattern as the pins, the coil will be a push fit and the pins will project sufficiently to enable soldered connections to be made.

The smaller transistors are soldered directly into the circuit but *great care must be exercised when doing so to avoid damage by heat*. Whilst soldering it is advisable to hold the transistor wires with a pair of pointed pliers to act as a heat shunt. Mounting of the power transistors should be carried out in accordance with the manufacturers' instructions. As the power dissipation is low the mounting brackets will act as small heat sinks. The mounting brackets are earthed so the transistor case, being the collector connection, must be insulated from the bracket by means of a mica washer. Connections to the base and emitter are by means of pins projecting through the case of the transistor and wires may be soldered directly to these pins but must be done very carefully. A more convenient method is to use small clips of the type intended for the anode connection of valves having a B3G type of base.

The bracket supporting the final stage is clamped on the front panel by the fixing bush of C13. Fig. 3 shows the positions of the larger components. Coil winding data is given in Table 2. Send/receive switch S2 has not been fitted on the transmitter, although this may be done, as it is intended to combine it with the aerial tuner when completed. The whole transmitter, excluding power supplies, fits into a metal case measuring 7 in. by 4½ in. by 4⅞ in. deep. In the writer's transmitter a case from an aircraft inter-com amplifier type A.1134 was used.

TABLE 2

Coil Winding Data

Coil	Turns	S.W.G.	Details	Diameter of Former
L1	—	—	} Teletron type FTO 4	—
L2	—	—		
L3	50	30	—	⅜ in. with dust core.
L4	12	26	over earthy end of L3	
L5	50	26	tapped at 10 turns	½ in.
L6	30	30	over earthy end of L5	
L7	40	26	tapped at 10 turns	⅞ in.
L8	15 + 15	30	over earthy end of L7	
L10	15 + 15	30	over earthy end of L11	⅞ in.
L11	40	26	tapped at 10 turns	

Wire is enamelled and turns are close wound

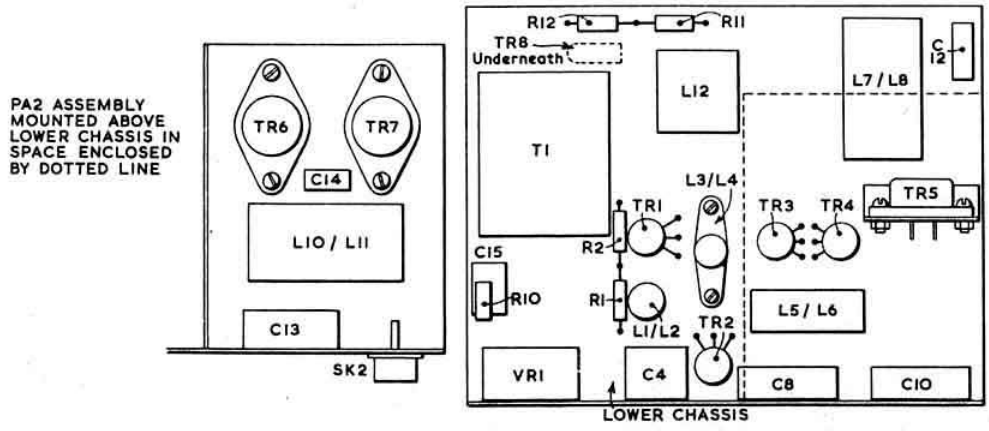


Fig. 3. The positions of the major components.

The European Band Plan

The Plan, which is voluntary and supported by all I.A.R.U. Societies in Europe, is as follows:

Frequency Band	Type of Emission
3500— 3600 kc/s	Telegraphy only
3600— 3800 kc/s	Telephony only
7000— 7050 kc/s	Telegraphy only
7050— 7150 kc/s†	Telegraphy and Telephony
14000—14100 kc/s	Telegraphy only
14100—14350 kc/s	Telegraphy and Telephony
21000—21150 kc/s	Telegraphy only
21150—21450 kc/s	Telegraphy and Telephony
28000—28200 kc/s	Telegraphy only
28200—30000 kc/s	Telegraphy and Telephony

†7100—7150 kc/s shared with broadcasting which has priority

Satellite Balloon Reflections

By O. J. RUSSELL, B.Sc.(Hons.), A.Inst.P. (G3BHJ)*

SOME notes on the feasibility of " balloon reflection DX " may be of interest, in view of the recent release of the *Echo 1* satellite.

In a previous article on moonbounce contacts [1] the writer showed that by applying the radar equation, it could be seen that moon reflection DX was just about the limit of amateur achievement. That is to say, it would involve high powers, very high gain aerial systems and exceptional receiver performance even to obtain a moon echo just above the noise. In fact, using 144 Mc/s transmitters running one kilowatt input, U.S.A. amateurs have been able to receive amateur moonbounce signals. Communication with such equipment is not exactly a simple matter, especially when receiver bandwidths of the order of cycles are involved.

With powers of a few kilowatts, and super high gain aerials such as those used at Jodrell Bank, communication even on phone is quite practical. However, this is not exactly the case for amateur conditions. Although the facts about the possibility of " balloon bounce " QSOs are readily deducible from the radar equation, a great deal of misunderstanding still exists. It is therefore interesting to examine the feasibility of balloon satellite contacts from simple straightforward considerations.

The radar equation may be simplified to the form:

$$P_R = \frac{K.\,P_T.A.G.\lambda^2}{D^4}$$

where P_T is the radiated power, P_R is the reflected power received, and G is the gain of the system in terms of aerial gain both on reception and transmission, D is the distance to the reflecting object, A is the area of the reflecting surface, λ is the wavelength and K is a constant.

This simplified equation reveals many interesting facts that are still the object of much misdirected argument in some circles. Thus the opinion is expressed that the balloon satellites are " too small " to be of any use to amateurs. On the other hand the "anti-highbrows" who are convinced that moon reflection DX is just around the corner for everyone, also ignore the implications of the radar equation.

One important point is that the received echo depends upon the fourth power of distance. Hence a balloon in an orbit 1,000 miles away will reflect per unit area some three thousand three hundred million times as much power as the surface of the Moon. This follows as the Moon is 240,000 miles away, so that the balloon satellite in a 1,000 miles orbit is 240 times nearer, and due to the fourth power law, reflection per unit area will be $(240)^4$ or $3{\cdot}3 \times 10^9$ times stronger than Moon echoes.

Moreover, the reflectivity of an aluminised balloon is pretty well 100 per cent while the Moon's surface is only about 17 per cent efficient as a reflector of radio waves. Hence there is a further factor of about six times in power reflected per unit area from the balloon satellite. A figure per unit area of some 2×10^{10} times improvement per unit area in reflected power may be expected from a satellite balloon in an orbit 1,000 miles overhead. An improvement of some twenty thousand million times, or 103db is not negligible: it is a colossal gain that even the most enthusiastic equipment manufacturer has yet to claim for a new product!

However, a balloon is very much smaller than the Moon and therefore it contains a lot less unit areas than the Moon. In fact, a balloon 100 ft. in diameter has approximately ten thousand million times less surface area than the Moon (i.e. some 10^{10} times smaller). Thus correcting for the difference in areas, the balloon echo becomes about twice as strong as a moonbounce echo (a power gain of, say, 3db). The figures given in the September BULLETIN for moonbounce versus a balloon echo show that there is a slight gain with a 100 ft. dia. balloon at a range of 1,000 miles as compared with a moonbounce. This confirms the above simple arithmetic very closely.

The situation *seems* little changed by the first balloon satellite. However, it should be noted that the *fourth* power of distance is involved, so that a balloon in a 500 mile orbit would give a gain of a further 2^4 or 16 times, that, is a further 12db. Thus, with a total gain of, say, 15db over a moonbounce QSO, the figures in the September BULLETIN (page 127) give a great deal of encouragement. With a 15db system gain over a moon echo and assuming a perfect receiver and an aerial consisting of a 16 ft. dish, about 100 watts of r.f. would be required to produce a 1296 Mc/s echo from a 100 ft. dia. balloon. In fact, had the first satellite reflector balloon been in a 500 miles orbit, U.S.A. experimenters on 144 Mc/s with a kilowatt rig could have progressed in one bound from deciphering weak " pings " from a roaring background of noise to solid QSOs. The successful balloon echo QSOs on 1296 Mc/s could probably have been phone contacts had the balloon been in a 500 mile orbit.

Similarly a balloon of 300 ft. dia.—a quite feasible increase at the present time—in a 1,000 mile orbit would have given some 9db increase in echo strength over the present 100ft. dia. balloon. This means that 100 watt stations would have been able to compete with kilowatt stations for balloon echo QSOs.

Finally, with a 300 ft. dia. balloon in a 500 mile orbit, a total gain of some 21db over a moon echo would be obtained. With this, a 10 watt 144 Mc/s station would be as well placed as a kilowatt station using moonbounce methods. In fact, larger balloons would start to introduce problems of double images on TV channels due to the intensity of reflection echoes.

It is clear, therefore, that the feasible gains with present satellite balloons used as passive reflectors have in fact now made DX contacts entirely feasible. The enthusiasts are thus justified in their belief that this possibility would some day eventuate. However, no rupture of established communication engineering theories is involved, and in fact established theories have been substantiated.

Reference

[1] " Problems of Moon Reflection Communication," O. J. Russell (G3BHJ). R.S.G.B. BULLETIN, November, 1954.

* *Manager, Mosley Electronics Ltd., 15 Reepham Road, Norwich, Norfolk. (Nor. 54M.).*

Satellite Balloon Reflectors

Additional Notes

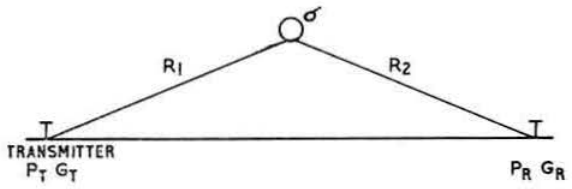
By G. M. C. STONE, Grad.I.E.E. (G3FZL)*

THE problem of moon bounce and satellite bounce communication has already been discussed above in practical terms by O. J. Russell (G3BHJ). These notes have been added to assist those who wish to calculate for themselves the equipment and aerial requirements for a given frequency band.

The radar equation, previously given in simplified form, as applied to moon or satellite bounce communication is [1]:

$$P_R = P_T.\,\frac{G_T G_R\,\lambda^2}{(4\pi)^3\,R_1^{\,2}\,R_2^{\,2}}\cdot\sigma$$

* *Chairman, Scientific Studies Committee.*



where G_T is the gain of the transmitting aerial over an isotropic source,
G_R is the gain of the receiving aerial over an isotropic source,
P_R is the minimum detectable signal power,
P_T is the transmitter power,
σ is the radar cross sectional area.

The minimum detectable signal power can be determined from $P_R = N.\ K.T_S B$

where N is the receiver noise factor (in power ratio, not db),
T_S is the effective noise temperature of the system in ° Kelvin,
B is the bandwidth in cycles,
K is Boltzman's constant $= 1{\cdot}38 \times 10^{-23}$.

The only uncertain quantity in this equation is T_S, the effective noise temperature of the system, because this will depend upon the part of the sky at which the receiving aerial is directed, the performance of the receiving equipment and also upon the frequency in use. According to Dimond [2] the average cosmic noise at 144 Mc/s is equivalent to about 1,500° K. and at 1296 Mc/s is less than 10° K. However, even at 144 Mc/s the figure is considerably less than 1500° K. in " cold " parts of the sky, i.e. outside our galactic plane and away from powerful radio star sources. The effective noise temperature for Earth/Space communication according to Dimond can be determined from the equation—

$$T_S = [T_G + T_{BL}] + [(L_o^{-1})\ T_o] + [T_e\ L_o]$$

where T_G is the galactic background radiation field, cosmic noise,
T_{BL} is produced as a result of the inefficiency of the aerial in directing its entire pattern into the forward direction (back lobes intercepting the earth as a thermal reservoir),
L_o is the composite losses of the passive hardware of the system,
T_e is the effective temperature of the active circuits,
T_o is 290° K.

For the calculations shown on page 127 in the September BULLETIN an effective overall temperature of 290° K. was used for both the 144 and 1296 Mc/s calculations. Other factors that will influence the effective noise temperature are noise radiation from the earth, and of much more serious consequence, from the sun.

The radar cross sectional area in the case of the *Echo 1* satellite balloon is $\frac{\pi D^2}{4} \times 0{\cdot}98$ (98 per cent reflection efficiency), i.e. 715 square metres.

In the case of the moon the reflection efficiency is of the order of 10-17 per cent and a figure of 10^{12} square metres is approximately correct. To compare the efficiency of the moon with a 100 ft. dia. satellite balloon at a range of 1,000 miles these figures can be substituted into the radar equation simplified to

$$P_R = K.\ \frac{\sigma}{R^4}$$

where K is a constant.

The results are:

$$\textit{Moon}: P_R = K.\ 0{\cdot}465.\ 10^{-22}$$
$$\textit{Balloon}: P_R = K.\ 1{\cdot}09.\ 10^{-22}$$

i.e. the signal from the balloon will be twice as powerful as the moon echo (this assumes the same transmitting and receiving points). For a contact over a 2,000 mile baseline the moon reflection total path length is almost unchanged. However, in the case of the satellite the path length has increased considerably and thus:

$$\textit{Balloon}: P_R = K.\ 0{\cdot}23.\ 10^{-22},$$

i.e. for long distance communication the moon is a more effective reflector. Incidentally, the figures given on page 127 of the September BULLETIN for moon bounce communication are optimistic by a factor of approximately ten as an incorrect figure for moon reflection efficiency was used.

A further problem which has not so far been discussed is that of Doppler shift. This causes the reflected frequency to differ from the transmitted frequency by—

$$f_R \simeq f_T \left(1 + \frac{V_T + V_R}{C}\right)$$

where V_T is the relative velocity of the moon/balloon at the transmitting station,
V_R is the relative velocity of the moon/balloon at the receiving station,
C is the velocity of light,
f_R is received frequency,
f_T is transmitted frequency.

The maximum Doppler shift caused by the relative velocity of the moon with respect to the earth (980 m.p.h.) is 426 c/s at 144 Mc/s and 3840 c/s at 1296 Mc/s. The rate of change of Doppler shift is so slow that no difficulty is experienced when communicating from one station to another even with 100 c/s receiver bandwidth. However, in the case of satellite reflection communication, the rate of change of Doppler shift will be considerable since the actual velocity of the *Project Echo* balloon is about 6·7 km./sec. and will change from near maximum approaching to near maximum receding velocity in about 10-15 minutes. Since the receiver bandwidth has to be kept to a minimum to reduce noise, there will be some difficulty in finding a signal in the first instance and it will be necessary to keep the receiver tuning moving in step with the changing Doppler shift. The maximum Doppler shift theoretically possible is 12·8 kc/s on 144 Mc/s and 115 kc/s on 1296 Mc/s; however the satellite will be out of contact range for these maxima although about two thirds of the total would be observed during the period required for a contact.

The final point to be considered is the actual orbit of a satellite balloon. In the case of *Echo 1*, the orbit is inclined at approximately 47° to the equator and initially the balloon was 1,000 miles above the earth's surface. This means that at its most northerly excursion the satellite will be overhead at a latitude of 47° N, i.e. over central France. Thus at its nearest point the balloon will be some 1,200 miles slant range from, say, London. If contact is to be established between two stations then the system parameters must be such that contact can be established when the satellite is at least 1,500 miles away, since it is moving at about 250 miles per minute.

References

[1] " Allocation Problems with Satellite Relays " F. E. Bond, C. R. Cahn, H. F. Meyer, *Proc.I.R.E.*, April 1960.

[2] " Interplanetary Telemetering " Robert H. Dimond, *Proc.I.R.E.*, April 1960.

Series Valve Screen Feed Circuits*

By G. D. ROE (G3NGS)†
and G. M. C. STONE, Grad.I.E.E. (G3FZL)‡

WHEN constructing medium or high powered r.f. amplifiers many amateurs lightly dismiss the problem of feeding the screen by employing a resistor from the h.t. supply although reference to valve characteristic curves will show that for optimum performance the screen voltage must be critically set and must maintain the same value over wide ranges of anode current. These conditions are certainly not fulfilled by a simple resistive dropper.

The requirement for a source of unvarying potential is met by a d.c. coupled cathode follower of the type shown in Fig. 1. The output is of low impedance, being approximately

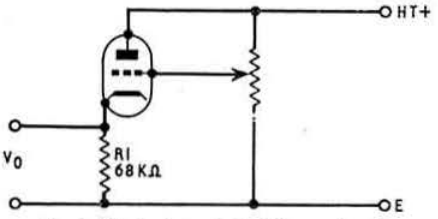


Fig. 1. The basic cathode follower circuit.

equal to $1/gm$ and so current variations affect the voltage output (V_o) only slightly. The output voltage can be easily adjusted by varying the voltage on the control grid of the cathode follower. Most of the common triodes and pentodes may be used, valves such as the SP61, EF50, 6V6 and 6AG7 being quite suitable, though it should be remembered that the

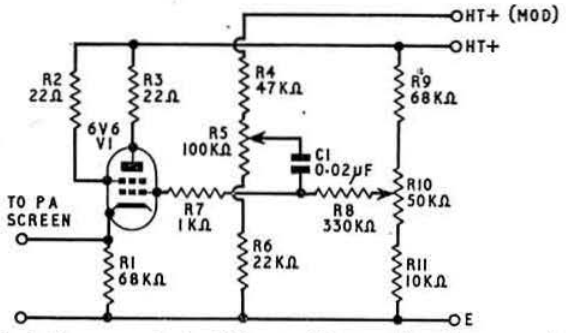


Fig. 2. Screen supply circuit for use with an anode and screen modulated p.a. employing a QQV06/40 valve running 100 watts input.

valve selected must be capable of carrying more than the p.a. screen current.

The basic cathode follower circuit may be modified to perform a number of other functions. In a normal anode and screen modulated p.a., unless the correct setting is fortuitously achieved, the anode current will vary with modulation indicating that either the screen is modulating more than the anode or vice versa. This will cause one electrode to overmodulate before the other and perfect 100 per cent. modulation will be unobtainable. However, if a circuit such as that shown in Fig. 2 is employed the p.a. input meter can be made to kick up, remain steady, or kick down with modulation, depending on the setting of R5. The correct setting is of course the one under which the anode current remains steady.

It should be remembered that an r.f. indicator will still kick upwards under modulation. By adjusting R5 and R10, a correctly modulated signal of the desired power can be attained. The circuit has proved particularly useful in feeding valves such as the 4X150A which, under some loading conditions, may draw negative screen current, and would therefore be damaged if a dropper resistor from the h.t. line were used for the screen supply. R9 and R11 should be selected so that the correct screen voltage is produced with R10 in its midway position. Similarly R4 and R6 should be such that the point of correct modulation occurs with R5 in its mid-position. The example values given in the diagram are those used by G3NGS in conjunction with a QQV06/40 valve running 100 watts input on 144 Mc/s.

Keying the p.a.

It is common practice, especially on the v.h.f. bands, to key the p.a. by removing the screen supply voltage, although frequently the p.a. valve cannot be completely cut off until a negative potential is applied to the screen. This may also be achieved by using the cathode follower. In this case (Fig. 3), with the key up, the cathode follower is cut off by connecting the control grid to a supply more negative than that

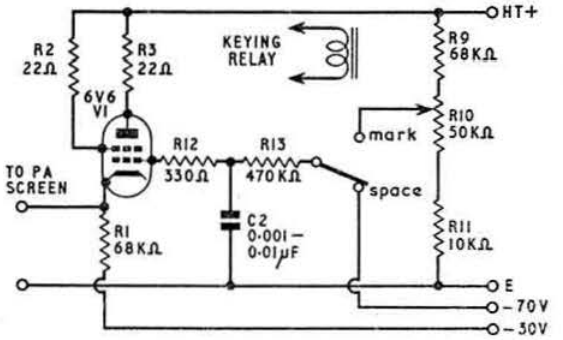


Fig. 3. Cathode follower screen feed arrangement incorporating provision for screen keying of the p.a. valve. The values shown are for example only.

connected to the end of R1. Under these conditions the cathode follower is not conducting and the screen of the p.a. valve takes up the negative potential, ensuring complete cut off. When the key is depressed the control grid of the cathode follower is connected to a positive supply which causes the valve to conduct, producing a voltage across R1, thereby returning the p.a. screen voltage to its correct value. The keying characteristic may be adjusted by altering the values of C2 and R13 until the desired time constant is obtained. By means of switching the circuits of Figs. 2 and 3 may be combined to give a circuit suitable for a phone/c.w. transmitter.

The circuits described are capable of greatly improving the performance of amateur band transmitters but two important points must be borne in mind. First, not many valves have a heater cathode insulation of more than 90 volts, so a separate heater supply must be provided for the cathode follower, the heater being connected to the cathode through a 100 K ohm resistor. The second very important point is the selection of the h.t. voltage for the cathode follower. Normally the transmitter h.t. will be satisfactory but the voltage drop across the cathode follower must be sufficient to allow the screen current of the p.a. valve to flow through it.

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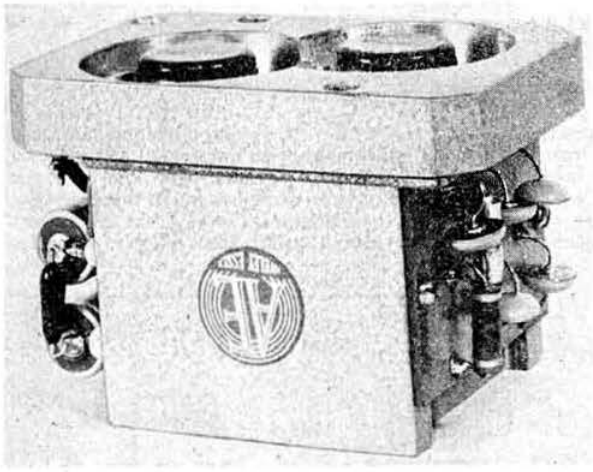
* A revised version of an article by G. M. C. Stone (G3FZL) in the *Proceedings of the London U.H.F. Group*, Summer 1956.

† *16 Dorchester Drive, London, S.E.24.* ‡ *10 Liphook Crescent, Forest Hill, London, S.E.23.*

The Aveley Transistorized Power Supply

FOR some time a good deal has been heard in amateur circles about the advantages of transistorized power supplies for portable and mobile operation, but comparatively few operators have, in fact, installed such units. The reason probably lies in the difficulty of obtaining suitable components for home construction and the relatively high cost of most manufactured types.

It was with great interest, then, that an Aveley type



The Aveley d.c.-to-d.c. converter. The toroidal transformer is housed within the diecast casing.

5AC12 d.c.-to-d.c. converter rated at 45 watts output was obtained for review. With an output voltage between 200 and 300 volts, it is therefore suitable for powering a complete mobile station. As the photograph shows, the construction of the unit differs from that adopted in more conventional designs. It measures only 3⅜ in. × 2½ in. × 2¼ in. overall, and weighs 20 oz. The unit uses a toroidal transformer tapped for 200 250 or 300 volts, a pair of Mullard OC35 transistors and silicon rectifiers.

It is generally considered that the high efficiency of transistor type power supplies can only be obtained when maximum output is being drawn. In other words, that the efficiency varies inversely in relation to the output. As Fig. 1 indicates this was not so with the unit tested. The graph was in fact prepared from readings obtained with nine variations

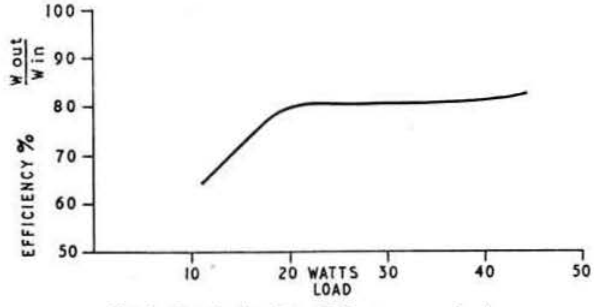


Fig. 1. Graph showing efficiency versus load.

of load with input voltages of 12·5V from a car battery (simulating stationary operation) and 14·5V, with the engine running and the battery charging. No damage to the transistors occurred even when the engine was running very fast.

At loads of more than 35 watts, the heat sink became warm and adequate ventilation would appear to be necessary if it were intended to operate the converter at loads approaching maximum.

The regulation and efficiency were found to be superior to other transistorized converters that have been used in the past.

The supply was found to be quiet in operation and the whine so slight that it would be hardly audible if the unit were placed in the glove compartment of a vehicle in motion. There was no radio interference on amateur frequencies up to 28 Mc/s.

Aveley transistorized power supplies are manufactured by Aveley Electric Ltd., South Ockendon, Essex. The retail price of the model tested—the type 5AC12—is £11 10s.

A leaflet describing new pocket dispensers for **Electrolube** is obtainable from the Technical Manager, Electrolube Ltd., Oxford Avenue, Trading Estate, Slough. Electrolube is now available in two grades: No. 1, for "non-arcing" contacts, which cleans and lubricates contacts and mechanisms; No. 2, for "arcing" contacts, is for the lubrication of cleaned contacts. It is suitable for use on valve pins, switches, relays, potentiometers, plugs and sockets, etc. Flow of the fluid from the new dispensers is accurately controlled by the amount of pressure on the nylon reservoir body.

Beryllium copper **clips for transistors** which also act as heat sinks are now available for the OC72, OC170 and SB345 types. The clips can be easily fitted horizontally to circuit boards through ⅛ in. diam. holes. A descriptive leaflet may be obtained from the Lewis Spring Co. Ltd., 122 High Holborn, London W.C.1. The firm also manufacturers valve retainers and spring loaded terminals.

Pamphlets describing Adamin and Litesold **soldering irons** are available from Light Soldering Developments Ltd., 28 Sydenham Road, Croydon, Surrey. The Adamin range comprises micro soldering instruments and is a new addition to the firm's products. A 55 watt Litesold model has been recently introduced.

A comprehensive price list of Lucas **silicon diodes** is available from G. & E. Bradley Ltd., Electral House, Neasden Lane, London, N.W.10. Supplies are available to R.S.G.B. members at normal trade prices but orders should be accompanied by a remittance.

Multicore Solders Ltd., now offer self adhesive Bib Tape labels for titling and identifying reels of recorded tape at 2s. 6d. a packet of 24 mounted on a backing sheet.

R.E.E. Telecommunications Ltd., Telecomm Works, Market Square, Crewkerne, Somerset, are now manufacturing a **transistorized p.a. amplifier** Type TA/2. The unit is capable of 20 watts output, the consumption from a 12 volt battery being 1 amp on average speech. The amplifier costs 30 gns. and is supplied complete with a moving coil microphone.

Texas Instruments Ltd. have announced a number of **new types of transistors** which are available. These include the 2S701/2, silicon general purpose industrial types; the 2G301/2/3/4, germanium alloy switchers; the 2N696/7, silicon diffused base medium power types which have a cut off frequency of 40 Mc/s and a total dissipation of 2 watts; the 2N716/6, a silicon diffused base mesa series designed for amplifier and v.h.f. output stages which will deliver 50 mW at 200 Mc/s. Also available is the 1S101 series of diffused silicon rectifiers with ratings between 200 and 800 p.i.v. at 750 mA. Further details and prices are obtainable from the manufacturers at Dallas Road, Bedford.

Recent Activity on Christmas Island

By S/Ldr. A.G. GODFREY (G3DAF, ex-VR3Z)*

AMATEUR Radio transmissions recommenced from Christmas Island (Zone 31) in the Pacific Ocean in September 1959. First to receive a licence from Tarawa, capital of the Line Islands Colony, was VR3V, Don Grafham (G3MKG), closely followed by VR3W, Ron Woodward (D2LV). Then came VR3X, Roy Hathaway (G3JHI, DL2MP); VR3Y who left before getting on the air and finally VR3Z, "Jumbo" Godfrey (G3DAF, DL2MZ). Between them they kept VR3-land on the air from September 26, 1959, when VR3V started, to May 8, 1960, when VR3W went QRT. Unfortunately Ron was the last to have a licence but there is hope for the future.

Between them they made nearly 2,000 QSOs with stations in all continents, all United States and over a century of countries. Notable achievements include VR3V's WAC in 2 hours 29 minutes in one evening! Rare calls include UA1KAE/6 from Antarctica, LA3SG/P, CN8LO/MM in the yacht *Eole* on a single-handed round-the-world trip using 25 watts from Tahiti, VK9AU using 9 watts from Papua and KR6IG using 7 watts from Okinawa. Other notable QRP stations were VK3NC with 8 watts, JA4VQ with 16 watts and JA7KX with 20 watts. European calls were scarce and only 26 G QSOs were obtained. These included G3AAE(2), G3AAM(13), G2DC, G8KS, G6XB, G6RH, G6ZO(2), G2DPY, G2FXB, GI3IVJ, GM3ITN and GM3EST.

In the early days several attempts were made to use phone but it was soon apparent that 30 watts could not compete for DX in the Pacific bordered by California kilowatts. Thus the majority of QSOs were on c.w. on 20m. Maybe an apology is due for some of the Morse! VR3W did however make about 350 phone QSOs in the Pacific area.

Mouth Waterers!

Equipment

The first transmitter was taken to the island by VR3X. It was a 6L6 crystal oscillator driving an 807 final to give 30 watts on phone and 50 watts on c.w. The modulator used 6SJ7, 6J5 and push-pull 6V6s and a dynamic mike. This transmitter had already given good service at G3JHI and DL2MP. Later it was supplemented by a rusty, salt-coated, whiskery Panda 120-V which, after a period of service as the main transmitter of the Christmas Island Broadcasting Service on 1450 kc/s, had been extensively re-modified to give about 100 watts on 20m c.w. This set had an initial rate of frequency drift of about 150 kc/s in the first hour whilst the moisture dried out of the coral dust and salt. Fortunately the drift was upwards so an automatic band sweep was achieved by starting at 14 Mc/s and in an hour arriving at 14·15 Mc/s without touching a control. Some customers found the initial rate of drift a bit too much for them. The note was doubtful and never really deserved the T9s which were given; sometimes T4 would have been generous praise!

The receivers used were AR88s peaked up on 15, 20 and 40m. Very good they were too although it was sometimes a little hard to sort out one station from 50 callers.

Aerials

A variety of aerials were tried. Long wires, ground planes of various construction, cubical quads (the spider for which was made by John Franklin and the 5A2CV gang and sent

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round the world for our use), ZL specials, dipoles and finally a 4 element 20m beam. The material for the beam was given by the KH6 members of the Hickam (Hawaii) M.A.R.S. outfit. The first quad was made of aluminium angle bolted together and lashed to the spider. When it blew down the four booms on one side were used as the ground plane and one boom from the opposite side as a vertical radiator. Next a 20m vertical was mounted on the roof of the shack and the aluminium roof used as a ground plane. This was the best and most used aerial for DX. In late March the beam came into use; as a W/K rejector rather than as a normal beam.

High Temperature Shack

Operating conditions were not ideal. The shack was an aluminium roofed wooden building built of packing crates. The surface temperature of the roof reached 140° F. in the sun, but normally a sea breeze kept the air temperature below 95° F. and the temperature in the shack rarely went above 85° F. On the other hand it never went below 72° F. and with humidity varying from 70 to 100 per cent the operator sat in a pool of sweat—and was ultra-sensitive to voltage leaks. Normal dress was shorts and flip-flops (foot type). the rig was operated between 20.00 and 01.00 hours local time (05.00-10.00 G.M.T.) on every night possible. At weekends it was sometimes possible to open up at other times.

A diesel-electric set supplied the power so the first job was to service and start the engine and get as near as possible to 50 c/s and 230 volts. The volts drop along the line depended a lot on the weather and degree of humidity. Often the site cat used to walk clear of certain areas where it had previously found a tingling sensation. A tropical downpour could cause massive voltage variations which detracted from the quality of our note. It also made such a noise on the roof that signals were unreadable. As soon as it was running smoothly all that was left to do was to send a CQ call to show VR3-land was on the air. Anything up to 50 simultaneous replies would result. The technique was then to sit back and wait for the hullabaloo to die down before selecting the wise guy who was sitting 10 kc/s up. Then followed a period of 10 to 15 QSOs an hour until the exhausted operator staggered out to shut down the power plant, jump in his Landrover and seek refreshment at the bar!

Great fun, satisfying in the knowledge that many fellow amateurs were logging a rare one; interesting in plotting the 20m fade across the world; infuriating at times when the big boys came in synchronously with a QRP man's last call. These were logged and black-listed. A 9000 mile QRP DX QSO means more than a 3000 mile kilowatt contact to most of us who get the chance to operate a rare 'un for a time. And long may that be so.

Grafton Radio Society Christmas Party

A HIGHLY successful Christmas Party, attended by more than 80 members and friends, took place on December 17, 1960, at Mozart House, Stoke Newington, London, N.16. The party was organized by A. W. H. (Bert) Wennell, G2CJN (Honorary Secretary of the Grafton Radio Society) with the active support of Pat Beresford, G3AFC (Chairman) and H. Mulcahy, G3JVV (Vice-Chairman). Guests of honour were Mr. P. I. Nicholson (Assistant Manager, Mullard Films and Lectures Organization) and Mrs. Nicholson, May Gadsden and the General Secretary of the R.S.G.B.

During the evening Mr. Wennell made a presentation to Miss Gadsden to mark the Society's appreciation of her services to Amateur Radio over a period of more than 30 years.

Bands Available

THE following is a summary of the bands in which amateur operation is permitted. The table also shows the maximum power input and types of emission allowed to holders of Amateur (Sound) Licences. Holders of Amateur (Sound Mobile) Licences are permitted to operate under the same conditions.

Frequency in Mc/s	Maximum d.c. input (Watts)	Types of Emission
1·8–2·0	10	A1, A2, A3, A3a, F1, F2 and F3
3·5–3·8	150	A1, A2, A3, A3a, F1, F2 and F3
7·0–7·150†	150	A1, A2, A3, A3a, F1, F2 and F3
14·0–14·35	150	A1, A2, A3, A3a, F1, F2 and F3
21·0–21·45	150	A1, A2, A3, A3a, F1, F2 and F3
28·0–30·0	150	A1, A2, A3, A3a, F1, F2 and F3
70·2–70·4 *	50	A1, A2, A3 and A3a
144·0–144·5	150	A1, A2, A3 and A3a
144·5–145·5	150	A1, A2, A3, A3a, F1, F2 and F3
145·5–146·0	150	A1, A2, A3 and A3a
420–460	150	A1, A2, A3, A3a, F1, F2 and F3
1215–1325	150	A1, A2, A3, A3a, F1, F2 and F3
2300–2450	150	A1, A2, A3, A3a, F1, F2 and F3
2350–2400	25 (mean) and 2·5 kW peak	P1, P2d, P2e, P3d and P3e
5650–5850	150	A1, A2, A3, A3a, F1, F2 and F3
5700–5800	25 (mean) and 2·5 kW peak	P1, P2d, P2e, P3d and P3e
10000–10500	150	A1, A2, A3, A3a, F1, F2 and F3
10050–10450	25 (mean) and 2·5 kW peak	P1, P2d, P2e, P3d and P3e

* Licensees living north-west of the line Firth of Lorne to the Moray Firth may only use the 70·3-70·4 Mc/s portion of the 70·2-70·4 Mc/s band.

† 7·1–7·15 Mc/s shared with broadcasting which has priority.

Types of Emission

IN accordance with regulations drawn up at the Atlantic City Radio Conference in 1947 all emissions are designated according to their classification and the width of the frequency band occupied by them and are classified and symbolized according to the following characteristics: (1) Type of modulation. (2) Type of transmission. (3) Supplementary characteristics.

Types of Modulation	Symbol
(a) Amplitude	A
(b) Frequency (or Phase)	F
(c) Pulse	P
Types of Transmission	
(a) Absence of any modulation intended to carry information	0
(b) Telegraphy without the use of modulating audio frequency	1
(c) Telegraphy by the keying of a modulating audio frequency or audio frequencies or by the keying of the modulated emission (special case: an unkeyed modulation emission)	2
(d) Telephony	3
(e) Facsimile	4
(f) Television	5
(g) Composite transmissions and cases not covered by the above	9
Supplementary Characteristics	
(a) Double sideband, full carrier	(none)
(b) Single sideband, reduced carrier	a
(c) Two independent sidebands, reduced carrier	b
(d) Other emissions, reduced carrier	c
(e) Pulse, amplitude modulated	d
(f) Pulse, width modulated	e
(g) Pulse, phase (or position) modulated	f
As an exception to the above principles, damped waves are designated by	B

Types of Emission Available to U.K. Amateurs

From the above information, the meanings of the various types of emission available to British radio amateurs may be ascertained. Examples are as follows:

A1	Telegraphy without the use of modulating audio frequency (on-off keying).
A3	Amplitude modulated telephony, double sideband, full carrier.
A3a	Amplitude modulated telephony, single sideband, reduced carrier.
F3	Frequency modulated telephony.
P1	Pulse modulated telegraphy without the use of modulating audio frequency.

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

THE past month has produced a worthwhile amount of DX on the h.f. bands but there have also been some very poor periods. On occasions, the 14 Mc/s band has remained open in a Westerly direction until the small hours but on other days this band has been completely devoid of DX signals by 19.00 G.M.T. 28 and 21 Mc/s have been similarly affected but when the trans-Atlantic path has been closed on the latter band, the North-South path has produced some very interesting signals. From the Persian Gulf area MP4BBW reports European signals dropping out between 16.00 and 19.00, with the skip favouring South, Central and North America as the day proceeds. Generally it has been quite impossible to forecast evening conditions.

Sunspots

The predicted sunspot number issued by the Zurich Solar Observatory for January 1961 is 101 and it is opportune to review the progress of the present cycle (No. 19) which has produced the most intense solar activity since records have been kept. The beginning of the present cycle is generally accepted as April 1954 with a number of three, which rose to 23 in the same month of 1955, followed by 119 in 1956, 181 in 1957, 197 in 1958, reaching the peak figure of 201 in November 1958. April 1959 produced an activity number of 159 which fell to 121 in April 1960. Whilst the sunspot number is not a guide to day-to-day conditions it will give a good indication of the average propagation to be expected. At the present time conditions on the l.f. bands are improving, with ZL and KH6 worked on 3·5 Mc/s, whilst there is still plenty of good DX to be heard on 28 and 21 Mc/s. It appears, therefore, that *M.O.T.A.* should continue to remain in business for some while yet!

News from Overseas

MP4MAH is now active from the Sultanate of Muscat and Oman on 14 Mc/s, c.w. and a.m. 'MAH, whose address appears in *QTH Corner*, also holds the call VU2TA.

From ZD2FNX we learn of the new prefix allocations for the **Federation of Nigeria** which took effect from 00.01 on January 1, 1961. 5NA-5OZ all fixed stations; 5NAA—5OZZ maritime mobile service; 5NAAA—5OZZZ aeronautical mobile stations; 5N2 (followed by two or three letters) amateur stations; 5O2 spare.

5A2CX is the call now held by ex-ZC4RJ who is active from Benghazi on 28, 21 and 14 Mc/s a.m. Address in *QTH Corner*.

K6BX, Clif Evans (Box 385, Bonita, Calif.), is sponsoring a scheme whereby *Call Books* up to three years old are sent to stations outside the U.S.A. Up to the present Clif has made arrangements for some 2,000 *Call Books* to be despatched to overseas stations but still has about 1,000 requests on file. If any reader has a *Call Book* for disposal a line to K6BX will bring the name and address of a suitable recipient. The *DX-QSL-News Letter* is a new project launched by K6BX. This quarterly publication lists overseas and A.R.R.L. QSL Bureaux, and also the calls of nearly 1,000 stations and their QSL managers, together with various items of DX interest. The annual subscription is $1.50.

Every week the " Voice of America " broadcasts the *VOA Amateur Radio Programmes* which are written and presented by W2SKE. Radiated on a number of frequencies they can usually be best heard in the U.K. on Sundays on 3980 and 6185 kc/s from 21.15 to 21.30, and on 173 and 1196 kc/s from 22.15 to 22.30.

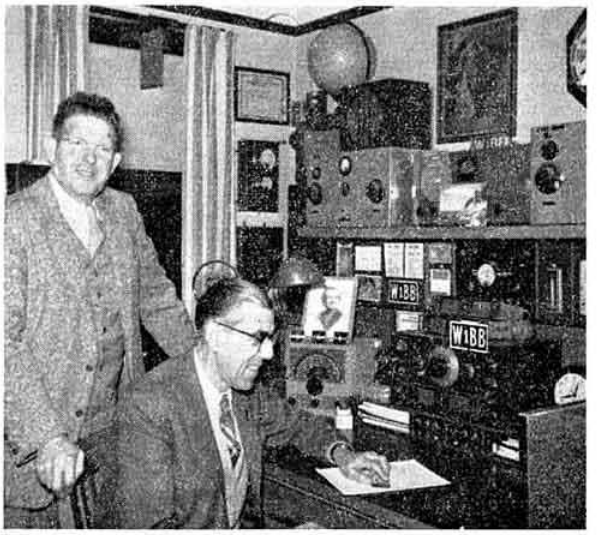
The **Cyprus** situation is that there are two Base Areas held in perpetuity (not on lease) by the British Crown—the Akrotiri Base Area and the Dhekelia Base Area. These are about 50 miles apart with Republic of Cyprus territory intervening. ZC4AK and ZC4SC are active from the Akrotiri Area and ZC4s 'GT, 'PC, 'SJ and 'SS from the Dhekelia Area. The issue of radio licences is still the province of the Republic and therefore no alteration has taken place in so far as the prefix is concerned. In addition to the above there are at lease six other stations active from the Republic.

DXCC News

There are three new country listings which become effective for DXCC credit from March 1, 1961: **Kaliningradsk Region** (UA2), for contacts after November 15, 1945; **Mali Republic** (FF8), for contacts after June 20, 1960; **Senegal Republic** (FF8), again after June 20, 1960. The Mali Federation listing is now deleted but credit will be transferred to the current list for either Senegal or the Mali Republic.

From W6YY it is learnt that the A.R.R.L. has decided **not** to give country status to the British Sovereign Area of Cyprus in view of the unstable nature of military bases from a long term point of view, and to consider such bases as creditable toward the country in which they are in. Does this mean that Guantanamo Bay (KG4) will now be considered as part of Cuba?

The A.R.R.L. have recently issued their annual list of the



W1BB and G6CJ discuss Top Band DX prospects during the latter's recent visit to the U.S.A. and Canada.

** Please send all reports to R.S.G.B. Headquarters to arrive not later than January 19.*

DXotic Showcase

Call-sign	kc/s	Mode	G.M.T.	Country
7G1A	28,030	c.w.	10.55	Rep. of Guinea
BV1US	21,430	s.s.b.	09.20	Formosa
HK0HCA	21,410	s.s.b.	12.38	San Andres Is.
FB8ZZ	14,068	c.w.	16.50	Amsterdam Is.
KW6CP	14,315	s.s.b.	15.45	Wake Is.
W8OLJ/PK	14,322	s.s.b.	14.02	S.S. Hope
EP1AD	7,005	c.w.	22.05	Iran
UA0KAE	7,005	c.w.	04.15	U.S.S.R. Zone 19
6O2GM	7,020	c.w.	21.50	Somalia
YV5BJ	3,510	c.w.	07.15	Venezuela
ZL2FT	3,505	c.w.	07.30	New Zealand

members of the **DX Century Club,** from which it is seen that the top ten U.K. stations, with the number of countries confirmed, are: 293 G2PL, G3AAM; 291 G4CP; 285 G6ZO; 278 GM3EST; 271 G3YF; 265 G5VT; 262 G3AAE; 261 G3DO, G6RH.

DXpeditions

From January 23 to 27 G6ZY will be operating from Gibraltar under the call **ZB2I** using a KWM-2. The preferred frequencies will be 14,300, 21,390, 28,650 and possibly 3,780 kc/s. G6ZY makes periodical trips to ZB2 and if this first sortie is successful the equipment will be taken along on subsequent visits.

HK0TU will be the call of an all band all modes operation from Malpelo Island expected to begin around January 17.

9N1GW will not now be making a trip to East Pakistan, but **VQ9TED** hopes to be able to visit some of the islands which W4BPD had included on his visiting list before bad weather intervened. S.s.b. operation from VQ7 appears high on the list of priorities.

FF8CW, operated from Senegal by DL9KR, was active on December 8 to 10 on 14 and 21 Mc/s, and a further period of operation will probably take place early in 1961. **ZD2AMS** has the intention of visiting FD8 again during 1961, and may have s.s.b. equipment available. By the time that this is being read the promised operation from the **Laccadive Islands** by VU2NR should have materialized. (Thanks, G3NOF, for the above.)

The period of operation of **FO8AN** from Clipperton Island was from November 29 to December 3 and only a relatively small number of QSOs was made. Danny Weil is now back in the U.S.A. The **Marcus Island** trip did not take place owing to unexpected Service demands on the personnel concerned.

OD5CT planned to operate from the Neutral Zone between Kuwait and Saudi Arabia under the call 9K7A but owing to a licensing snag did not actually go on the air. The c.w. operation using this call was definitely piratical, and it is hoped that OD5CT will not be inundated with useless QSLs.

Contests

The Fifth Annual CQ World Wide S.S.B. Contest will take place from 15.00 on January 28 to 21.00 G.M.T. on January 29, with only 24 hours of operating permitted. The object is to work as many stations and as many different prefixes as possible using s.s.b. Only one contact with a station may be counted and no multipliers are allowed for multi-band operation. Only the licensee may operate. The six hours of non-operation must be consecutive at any time during the contest and must be clearly designated in the log. Exchanges will consist of the usual R and S report followed by the number of the contact. All times must be in G.M.T. Final scores will be determined by multiplying the number of stations contacted by the number of the different prefixes worked. Logs must be returned to K2MGE-K2HEA not later than March 30, 1961. Copies of the rules and log sheets may be obtained by sending a s.a.e. to G2BVN.

A reminder that the first half of the A.R.R.L. telephony contest will take place during the weekend February 3 to 5.

The **Kansas Centennial QSO Party** will take place from 14.00 on January 28 to 23.59 on January 29. Kansas stations will work U.S.A. and DX stations. The signal exchanges for DX stations will consist of a RS or RST report plus the name of the country in which the station is located. Further information from, and logs to, Kansas Centennial QSO Party Committee, 414 Avenue " C," Wichita, Kansas, U.S.A.

From preliminary reports it appears that the leading stations in the **R.S.G.B. 21/28 Mc/s Telephony Contest** were G3NNT, G3KGY and G3FPQ, in that order. G3FPQ claims 4,290 points with 434 QSOs and 106 bonus QSOs, and reports that conditions on 21 Mc/s were fair on the Saturday and quite good on the following day, whilst 28 Mc/s produced little activity except from the U.S.A.

Awards

From the Norwegian Radio Relay League via G8PL come details of the **WALA Certificate.** This is awarded for contacts with LA stations after January 1, 1950, and stations in the U.K. must produce evidence of contacts with 20 LA amateurs on any band, c.w. or phone. At least six of the stations must be located North of the Arctic Circle. The list of stations worked, QSL cards and a fee of five Kroner (or 10 I.R.C.) should be sent to N.R.R.L., P.O. Box 898, Oslo, Norway. It should be noted that contacts with stations having prefixes other than LA, e.g. LJ, LF and LH, will not count for this award.

The **Heard All Dusseldorf Award** is being sponsored by the local radio club and may be claimed by U.K. SWLs hearing 10 stations of the Dusseldorf region club. There are about 45 active amateurs in this area. An extract of the log must be sent together with four I.R.C. to F.W. Kradepohl, Deutzerstr. 96, Dusseldorf-Eller, W. Germany.

The 1961 **Directory of Certificates,** published by K6BX, is now available and copies may be ordered through the R.S.G.B. Certificates Manager, G3IEC. The cost of $3.50 (third class mail) includes one year's revisions free of charge.

QTH Corner

CP5EL	via W1BAN.
CX6AS	P.O. Box 37, Montevideo, Uruguay.
FB8CQ	G. Beaudouard, Service des Mines, P.O. Box 67, Fort Dauphin, Madagascar.
FL8ZA	
OD5CT, etc.	L. M. Rundlett, Box 5043, Beirut, Lebanon.
FF8CW	via W2VCZ.
FQ8HO	via K6EC.
FQ8HZ	P. Rossignol, 2me C.T.O.M., Brazzaville, Rep. du Congo.
HS2A	via W7USF or D.M.J.M., Kohorat, Thailand.
KW6DG	(Formerly K0SLD/KW6), P.O. Box 68, Wake Island.
LX3AX	via DL7AH.
MP4MAH	C. A. Thomas, Communications, P.D. (O) Ltd., Afar, c/o P.O. Box 47, Doha, Qatar, Arabian Gulf.
SP5PO	A. Gamdzyk, Irysowa 2, Warsaw, 25, Poland.
SV0WZ	M/Sgt. S. R. Horn, Box 518, Iraklion Air Station, Iraklion, Crete.
VE5MK/SU	56 Canadian Signal Squadron, U.N.E.F., B.P.O. via Beirut, Lebanon.
VO2CO	923 Sqdn., P.O. Box 61, A.P.O. 434, N.Y., N.Y., U.S.A.
VP2LD	Box 181, Castries, St. Lucia, W. Indies Federation.
VP5BB	Grand Turk A.F.B., G.R.M.D., Box 4187, Patrick A.F.B., Florida, U.S.A.
VP7NF	via W1YDO.
5A2CX	N. Joyce, No. 5 Forces Broadcasting Service, B.F.P.O. 55.
5A5TZ, 5A1TP	Royal Signals, 219 Signal Squadron, B.F.P.O. 57.

* * *

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent, England.

The increased size shows the amount of work that has been done to make this book the most comprehensive of its kind.

Operators wishing to claim awards offered by overseas societies but unwilling to send QSL cards abroad should check with G3IEC, who is in a position to carry out certification for a number of awards.

G3DO and **G3KHE** are amongst the stations that have recently qualified for the Worked 100 Countries Sideband Certificate offered by *CQ Magazine*. Applications for the 50, 75 and 100 country certificates may be sent to G2BVN.

DX Briefs

KH6BPF, R. Lee, Box 34, Captain Cook, Hawaii, writes to G3AIZ to say that if any G station is awaiting a QSL from **4S7YL** he now has all the old logs. It is suggested that cards should go direct to KH6BPF (with I.R.C. if direct reply is required) as delivery through the KH6 bureau is rather slow.

W2CTN, via G3ALI, mentions that he cannot handle any cards for **FG7XF** as the logs have never been forthcoming. A pity, for direct QSLs are a very doubtful proposition.

VR6AC is again active from Pitcairn Island on c.w. and s.s.b. on 14 and 21 Mc/s. QSL via W6RCD.

VK2FR is now operating from Lord Howe Island and may often be found around 14,055 kc/s between 04.30 and 06.30 on Mondays.

YA1BW is now back in Afghanistan and operating c.w. around 14,080 kc/s and 21,075 kc/s. QSLs should go via DL8AX.

UA9OI (Zone 18) and **UA0LA** (Zone 19) are now active on 14 Mc/s s.s.b.

According to information from VQ4, **VQ1AM,** worked by many Europeans on 14 and 21 Mc/s, is a pirate.

New licensees in **Iran** include: EP2AF (Sandy); EP2AJ (John); EP2AP (Jim); EP2AQ (Florence, wife of EP2AP) and EP2AG (Buck). The latter is active on s.s.b.

Contrary to current rumours, there is, at the time of writing, no activity from N. Cameroons. ZD2KHK is in Mubi, but is inactive owing to lack of a licence. A plebiscite will be held on February 11, 1961, to determine whether the Cameroons will join Nigeria or Cameroun (FE8). Later news is that ZD2KHK/NC has been heard on c.w.

Stations working HV1CN are asked to QSL via W2BIB but dissatisfaction with this arrangement has been voiced in several quarters, and it is understood that moves are being made in the U.S.A. regarding alternative assistance to the Vatican City station.

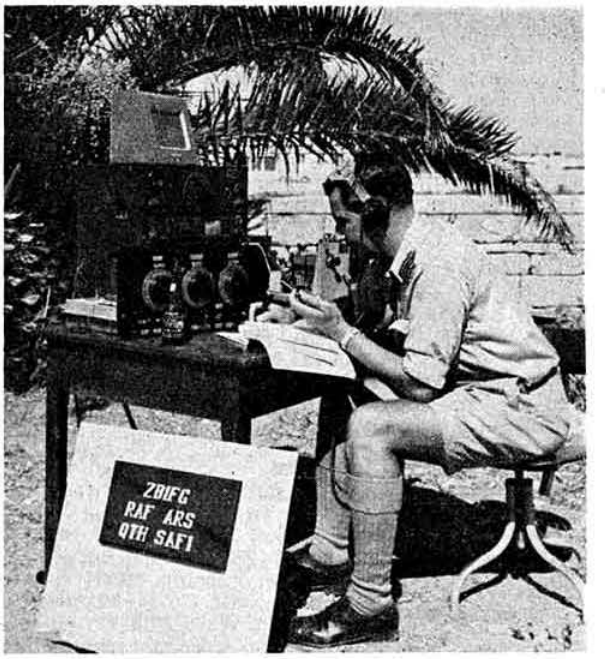
Band Reports

3·5 and 7 Mc/s

With improving conditions these bands are attracting the attention of the DXperts, both transmitting and s.w.l., and some excellent logs have been submitted. With waning sunspot conditions 7 Mc/s will continue to attract much DX in the months ahead.

Leading the way on **3·5 Mc/s** c.w. is **G3FPQ** (Elstead) with UA9DN (00.20), and ZL2FT (07.30), followed by **G3BHW** (Margate) with LX3AH (20.30), VE1ZZ (00.10) and several of the U prefixes. **G5WP** (Guildford) worked ZL3JT, ZL3FZ and ZL4IE all around 07.30 also YV5BJ (07.15), all W call areas except 6 and 7 and VE1, 2 and 3. **B.R.S.20317** (Bromley) submits the following excellent log: K9QBV (08.45), KV4CI (03.08), UA9CM (01.32), UA9DN (01.26), VE7FS (07.23), W5KC (07.27), W8SM (08.30), YV5BJ (07.40), ZB1FA (05.50), ZL3FZ (08.04) and 4X4FS (03.37).

On **7 Mc/s c.w. G3LET** (Westcliff-on-Sea) worked EP1AD (22.08), HZ1AB (17.58), KV4CI (21.47), KZ5TD (07.50), KP4AMT (22.30), MP4BCV (20.31), JA5CP (18.15), FQ8HW (20.50, Tchad), OD5LX (19.55), ST2AR (03.51), SV0WZ (20.05, Crete), UA0KAE (04.15, Zone 19), VS9OA (20.26), W6s (14.00) and ZD2s (22/23.00). **G3FPQ** exchanged RST with several of the above and PY7LJ (20.40), UH8KAA (21.45), UI8KAA (20.10), UM8KAA (19.30), VK5LD (20.30), VQ4DT (23.15), XZ2TH (21.10), 6O2GM (21.50) and 7G1A (21.30). **G3BHW** contacted LA1NG/P (00.17), MP4TAK (21.25), SV1AB (23.45), UG6KAA (22.08), UO5AA (17.55), ZD2JKO (19.53), 3V8CA (18.38), and N. American stations around 22.00.



A weather test for N.F.D. 1961. Sqn. Ldr. E. J. Griffiths, senior operator of ZB1FG at the R.A.F. Maintenance Base in Malta, takes advantage of the sun. Or perhaps he is doing a heat test.

From overseas we have **VQ4HE** (Nairobi) with VQ1SC (15.30), VQ1A (16.00), VQ3HH (07.30), VQ5AU (08.00), VQ5GF (07.00), VQ5EK (16.00), VU2XG (19.15), 9Q5LW (16.00) and 9U5PD (16.00). **ZD2JKO,** now on leave in the U.K., reports FA8RJ (23.20), PY7LJ (20.15), UD6KAB (01.00), UF6KAB (01.15), UG6KAE (01.30), UJ8KAC (00.40), ZB1JR (23.15), and ZS1, 2, 4 and 6. The log from **ZC4CT** includes KP4AMT (22.55), W4EL (00.30), UA0AG (22.50), UM8KAB (18.15) and 4X4DH (04.34).

Stations heard include: **00.00** LU7JI, UH8KAA, VQ4DT; **01.00** HZ1AB, LA1NG/P; **02.00** ST2AR, SV0WI; **04.00** KZ5TD, ZP9AY; **07.00** KG4AP, 7G1A; **08.00** VE4RO, VK3ADB, UA0KAE, ZL1MQ; **15.00** K6HOB, W6ULI; **19.00** FB8XX, JA3AS, MP4TAK, SV0WQ, UD6BC, UF6AF; **20.00** UC2BW, UL7AA, VS1FW; **21.00** EP1AA, KP4AMT, KV4CI, OD5CT, UA9DN, UD6KAB, UO5KAA UQ2AN, UR2BU, UT5CC, 5A3TR; **23.00** CN8JX, UA9KCA, UM8KAB, UO5WN, RAEM, VP6AF, YV5AIZ, ZB2AD. This listing was supplied by A.1543, A.1930, B.R.S.22795 and B.R.S.20317; special mention must be made of the first-class report made by the last mentioned.

14 Mc/s

C.W.

G3YF (Chingford) lists contacts with CR5AE (18.00), FB8CE (15.15), FB8XX (15.40), FQ8HB (17.10), FQ8HD (20.30), FB8ZZ (16.50), F9UC/FC (16.15), KH6ACU (16.55), VQ8BM (20.10), VS9MB (17.10), XZ2TH (15.30), ZS6AJH/ZS8 (17.10) and 9U5MC (19.10). **G2FFO** (Burnley) reports a quiet month with the band dead early in the evenings; however QSOs were completed with KL7KG (11.10), OD5CV (16.30), OY1R (13.15), VP7NT (00.50), VP9EP (18.45), VS9OA (16.15), VS6IF/9 (18.10) and UA1KAE/6

(19.18) at Vostok Base, Antarctica. **G3BHW** follows with EP1AD (16.17), FF8CW (19.00), FL9 (18.38), LA1NG/P (17.41), VK0PM (18.16), and VP2LD (19.15). **G8PL** (Hampstead) believes in working DX the hard way with an indoor bent dipole and mentions MP4QAR, MP4QAQ, UA0KAE, UL7IF, ZC4WD and 4X4DF, all in the early morning. **ZC4CT** lists UD6BB (15.25), UG6KAA (12.10), UJ8KAA (06.30), UO5SA (05.10) and 6O1AA (21.20). **ZD2JKO** records contacts with CR4AX (02.45), EP1AD (18.30), ET2US (02.00), FK8AH (18.20), FL8ZA (05.55), OR4TX (04.15), UA0BP (03.30), VP7NT (03.20), VU2CK (03.16) and 7G1A (03.40). **VQ4HE** has QSOd VQ1HT (15.30), ET3AZ (17.15), VQ1B (16.00) and reports a.m. contacts with FR7ZD (03.45), VS9OC (03.45), and ZS7L (04.30). **A.1930** (Thorpe-le-Soken) logged FB8CJ (19.30), FQ8AW (21.05), HK0HCA (20.32), LA2JE/P (13.25), JT1KAC (08.20), KV4AA (22.40), UJ8AG (08.15), UA0YE (11.10), VP6PV (20.05), ZA2BAK (17.15) and 7G1A (07.10). The only QSL from ZA2BAK that the writer has seen consists of a programme schedule of Radio Tirana.

S.S.B.

G3NOF (Yeovil) worked EA8CT (14.29), MP4TAI (14.45), PZ1AX (20.21), ZB2A (17.52), 5A3TX (20.07) and 9Q5AG (17.49), whilst **G3FPQ** follows with KW6CP (15.45), VQ8AD (17.40), VU2NR (16.00), ZS7M (17.35), and 6O1AA (18.55). **G6UT** (Gt. Hallingbury) reports EP5X (14.47), FL8ZA (17.22), HS2A (15.48), KX6BU (15.47), VE5MK/SU (09.45), and 3V8CA (18.14), with W8OLJ/PK (11.45) as a "got-away." **MP4BBW** (Bahrain) sends in a report which shows nearly 50 countries worked during the last month. These include AP2CR (15.33), CR9AH (14.20), EA8BA (19.20), EQ2AT (19.03), FF8AF (20.39), FL8ZA (14.18), HC1FG (21.10), HK0HCA (12.53), HS2A (16.06), HV1CN (17.20), KC4USV (15.18), KI1FS/KL7 (09.54), KG4AP (14.10), KP4AZ (19.44), KV4BQ (19.23), KW6DG (11.47), KX6BU (15.06), OA4DQ (20.35), W8OLJ/PK (14.02), PZ1AX (17.10), SP5PO (18.37), UC2KAB (14.48), UL7JA (11.24), VK0KJ (16.51), VP2AB (17.10), VQ3FQ (17.26), VQ8AD (17.08), VQ9TED (14.10), VS6AE (14.20), XE1DT (13.39), YN0NZ (13.26), ZB2A (14.24), ZD2PJB (15.00), ZS3B (16.50), ZS7P (19.41), 9M2DB (15.09) and 9N1SM (13.14).

Reports from A.1930, A.2291, A.2410, F.R.S.309, B.R.S.18876, B.R.S.22357, B.R.S.22795 and B.R.S.22844 list: **08.00** KG6AJB, KW6CV, KX6BQ; **09.00** HC1FG, KL7DMT, VR3L; **10.00** W9ADB/AM (Naples to Frankfurt); **12.00** EA8BA; **14.00** 6O1AA, W8OLJ/PK; **18.00** FL8ZA, LA1NG/P, SV0WP, VQ5FS, 9Q5AG; **19.00** FF4AK, FF8AF, KV4BQ, TI2HP; **20.00** PZ1AZ, VP6WD.

21 Mc/s

C.W.

GM3OEV (Kinloss) QSOd FF7AG (17.15), KV4AA (19.15), ST2AR (16.27) and 3V8CA (16.35); **G3FPQ** adds HK0HCA (12.35), PY7LJ (17.55), XE1PJ (13.30), ZS7R (08.55) and 7G1A (08.45). **G3BHW** contacted FB8XX (15.00), FL9 (12.00), FQ8HO (14.14, Tchad), FR7ZD (14.53) and ZS6IF/9 (15.55). **ZC4CT** exchanged RST with several of the foregoing and EP1AD (08.38), FQ8HP (17.50), MP4QAR (11.46), UI8AD (10.35), VS9MB (11.15) and 9G1CW (06.35).

S.S.B.

Just to prove that A3a DX can be worked on this band **G3NOF** lists BV1US (09.20), FF8CW (18.45), HK0HCA (12.38), HZ1AB (12.54), KR6RN (09.20), OA0HLA (13.46), ZL1AU (09.45), ZS5DN (18.24), and 5A5TA (08.47).

A.M.

The sole reporter on this mode is **G3FPQ** with CR9AN (12.30), FR7ZD (15.40), FQ8HN (07.50, Central African Rep.), FQ8HX (07.00, Congo Rep.), OR4TX (17.45), VP2DQ (18.35), and VS9MB (07.30).

This band has produced listener reports from A.1543, A.1736, A.1980, A.2404, B.R.S.11876, B.R.S.22795, B.R.S.-22844 and F.R.S.309 which together read: **07.00** EP2AT, FQ8HN; **09.00** AP2MR, EA0AC; **10.00** FF4AB, PZ1AY, VP3MC, VS6CL; **13.00** EA6AR, VP2AR; **14.00** TI2WR, 6O2GM; **16.00** FF7AG, EA8CL; **17.00** CR8AC, EL2F, VP3MC, 9G1CB; **18.00** CO8ES, CR4AX, VP2LY, VQ2BZ, VQ8MG; **19.00** KZ5SU, YN4CD.

28 Mc/s

C.W.

G3FPQ worked ST2AR (13.20), ZS7R (11.01) and 7G1A (10.55); **ZC4CT** keyed with JAs, (07/08.00), VKs (09.00) VU2XG (09.12), and 7G1A (12.15). **G3IPV/MM** (*H.M.S. Hermes*) submits an extensive log of stations worked off Portugal and Gibraltar which include TI2WA (17.55), ZB2I (11.48) and most W call areas. Unfortunately conditions during the period of the R.S.G.B. Radio Hobbies Exhibition did not allow a QSO with GB3RS.

A.M.

GM3OEV exchanged reports with CR7CR (12.34), FF8CK (17.45), KG4AO (18.35), PJ3AJ (10.25), UJ8AC (10.47), UG6KAB (10.50) and UN1AT (12.10). **G3BHW** worked TG9FI (15.36), VP3EFG (16.30) and VP5BB (16.05, Grand Turk Is.). **G3FPQ** concludes an all band report with FF7AB (12.00), FF8AP (15.35), VQ8AV (15.25) and ZS7L (11.10). **G3NOF** mentions CR7LU (15.50), TI2RFT (16.17) and YN1JK (16.00), with the following three on s.s.b.: HK0HCA (17.43), OA4ED (18.19) and VP7NT (17.49, San Salvador).

Heard on this band were: **10.00** UL7KBA, ZS7L, 6O2GM; **13.00** CO2JK, CR7EI, PJ2AL, VP6PV, VQ8AV, 9K2AD; **14.00** FF8AP, HH5MV, KG4AT, PJ3AI, VQ2HR, VP2GAQ; **15.00** HI8JSM, KZ5KC, VP4MM, VP8EM, XE3VL, ZP5CF; **16.00** FF7AB, HP1AC, TI5RV, VP9AK, ZS3HT, ZS8I; **17.00** EL4E, HI8DGH, 9U5DM. Reporters were A.1543, A.1736, A.2404, B.R.S.11876, B.R.S.22357, B.R.S.-22795, B.R.S.22844 and F.R.S.309.

* * *

Commonwealth Competition scores have been held over until next month to allow overseas stations to submit their final figures.

Contributors are thanked for their support which, it is hoped, will be continued during 1961. The trouble taken by those who arranged their reports in band and prefix order is much appreciated.

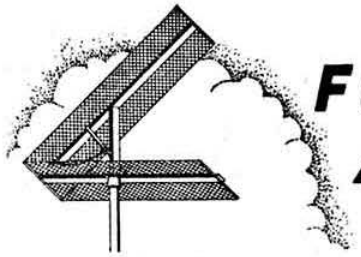
Report forms are available on request and these, together with any news items, should arrive at R.S.G.B. Headquarters not later than January 19.

The C.I.A. Certificate

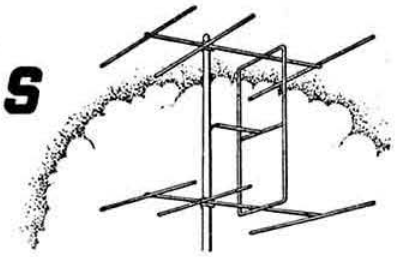
THE C.I.A. Certificate, details of which were given in the Society's *Certificates and Awards* booklet (now out of print), is available only to Spanish and Portuguese nationals.

"An Improved Low Noise Crystal-Controlled Converter for 144 Mc/s"

MR. G. R. JESSOP (G6JP), author of the article "An Improved Low Noise Crystal-Controlled Converter for 144 Mc/s," published in the June 1960 issue of the BULLETIN, has received a number of inquiries regarding the feed-through capacitors and r.f. chokes. Although the value of feed-through capacitor specified was 4700 pF, the more readily available 1000 pF types will be found quite suitable. The r.f. chokes should be wound on old style ½ watt insulated resistors.



FOUR METRES AND DOWN



New European 144 Mc/s Record – UA1 Signals Heard in England

By F. G. LAMBETH (G2AIW) *

A NEW European 144 Mc/s record was set up by means of meteor scatter propagation during the Geminids shower on December 13. HB9RG worked OH1NL and during the early morning of the 14th between 03.00 and 06.30 G.M.T. G3HBW also worked OH1NL, thus amply rectifying the earlier disappointment when all was received barring the final " R."

A letter from **OH2TK,** gives the other end of the story. Both contacts have been confirmed, the distances from OH1NL (Nakkila, near Pori) to HB9RG (Zurich) being 1,120 miles and to G3HBW 1,080 miles. OH2TK says that OH1NL is the leading v.h.f. man in Finland and has done a great deal of work in the meteor scatter field. Nakkila is a quiet village on the west coast of Finland. Previous QSOs by the same mode have been made with several SM, OZ, LA and UR stations. The present transmitter used by OH1NL runs 200 watts with two 826s in p.p. Permission was recently received to use 800 watts input and a new p.a. should be ready in the near future. The receiver is unusual, the converter using the following line-up: EC86, E88CC, E180F, a diode mixer, E180F and 6C4. The main receiver is a BC453 and the aerial a 13 element long Yagi. From Finland it is only a small step to UA1 and it is believed G5YV has already arranged skeds in that area. One was with UA1KAW (nr. Leningrad) for the Geminids shower but although G5YV listened on the frequency specified by the operator nothing was heard. However the signals were located about 20 minutes later about 40 kc/s higher than expected and several bursts were received of up to 30 seconds and one of approximately three minutes (the longest meteor burst yet heard by G5YV). The strength varied between S3 and S7/8 but it is not yet known whether UA1KAW heard G5YV's own signals.

No doubt all the other m.s. enthusiasts will be interested in this one too, and the way things are going, we may confidently expect some further successes in due course. One of the great things about these QSOs is the extreme patience which is required, owing to the necessarily very long duration of the contacts, and the fine results are richly deserved.

G3HBW (Bushey Heath) in reporting on his contact with OH1NL, mentions that he was running two sets of skeds, the other being with HG5KBP but with no result. It is not known whether anything was heard near Budapest. The contact with OH1NL brings G3HBW's country score to 19 on 144 Mc/s. Arnold notes a greatly increased interest in meteor scatter propagation, and thinks this might be the right time to point out the conditions required to make a *valid* m.s. QSO. He believes some people may be under the impression that it is only necessary to get reasonable bursts of signals in each direction to succeed but this is, of course, certainly not the case.

The A.R.R.L. recommendations on the subject are as follows: Both stations must copy, in their entirety, *both* callsigns, the report and *the final* " *R* " for a valid QSO. It is necessary to copy all at the time of making the contact; tape recordings are useful for confirmation of the contact but *they must not be used for obtaining vital but missed pieces of information afterwards.* Also, according to A.R.R.L., co-operative efforts do not qualify. Observers may be in the shack during the attempt but they must not take any active part in the proceedings. (Surely we are still experimenters as well as amateurs—EDITOR.)

G3HBW apologizes for putting these points forward again but feels they cannot be too strongly emphasized.

Lenna Suominen, OH1NL, operating his 144 Mc/s station. He is now joint holder with HB9RG of the European Record for the band.

Flash! During the Quadrantids shower on January 2-3, 1961, G3HBW worked HB9RG for his twentieth country on 144 Mc/s.

G4LX's Auroral Report

No reports from any U.K. observers have been received during the month under review, although there were signs of disturbances on December 1 and December 16, but these do not seem to have effected any 144 Mc/s contacts between stations in England.

SM6PU enjoyed another very busy month for auroral propagation, though he finds the beam direction much more critical and fading much more severe than before. A summary of his activity for November is as follows: On November 1, 3, 4, 14, 16, 17, 22, 24, 25, 27 and 30 there were definite auroral reflections on 88 Mc/s TV signals, but no results as high as 144 Mc/s. On November 12, QSOs were made with GM3BDA, SM4COK, SM5AAS in the first phase between 21.09-01.10 and with SP6LB, SP3GZ, DL6QS, SM4AMM,

* *R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

SM5BDQ. Stations heard during these openings included GM3GUI, ON4CP, DJ5HG, DL1RX, DL6SS, DL9ARA, LA4VC, LA4YG, LA3AA, OZ2AF and OZ7WA. A third phase occurred on November 13 from 09.48-11.14 G.M.T., with further openings throughout the day until 16.12 G.M.T. Several QSOs were made with SM stations and a number of DL, OZ and LAs were heard. On November 15 between 15.42 and 20.00 G.M.T. contacts were made with LA4YG and LA9T and other LA, OZ, and SM stations heard. On November 21, another QSO was made with GM3BDA, followed by LA4YG, SM4COK, SM5TC, SM5OT and SM5BWC. Stations heard between 18.00-22.30 on this day included GM3GUI, UR2BU, OH1NL, DL1RX, DL1PS, DJ5HG, SP3GZ, LA4RD, SM4PG, SM5BDQ and SM7BAE.

An auroral report from LA9T notes that November 12, 13, 15 and 21 produced auroral conditions in Norway. Apart from SMs, DL6QS was worked by LA4VC on the 12th, DJ1WP, SP3GZ and DL6QS on the 13th. On the 21st LA4RD worked OH1NL for the first QSO between the two countries and GW3GU was heard. LA4YG heard GM3BDA and OH1NL.

Two Metre Miscellany

G3HBW reports that there was a tropo opening on December 17 which might have been interesting except that hardly anyone appeared to be there to take advantage of it! Dresden TV was heard on true bearing, definitely tropo, with " pings " superimposed. However, in spite of frequent calls and much listening only one ON4 station was heard. The reception of the Dresden signals was the first since the grand opening of October 1958 when the OKs, SPs and Scandinavians were all worked together so it looks as if someone missed a great opportunity.

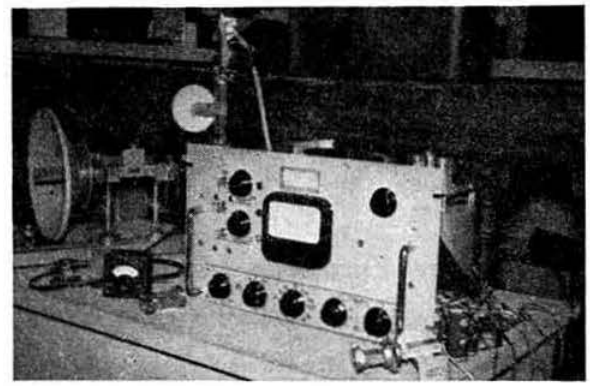
G3LTF (Galleywood, Essex) ran skeds during the Geminids shower with OE3SE but with no success. He did, however, hear OK2VCG for about 1½ hours and had quite a few good bursts from him. Dresden TV seemed to peak up at about 20.00-20.30 so possibly the skeds were just that bit too early! G3LTF is always looking for m.s. skeds with other European stations. On the tropo side, there has been little to report with some DX on November 21 (G3ILX) and GW3MFY in very windy weather on the 30th. On December 17, seven PA0 stations were worked, some on the German border, but although Dresden TV was S5/6 on *direct* signal no DL stations were heard.

G3MEV has moved to Chiswick and will be glad to hear from any 2m friends who can turn their beams in the new direction.

It is learnt from Mr. T. D. Walshaw of the Harris College, Corporation Street, Preston, that his country QTH at Low Sadgill, Long Skeddale, nr. Kendal, Westmorland, will be available for serious visiting v.h.f. DXpeditions. There is plenty of 2,500 ft. fell quite close, " and Bill Fishwick has a tidy line in tractors to get gear up there." Sounds very interesting.

GM3GUI (Friockheim) found very little activity during the month to December 18, Aberdeen and Edinburgh stations being the only ones worked by tropo, although auroral signs were evident on a number of days during the period; however, only one day produced any DX. DLs were heard by aurora on November 21 as well as G6NB, G3HBW and GW2HIY at fair strengths. December 1, 6 and 12 showed evidence of aurora but nothing outstanding developed whilst on December 15 GW2HIY was heard again. During the evenings of December 14/15 a few bursts of signals of up to three seconds at about S2/3 on a bearing of 120/140° at about 35/40 w.p.m. were heard. It is presumed that these signals were from OK2VCG who was testing with GM2FHH (Aberdeen) via the Geminids. The frequency was approximately 144·42 Mc/s.

LONDON U.H.F. GROUP
will meet at the Whitehall Hotel, Bloomsbury Square, London, W.C.1.
at 7.30 p.m. on Thursday, February 2, 1961
All v.h.f. and u.h.f. enthusiasts welcome.
Note the new venue!



G3LRH's microwave equipment shown at the R.S.G.B. Radio Hobbies Exhibition in November 1960. A description of the gear was given on page 269 of December " Bulletin".
(Photo by G2AHL)

On January 28-29, **GI3KYP/A** will be active from Island Magee, Co. Antrim, on 145·596 Mc/s using A1 and A3 until the 144 Mc/s C.W. Contest commences at 10.00 G.M.T. on the 29th. Operation will begin at about 19.00 G.M.T. on the Saturday evening. The transmitter will run 30 watts input.

GW3MFY (Bridgend) reports that with conditions as they are the only contacts over 120 miles between November 20 and December 22 were with G6OX, G3MPS, G3LTF, G3KEQ, all on c.w. On November 13, during the aurora, GI5AJ was heard 57A at 15.45 G.M.T. GW3MFY refers to *QST* remarks about parametric amplifiers to the effect that if we do not have them on 2m we are out of touch, and comments " it seems we are out of touch here, what about a paramp design from one of our technical types? "

A.1657 (Gomersal) says the following stations in the West Riding (Central area) are equipped to work 2m: G2HHV, 5PW, 5YV, 6XT, 3HA, 3AZU, 3LRP, 3LSA, 8CB, 6PL, 8BL, 6BX, 2SU, 2QM, 2BM, 3FQH, 3NDV, 2VO, 2DYY, 3CXP, 3NKJ, 3GJV, 3NAO, 3JKD, 8PK, 3HPD. G2FUT, 3KMJ and 3NEW are collecting new gear.

GM3LDU (Clarkston, Renfrewshire) was home between November 23 and December 6 and found that G2NY, GI5AJ and GM2FHH provided pretty consistent signals on 2m in spite of poor conditions. GM3GUI was also contacted twice. On December 1 quite strong aurora was noted on G2NY's signals whilst on sked with GI5AJ at 19.10 G.M.T. GM3LDU says that a recent talk by GM2CHN at a recent Glasgow R.S.G.B. meeting appears to have aroused a lot of interest in v.h.f. and quite a few more GMs should soon be on the band.

Four Metres

G3LZN (Rowington, Warwick) is active on 4m and the first contact was with G3EHY on December 11. Since then there have been regular QSOs mainly at 11.00 on Sundays. Other stations worked have been G3LZH and G3MNQ. A strong signal has been heard from G3GZM. Activity in the Midlands is growing and most appear to be free from TVI. Other stations known to be active are G3AYJ, G3MVE G3NUE and G4MK. G3LZN pays well-deserved tribute to G3EHY who, he says, is doing probably more than anyone else, by his active enthusiasm, to get many stations interested in 4m. G8BL is now on 4m and looking for QSOs.

GB3IGY QSL Cards

The V.H.F. Committee is anxious to clear up any outstanding QSL cards for reports on the reception of signals from GB3IGY. If anyone is still awaiting a card, he is asked to advise G2AIW immediately.

Scandinavian V.H.F. Contests

OZ5MK reports that the Two Metre Klubben (Copenhagen) and UK7 (South Sweden) are arranging a 144 and 420 Mc/s contest for March 4-5. The 144 Mc/s section will be held between 20.00-23.59 and 08.00-11.00 G.M.T. and the 420 Mc/s section between 19.00-23.59 and 07.00-11.00 G.M.T.

The final score will be obtained by multiplying together the number of contacts and the total distance in kilometres worked on each band and adding the results. (*Example:* 144 Mc/s—five stations and 2000 km. = 10,000 points; 420 Mc/s—eight stations and 400 km. = 3,200 points. Total score, 13,200 points.)

Entries, postmarked not later than March 12, 1961, should be sent to Ake Lindvall (SM7BE), Trastvagen 9, Lund, Sweden.

A similar contest will be held between 20.00 G.M.T. on June 17 and 11.00 G.M.T. on June 18. In this case, entries should be sent to Jorgen Rasmusen (OZ7BR), Borgevej 31, Lyngby, Denmark, and postmarked not later than June 25, 1961.

Flashback to " First Steps "

A reminder of the article " First Steps on Two " which he contributed to the BULLETIN back in 1952 came to G5UM when he received a letter from G3KJX of Northallerton returning a circuit diagram of a converter which G5UM had lent to him. This circuit is the basic one which has helped bring many members in G5UM's district on to the 2m band.

The letter from G3KJX gave an interesting description of the progress of one enthusiast who followed his invitation (in the philosophical sense) to experiment with 2m.

Here are extracts from what he had to say to G5UM: " You may remember that I asked you about converting an R.F. Unit but as you suggested I have scrapped that idea and built a complete 2m converter, as per the November 1958 BULLETIN, ECC84-12AT7 with a crystal chain starting from a 7·222 Mc/s crystal. I am very pleased with it but hope to change the front end valve to a PCC89. Preliminary checks indicate a big improvement but not yet having a noise generator I have been unable to check the noise factor.

" At the moment the transmitter is running at 12 watts but I am constructing a completely new s.s.b. transmitter for two and hope to have it on the air before very long. My aerial is a four element Yagi. DX hasn't been very startling but extremely pleasing to me, G6NB being my most southerly and GM3EGW the most northerly . . . there are one or two stalwarts among the newcomers, the most consistent being G3ILD in Darlington with his s.s.b. rig. He is running about 150 watts peak at the moment and has a pair of VT90s which he hopes to bring into use shortly. He had a very interesting phone QSO via aurora with G3CCH. I heard his recording of it and it was extremely good. G3GSL is another likely candidate for s.s.b. G3AWL is active using a.m. and G3JYP in Appleby, Westmorland, is hoping to be on shortly; he has just finished a converter. G2FO in Stockton has come back after several years off the air. There are quite a number of other possibilities in the area. . . . I have found ' Two ' very interesting with endless scope for experimenting and I have lost interest in the m.f. bands at the moment. . . . G3ILD and myself both make a point of being active on Mondays but don't hear much from the South of England. Laurie has a sked at 21.00 G.M.T. every Friday with G3CCH which means his beam is south then. . . .

" Several people have made copies of your converter circuit so there are hopes that it may bring several more stations up on 2m."

CONTESTS DIARY

January 28-29	-	CQ S.S.B. Contest (See page 324)
January 29	-	144 Mc/s C.W. Contest (For details, see page 291, December 1960)
February 4-5	-	Affiliated Societies' Contest
February 4-5	-	A.R.R.L. DX Contest (Phone Section)
February 18-19	-	A.R.R.L. DX Contest (C.W. Section)
February 25-26	-	First 1·8 Mc/s Contest (For details, see page 340)
March 4-5	-	A.R.R.L. DX Contest (Phone Section)
March 4-5	-	144 Mc/s Open Contest * (For details, see page 340)
March 4-5	-	Listeners' V.H.F. Contest (For details, see page 340)
March 11-12	-	B.E.R.U. Contests (For details, see pages 290/291, December 1960)
March 18-19	-	A.R.R.L. DX Contest (C.W. Section)
April 8-9	-	Low Power Contest
April 16	-	D/F Qualifying Event
April 23	-	First 420 Mc/s Open Contest
April 30	-	D/F Qualifying Event (London)
May 7	-	First 144 Mc/s Field Day *
May 14	-	D/F Qualifying Event (South Manchester)
May 28	-	D/F Qualifying Event
June 3-4	-	National Field Day (For details, see page 338)
June 10-11	-	1250 Mc/s Tests
June 17-18	-	70 Mc/s Contest
June 25	-	D/F Qualifying Event
July 2	-	Second 144 Mc/s Field Day *
July 9	-	D/F Qualifying Event
July 15-16	-	Second 420 Mc/s Open Contest
September 2-3	-	I.A.R.U. Region I V.H.F. Contest
September 10	-	D/F National Final
September 17	-	Low Power Field Day
October 8	-	R.A.E.N. Rally
November 11-12	-	Second 1·8 Mc/s Contest
December 2-3	-	R.S.G.B. 21/28 Mc/s Telephony Contest
		R.S.G.B. 21/28 Mc/s Telephony Receiving Contest

* *To coincide with dates of I.A.R.U. Region I v.h.f. contests.*

Activity on Twenty-three Centimetres.

While in contact with G5UM on January 2, **G5DT** (Wallington) disclosed some startling statistics about his performance per band during the past year. Clem had no fewer than 1348 contacts during 1960 of which the amazing total of 218 were on the 23cm band. On 70cm, which all Home Counties u.h.f. operators know as Clem's most active band, the yearly total of contacts reached 927; and on 2m the total was 175. During the same period, G5DT had three contacts on 10m, 22 on 80m and three on 160m.

Emerging from these statistics was another significant fact: that the QQV03/20 valve which G5DT still uses as a final amplifier on 70cm has now operated for 14,356 hours since it was installed in September 1952. At that time Clem purchased two of the very first QQV03/20 valves to become available in this country. The initial sample, clocking up on these hours, has made it unnecessary even to unwrap the spare, which has remained in the G5DT cupboard these last eight years. One possible pointer to this amazing longevity is that heater voltage has always been scrupulously maintained at 12·6, and d.c. at that.

V.H.F. QSY

Members who wish to acquire or dispose of crystals in connection with the British Isles Two Metre Band Plan are invited to send details to " V.H.F. QSY," R.S.G.B. *Bulletin.*

Crystals Offered

By G3KH, 133 Station Road, Cropston, Leicester. 8075 kc/s (FT243 type).

Crystals Required

By G3KH, as above. FT243 type between 8000 and 8030 kc/s.

Single Sideband

By G. R. B. THORNLEY (G2DAF) *

FROM the general trend of conversation among amateurs one is struck by the thought that there is a widely held belief that what the Americans do today we in the U.K. do two or three years later—that all original thought and up-to-date progress in the radio field originates from the other side of the Atlantic. With this in mind it was rather refreshing to note that in the October 1960 issue of *QST* there are two articles in which this process is reversed and the latest ideas from Stateside are following methods and development that has originated in this country and circuit technique that is in common use by British amateurs.

The " Ultimate " in V.F.O.s

The first is a description and constructional article on a very stable v.f.o., the opening paragraph of which is as follows:

" In my 30 years as a radio amateur I have probably built as many v.f.o.s as anyone else. Because most of them did not meet the standards that I wanted, I kept on seeking the ultimate. Although this v.f.o. may not be, strictly speaking, the ultimate, its performance has been exceedingly good; for this reason I thought others might be interested in this simple design."

In view of the past ballyhoo and claims made for the series tuned oscillator, one turns the page to the circuit diagram naturally expecting yet another version of that v.f.o. to end all v.f.o.s—the Clapp. How refreshing then to see that the oscillator found to be most satisfactory and stable after a 30 years' search is our old friend, the parallel tuned Colpitts, and in fact is basically the same—including cathode follower —as the arrangement described in this feature in October 1959.

Most of the older more experienced sideband operators found out many years ago that the parallel tuned Colpitts with large values of swamping capacity across the valve input and tuned circuit was an arrangement that was virtually unbeatable. They were however never quite able to convince the other " camp," who stuck tenaciously to the American way of life and Mr. Clapp.

Well, well! The wheel has turned full circle and the series tuned v.f.o. appears now to have had his American day!

The Latest American S.S.B. Transmitter

The second *QST* article is a description of the new Hammarlund HX-500. This is a beautifully engineered all-band (80-10m) transmitter with a pair of 6146 in the final and a total complement of 21 valves. The price is $695: with import duty and freight charges about £350 in this country.

Many old timers will have nostalgic memories of that very fine pre-war communication receiver, the Super Pro, and Hammarlund have always had a reputation for turning out equipment in the top bracket, built to high engineering and design standards. It is therefore of great interest to note that this transmitter (the block diagram is given in Fig. 1) embraces the basic design considerations developed in the G2DAF s.s.b. transmitter and published as an article in a British magazine.†

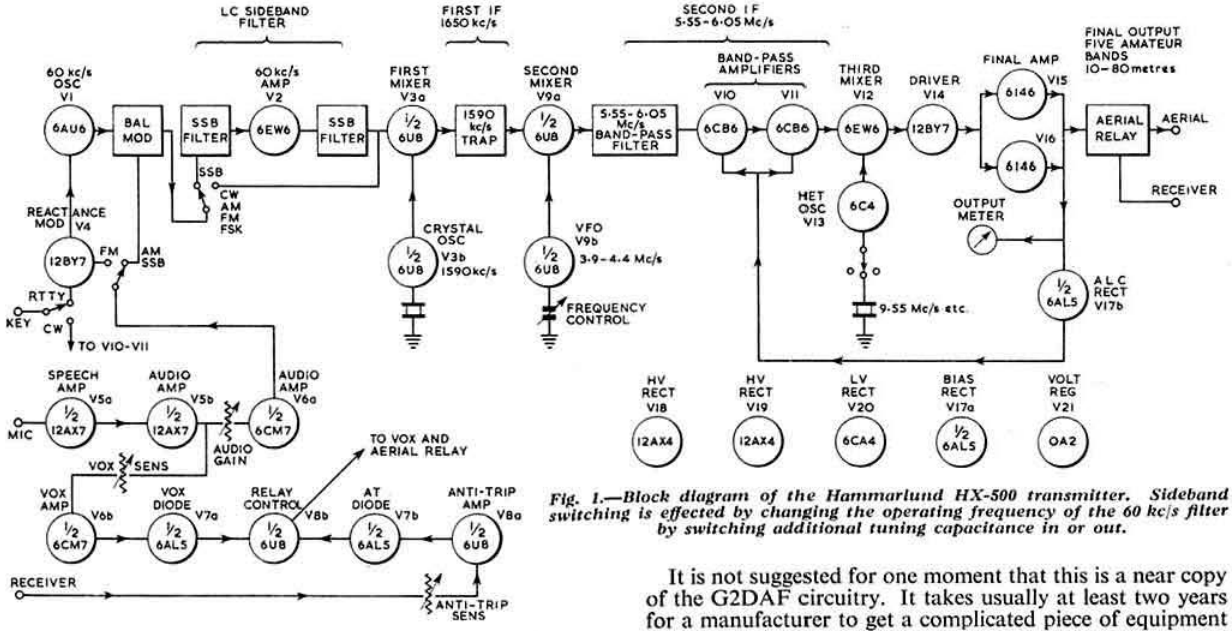


Fig. 1.—Block diagram of the Hammarlund HX-500 transmitter. Sideband switching is effected by changing the operating frequency of the 60 kc/s filter by switching additional tuning capacitance in or out.

It is not suggested for one moment that this is a near copy of the G2DAF circuitry. It takes usually at least two years for a manufacturer to get a complicated piece of equipment such as a transmitter or receiver from the design stage to final production. It is however quite remarkable that engineers with the resources and know-how of an organization such as Hammarlund should independently arrive at the same basic conclusions put forward by the writer in an article written two years ago.

In that article it was stated that the wrong way to get on to the other bands was from a basic 80m exciter and that the better method was to translate the initial single sideband signal (generated at a low frequency) up to the required output in steps, using three processes of conversion, and that the tunable sideband output should be on a neutral frequency clear of the amateur bands to be used. It is noted that Hammarlund use a semi-conductor diode balanced modulator, a high C v.f.o. circuit with 500 kc/s coverage, wideband couplers following the second mixing process, and that their choice of tunable sideband output of 5·55-6·05 Mc/s is within approximately 500 kc/s of that used in the G2DAF transmitter.

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

† R.S.G.B. BULLETIN, September, October and November, 1959.

Mullard Works Southampton

The Administration wing of the Mullard Semiconductor Plant at Southampton. This building houses the Semiconductor Measurement and Applications Laboratory.
(Photo by courtesy of Mullard Ltd.)

REPRESENTATIVES of the technical and trade press were recently afforded the opportunity of visiting the Mullard Southampton Works and of seeing at first hand the progress that has been made since an earlier visit a year or so ago.

The Southampton plant is being built specifically for the purpose of manufacturing transistors and other semi-conductor devices and when complete will be one of the largest single mass-production units for semi-conductors in the United Kingdom. The plant operates as a self-contained centre containing research, development and application laboratories. In addition it has its own tool room, drawing office, library and other services. Basic research continues to be undertaken at the central Mullard Research Laboratories.

Measurements and Applications Laboratory

The high reputation and extensive markets enjoyed by Mullard semi-conductor devices are due in no small measure to the activities of the Measurements and Applications Laboratory at Southampton. Here teams of engineers investigate and devise new applications and improve existing ones, measure device performance under a variety of circuit conditions; assess the requirements and potentialities of future devices; evolve new and better methods of measurement for the plant's own manufacturing test departments and assist in the production of the technical data that accompanies every semi-conductor device. In addition, the staff of the laboratory produce a wide range of technical reports, many of which are a source of authoritative information for design engineers the world over. About 40 of these reports are produced each year. Over and above this many lectures are given to technical colleges and professional institutions.

Recently the laboratory has been reorganized and now consists of six separate project groups. Although necessarily inter-dependent in some respects each explore a different field of semi-conductor applications.

The fields covered by the various groups are (i) Power and Industrial Control, (ii) Telecommunications and General Industrial (Linear), (iii) Radio and Television, (iv) Computor and General Industrial (Switching), (v) Electrical Development and Measurement Investigation, (vi) Device Investigation.

Mr. E. Wolfendale is Head of the Laboratory, while Mr. L. E. Jansson is in charge of the Radio and Television Group.

Practical Applications

Many demonstrations exemplifying the work of the various groups were seen during the press visit. These included (i) a class A 6 watt high quality audio amplifier for general industrial use or for driving loudspeakers; the output contains less than 0·6 per cent distortion and the frequency response extends from 7 c/s to 40 kc/s at full output; (ii) a 4 watt transmitter for use on the marine distress frequency of 500 kc/s; (iii) an experimental transmitter generating 2·5 watts at 8 Mc/s using alloy diffused germanium transistors; (iv) a single-stage amplifier with a gain of about 13·5db for use in the r.f. stage of a communications receiver operating at 170 Mc/s.

Further information on the Southampton plant or the work of the Measurements and Applications Laboratory can be obtained from Mullard Press Department, Mullard House, Torrington Place, London, W.C.1.—J.C.

British Standard
Glossary of Terms Used in Telecommunication

THE 2,700 definitions in this new 350 page volume represent a decade's work on the part of one of B.S.I.'s many committees of experts. The standard brings together all the terms previously dealt with in the 1943 edition and the various supplements published between 1948 and 1951. Throughout its preparation, account was taken of parallel international work having a bearing on important sections of the glossary.

The glossary contains many new terms and definitions and —where necessary to reflect technical developments and changes in usage—many of the definitions have been extensively revised. Deprecated terms are indicated in a distinctive typeface, as are obsolete terms.

Noteworthy additions to the publication are a treatment of the terminology of semi-conductor devices, and data on information theory and inductive co-ordination.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 35/-, plus postage.

For Disposal

MRS. SCHOFIELD, widow of the late Lt.-Col. A. J. A. Schofield, B.R.S.18878, of 80 Lower Park Road, Hastings, has for disposal a very large quantity of radio equipment, much of which is ex-Government.

Members who would like to inspect the equipment with a view to purchase should write to Mrs. Schofield for a list of items.

Supplementary Report of the Council*

THE Report which follows refers briefly to some of the more important events and happenings that have occurred since the Society's financial year ended on June 30, 1960.

National Convention

The fourth post-war National Convention took place in Cambridge from September 15 to 17, 1960. The Convention was opened by the Mayor of Cambridge (Councillor C. A. Mole, J.P.).

A feature of the Convention was the lecture programme, which reached a very high standard. Mr. J. A. Ratcliffe, F.R.S. (at that time Head of the Cavendish Laboratory) and Professor Martin Ryle, F.R.S. (G3CY) were among the team of lecturers. Visits to the Mullard Radio Astronomy Observatory and to other places of technical and general interest attracted good attendances.

Throughout the period of the Convention an Amateur Radio Station was operated from the Arts School, using the call-sign GB2CAM.

Following tradition a conversazione with buffet supper was arranged for the Friday evening and an end-of-Convention dinner for the Saturday evening.

Unfortunately the support for the Convention fell somewhat short of expectations. Provision had been made for an attendance of 350 during the Saturday. The fact that the actual attendance was about 100 less than that figure was due very largely to the lack of support received from members resident within easy reach of Cambridge.

The Council records its warm thanks to the Convention Committee headed by Mr. T. A. T. Davies (G2ALL) (Chairman and Region 5 Representative), Mr. A. H. G. Waton (G3GGJ) (Honorary Secretary and Cambridge T.R.) and Mr. F. J. W. Walters (G3LIE) (Honorary Treasurer).

Official Regional Meeting

On Sunday, October 2, 1960, for the first time in the history of the Society, an Official Regional Meeting took place in the county of Dorset. The meeting proper was held in Weymouth when an attendance of nearly 80 members and friends was recorded. A visit to Dorchester Beam Station was arranged in the morning for the benefit of those who could reach the venue in time.

Exhibitions

The Society's stand at the National Radio and Television Show, held at Earls Court, London, from August 24 to September 3, 1960, attracted more attention than previously, probably because it was better sited than in recent years. About 90 new members were enrolled during the period of the show.

The fourth Annual International Radio Hobbies Exhibition sponsored by the Society and organized by Mr. P. A. Thorogood (G4KD), was held in the Old Hall of the Royal Horticultural Society, London, from November 23 to 26, 1960. The exhibition was opened by the actor manager and film star Brian Rix who also is the holder of the amateur call-sign G2DQU.

The exhibition was supported by about 30 radio manufacturers and publishers as well as by specialist sections of the Royal Navy, the Army and the Royal Air Force.

During the period of the exhibition nearly 130 applications for membership were received, whilst total receipts on the Society's stand reached the record figure of £1,038.

The Council records its thanks to Mr. F. F. Ruth (G2BRH) who acted as manager of the Society's stands at both exhibitions and to all who undertook stand duty.

* Read to the members present at the Annual General Meeting of the Society held on December 16, 1960.

New Society Publications

The 1961 edition of the *R.S.G.B. Amateur Radio Call Book* and the second edition of *Service Valve Equivalents* were published on the opening day of the R.S.G.B. Radio Hobbies Exhibition. The new edition of the *Call Book* records nearly 2,000 additions and amendments to the 1960 edition. The new edition of *Service Valve Equivalents* was prepared by Mr. G. C. Fox (G3AEX), and is based on information provided by the Ministry of Aviation.

Good progress is being made with another new Society publication, *The Radio Amateurs' Examination Manual*, due to be published next April, and a revised edition of *The Morse Code for Radio Amateurs* which will appear early in the New Year.

Honorary Vice-President

In recognition of his distinguished services to the Society as Advertisement Manager of R.S.G.B. publications from 1925 to 1960 the Council at its meeting in September 1960 elected Mr. Horace Freeman an Honorary Vice-President of the Society. An illuminated certificate recording his election was presented to Mr. Freeman by the President (Mr. W. R. Metcalfe) just prior to the official opening of the Radio Hobbies Exhibition.

R.S.G.B. News Bulletin Service

As from November 6, 1960, the R.S.G.B. News Bulletin Service was extended still further when a Sunday transmission was made for the first time from Aberdeen. The additional transmission is expected to prove of considerable value to members living in the northern parts of Scotland.

Radio Amateurs' Examination

The Radio Amateurs' Examination conducted by the G.P.O. on October 1, 1960, resulted in 182 candidates out of 274 obtaining a pass mark. It is interesting to record that the highest percentage of passes was achieved at the Cardiff centre where 22 out of 27 candidates (81·4 per cent) were successful.

V.H.F. Beacon Station

The Council is pleased to report that the Society's 2m beacon station is now operating successfully from the Wrotham site of the B.B.C. Thanks are recorded to the Corporation for help given to the members of the V.H.F. and Scientific Studies Committees who were responsible for installing the station.

Mr. Horace Freeman receiving his certificate of election to membership as an Honorary Vice-President from the late W. R. Metcalfe (G3DQ) on November 23, 1960. (Photo by G2AHL.)

Annual General Meeting

Minutes of the 34th Annual General Meeting of the Radio Society of Great Britain held at Over-Seas House, Park Place, St. James's Street, London, W.1, on Friday, December 16, 1960, at 6.30 p.m.

Present: The President (Mr. W. R. Metcalfe in the Chair), the Honorary Treasurer (Mr. N. Caws, F.C.A.), the Penultimate Past President (Mr. L. E. Newnham, B.Sc.), Messrs. D. Deacon, C. H. L. Edwards, A.M.I.E.E., K. E. S. Ellis. R. C. Hills, B.Sc.(Eng.), J. D. Kay, A. O. Milne, G. M. C, Stone (Ordinary Members of the Council), Messrs. E. G. Ingram, P. H. Wade, and E. W. Yeomanson (Zonal Representatives), Mr. John Clarricoats, O.B.E. (General Secretary and Editor), Mr. John A. Rouse (Deputy Editor), and Miss May Gadsden (Assistant Secretary). About 60 other members were also present.

Apologies: Apologies for absence were received from the Executive Vice-President (Mr. H. A. Bartlett), the Immediate Past President (Dr. R. L. Smith-Rose, C.B.E.), Messrs. F. K. Parker, F. A. Russell and A. C. Williams (Zonal Representatives). * * *

Notice Convening the Meeting

The General Secretary read the notice convening the meeting.

Minutes

It was moved by Mr. H. Lassman, seconded by Mr. G. Leicester and RESOLVED that the Minutes of the Thirty-third Annual General Meeting, as published in the February 1960 issue of the R.S.G.B. BULLETIN be approved and confirmed.

Annual Report of the Council

The President moved and it was RESOLVED that the Annual Report of the Council, as published in the November 1960 issue of the R.S.G.B. BULLETIN, be adopted.

The General Secretary read to the meeting a short Supplementary Report of the Council dealing with events and happenings that had taken place since July 1, 1960 (The Supplementary Report is published on page 332).

Report of the Treasurer and the Audited Accounts

Before formally moving the adoption of his Report the Honorary Treasurer (Mr. Caws) explained to the members the reasons for the more important increases and decreases of the various items in the Income and Expenditure Account and the Balance Sheet as compared with the previous year.

Mr. Leicester, after congratulating Mr. Caws on the clear manner in which he had presented the accounts, expressed the view that the Society is extremely fortunate in having a member as competent as Mr. Caws to perform the onerous duties of Honorary Treasurer.

Mr. Caws agreed to look into a point raised by Mr. R. F. Stevens regarding the Norman Keith Adams Prize Fund.*

Mr. Leicester inquired how the Council proposed to meet the cost of employing a Senior Administrative Assistant. Mr. Caws remarked that the time may come when an increase in subscription rates becomes essential if the work of the Society is to be continued in an efficient manner. Mr. Caws reminded the meeting that the Society possesses assets amounting to £11,000 which could be used to meet a deficit in any particular year.

* *Honorary Treasurer's Note:* The amount charged in any year's Accounts of the Norman Keith Adams Prize Trust Fund should be in respect of the Prize for that year and the Prize is normally presented at the appropriate Annual General Meeting following. Previous Accounts of the Trust Fund show that no Prize was presented in respect of the years ended June 30, 1957, and June 30, 1958. Unfortunately, no provision was made in the 1959 Accounts for the Prize in respect of the year ended June 30, 1959, the cost of this Prize being the amount charged in the 1960 Accounts. The cost of the Prize given at the recent Annual General Meeting for the year ended June 30, 1960, should have been provided for in the 1960 Accounts, reducing, as a result, the balance of the Accumulated Fund to *£10 10s.*, the correct amount.

It was then moved by Mr. Caws, seconded by Mr. Leicester, and RESOLVED, unanimously, that the Report of the Honorary Treasurer and the Audited Accounts for the year ended June 30, 1960, be approved and adopted.

Election of Council 1961

The Secretary announced that the following members had been elected without opposition to fill the vacancies which will occur in the respective offices on December 31, 1960.

President	Major-General E. S. Cole, C.B., C.B.E.
Executive Vice-President and Zone F Representative ..	Mr. E. G. Ingram
Honorary Treasurer ..	Mr. N. Caws, F.C.A.
Zone E Representative ..	Mr. A. C. Williams

The Secretary further announced that the result of the ballot to fill the one vacancy which will occur on December 31, 1960, among the Ordinary Members of the Council was as follows:

Mr. D. Deacon	476 votes
Mr. L. E. Newnham, B.Sc.	648 votes
Mr. K. R. Whelan	189 votes

The Secretary also announced that the result of the ballot to fill the vacancy which will occur on December 31, 1960, in the office of Zone C Representative was as follows:

Mr. J. J. Hollington	169 votes
Mr. E. W. Yeomanson	331 votes

The President then declared that Major-General Cole, Mr. Ingram, Mr. Caws, Mr. Williams, Mr. Newnham, and Mr. Yeomanson had been duly elected to serve on the Council.

The Secretary reported that the scrutineers (Mr. G. R. M. Garrett, M.A. and Mr. R. F. Stevens) had accepted 1,313 ballot papers for the main election and 500 for the Zone C election. Twelve ballot papers had been rejected. The scrutineers had accepted seven ballot papers contained in unstamped envelopes upon which postage due had been paid by the Society. They had also accepted 216 votes (Mr. Hollington, 94; Mr. Yeomanson, 122) cast by members resident in Zone C who had not written their address on the backs of the envelopes.

The President congratulated the successful candidates and thanked those who were not successful for agreeing to stand for election. He also thanked Messrs. Garrett and Stevens for scrutinizing the ballot.

The Secretary announced that the following members of the 1960 Council had not been required to stand for election in their respective offices:

Mr. W. R. Metcalfe	Retiring President
Dr. R. L. Smith-Rose, C.B.E.. .	Retiring Immediate Past President
Messrs. C. H. L. Edwards, A.M.I.E.E., K. E. S. Ellis, R. C. Hills, B.Sc.(Eng.), J. D. Kay, A. O. Milne and G. M. C. Stone	Ordinary Members
Messrs. F. K. Parker, F. A. Russell and P. H. Wade ..	Zonal Representatives

Auditors

It was moved by Mr. Caws, seconded by Mr. J. W. Mathews and RESOLVED that Edward Moore & Sons be re-appointed Auditors for the year to June 30, 1961, at a fee of 100 guineas.

The meeting terminated at 7.10 p.m.

Informal Discussion

At the termination of the Annual General Meeting an informal discussion took place.

Committee Membership

Mr. A. J. Worrall inquired why certain members of the Council had attended a great many Committee meetings during the year whilst others had attended very few or none at all. The Secretary explained that the bulk of the routine Committee work of the Society falls upon members resident in and around London. It would not be reasonable to expect Council members and Zonal Representatives living outside Zone C to make long journeys to attend frequent Committee meetings.

R.S.G.B. News Bulletin Service

A member inquired whether it would be a practical proposition to provide a News Bulletin Service for overseas members. The Secretary considered that the practical operation of an overseas service would present difficulties. There had so far been no demand for such a service.

Amateur Radio Handbook

Mr. Alan Bayliss inquired what progress had been made with the *Amateur Radio Handbook*. Mr. Milne reported on the present position and informed the meeting that the Council had set the opening day of the 1961 R.S.G.B. Radio Hobbies Exhibition as the target date for publishing the *Handbook*.

Mr. Lewer suggested that a statement regarding the present position of the *Handbook* should appear in the Society's Journal. Mr. Milne stated that the Council would no doubt keep in mind the suggestion made by Mr. Lewer.

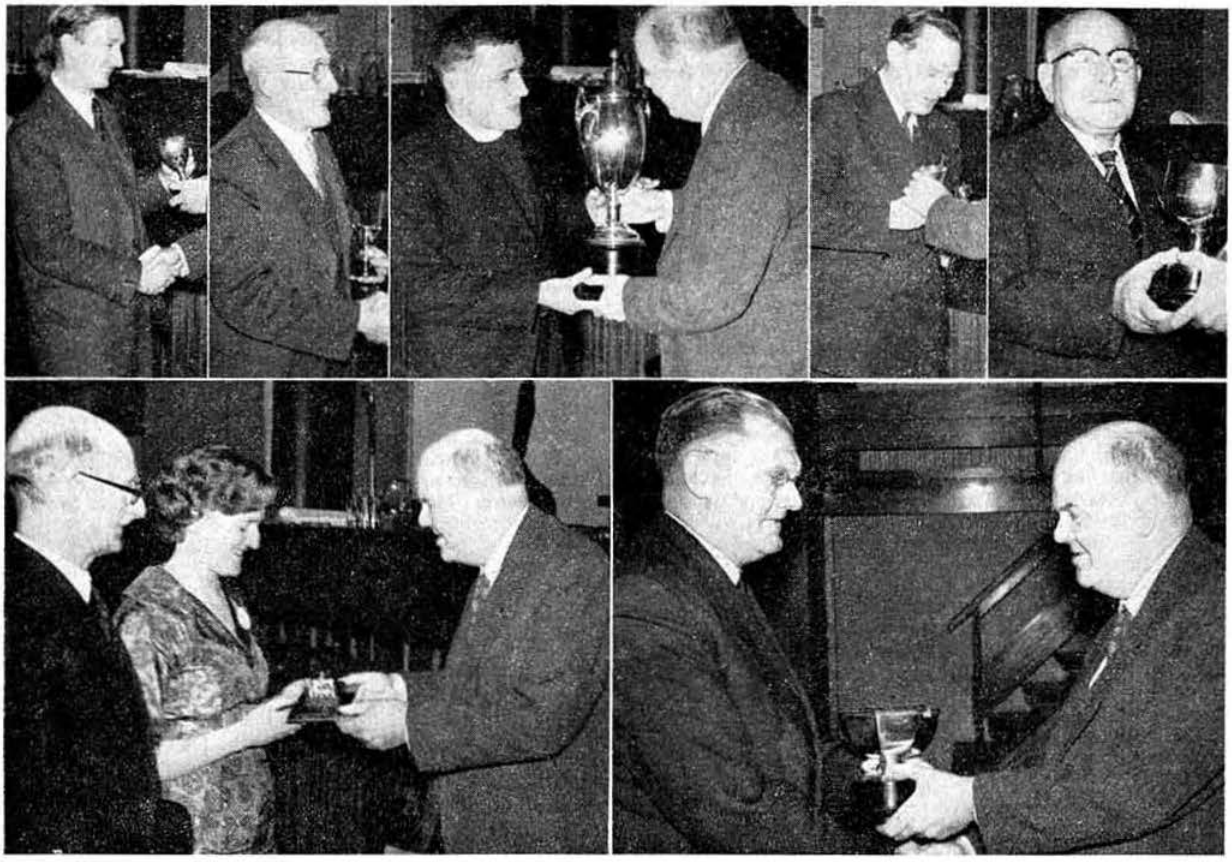
Replying to a further question about the *Handbook* the General Secretary expressed the opinion that the retail price would probably be fixed at about 25s., assuming reasonable support from advertisers; no serious increase in printing costs since the original contract was placed; the number of pages does not materially exceed 400.

The informal discussion ended at 7.25 p.m. after which a presentation of trophies and awards took place.

Presentation of Trophies

AT the conclusion of the informal discussion which followed the Annual General Meeting on December 16, 1960, the President (the late W. R. Metcalfe, G3DQ) presented the following trophies and awards.

ROTAB	Mr. H. Lassman (G2PX).
Courtenay Price	Mr. B. R. Arnold (G3FP).
Calcutta Key	Mr. S. E. Vanstone (G2AYC) and Miss B. A. Fletcher (B.R.S.20988) on behalf of her father, Mr. F. W. Fletcher (G2FUX).



Following the Annual General Meeting on December 16, 1960, the President (the late W. R. Metcalfe, G3DQ) presented a number of trophies and awards to members. From left to right (top row), D. L. Courtier-Dutton (G3FPQ) received the Whitworth Trophy, G. A. Jeapes (G2XV) a miniature, Paul Sollom, O.S.B. (G3BGL) the Wortley Talbot Trophy, David Deacon (G3BCM) the Varney Trophy, and H. Lassman (G2PX) the ROTAB Trophy. At the bottom left, S. E. Vanstone (G2AYC) and Miss Beryl Fletcher (B.R.S.20988) are shown receiving the Calcutta Key from the President. Right, E. H. Sherlock (B.R.S.6604) was presented with the B.E.R.U. Receiving Rose Bowl. (Photos by G2AHL.)

Wortley Talbot	The Rev. Paul Sollom, O.S.B. (G3BGL).
Varney	Mr. David Deacon (G3BCM).
Norman Keith Adams Prize	Mr. John Gazeley (B.R.S.20533).
N.F.D. Shield and Replica	Stamford and District Group.
N.F.D. Shield Miniature Replicas	Stourbridge and District Amateur Radio Society.
	Stamford and District Group.
	Gravesend Radio Society.
	Edgware and Hendon Group.
Edgware	Surrey Radio Contact Club.
Whitworth	Mr. D. L. Courtier-Dutton (G3FPQ).
B.E.R.U. Receiving Rose Bowl	Mr. E. H. Sherlock (B.R.S.6604).
Arthur Watts	Mr. B. R. Arnold (G3FP).
Victor Desmond	Mr. H. J. M. Box (G6BQ).
Miniature	Mr. G. A. Jeapes (G2XV).

Miniature replicas of the B.E.R.U. Senior and Junior Rose Bowls have been sent to Messrs. George Barrett (ZC4IP) and F. C. van Wyck (ZS6R).

The Council Election—A Commentary

ANYONE who imagines that the task of acting as a scrutineer at the counting of votes for members of Council is a sinecure is very far from the mark. They make you do a lot of the hard work—but more of that anon. Fact is I'd imagined that it would just take me half an hour or so, that I'd stand with my back to a warm fire, hands clasped behind my back, and glance around from time to time, pretending that I was preventing the General Secretary (or one of his minions) from "fiddling" the ballot. When it was over, so I imagined, I'd be given biscuits and sherry, bowed out with gracious thanks and escorted home in the Society's own Daimler. What a contrast was reality, but what a lot one learns. One thing, I regret to say, is that an appreciable proportion of our members would seem to be illiterate imbeciles! (Clearly I belong to the latter category for ever having volunteered to act as a scrutineer—a few years in the R.A.F. ought to have taught me better than to *volunteer* for anything.)

To start at the beginning, however, my luck was clearly in when I found a vacant parking meter at 10.30 a.m. less than half a mile from New Ruskin House—but what was more, the needle of this particular meter was firmly up against the "2 hours" mark. Not quite trusting my eyes, I popped a 6d. in. The meter gave a short protesting wheeze and the needle remained immovable at "2 hours." "That suits me," I said to myself, as I departed to seek the comfortable fire and the glass of sherry.

But no. As I've said, they actually make the scrutineers do the work, or at least quite a share of it—and this is where it becomes quite fascinating if you happen to be a student of human nature. Really, the quite extraordinary carelessness of some members is almost unbelievable—though sheer stupidity was alleviated by one generously minded member who'd enclosed thirty bob with his voting paper. Your two scrutineers at once decided that he'd intended this as a gift to be shared equally between us until, most unfairly we felt, your General Secretary observed that there was a Membership Renewal Card in the same envelope. A pity—we might have been fifteen bob up on that deal—but, more seriously, the member concerned had probably failed to realize that ballot envelopes must not be opened until the day of the count—there really *could* be a "fiddle" if this rule was not most strictly observed.

The ballot envelope specifically asks members to affix a 3d. stamp in the ordinary way, yet quite an appreciable number put no stamp on the envelope, which resulted in the Society having to pay 6d. "Postage-Due" on each one. A question then arises "Should the scrutineers reject such votes?" In point of fact we accepted them but, all the same, it isn't quite "playing the game," so in future, chaps, a 3d. stamp on the envelope, please.

Then there were quite a number of members who used their ballot envelopes to return the raffle ticket for the communications receiver offered as a prize at the Radio Hobbies Exhibition held last November! In case they're wondering why they didn't win it, this is, at least, one reason.

Ballot envelopes have to be signed on the outside so that a check can be made beforehand that the ballot paper inside is from a fully-paid member. Several were returned unsigned—and these were rejected by the scrutineers. Have a heart, chaps. Even at a Parliamentary General Election you can't just turn up at the Polling Station and demand a voting paper until you have first identified yourself to the clerks as being a duly qualified voter with your name on that particular Register. So—sign your envelope in future if you want your vote to be counted.

Then there were the fellows who voted for more than one candidate—the strange thing was that no one voted for all three!

Again there were those members who added their signature at the foot of the form. This is highly irregular and constitutes a "spoiled paper" although on this occasion we did, in fact, accept them. But DON'T DO IT AGAIN!

Perhaps the most foolishness was exhibited by those voting in the Zonal Representatives' Election. Obviously only those living in Zone C (London and Home Counties) are qualified to vote for a Zone C Representative. To check qualifications, the instructions which accompanied the form said, distinctly that those claiming a Zone C vote should put their address on the back of the envelope. One can only conclude that a large number of members are either lazy or illiterate, for no less than 216 members failed to carry out this instruction! They had signed the front of the envelope and added their call-signs, so every one could be checked to ensure that he was qualified to vote for the Zone C Representative. Many were NOT—but just think of the work that this throws on to the office staff. This time your scrutineers allowed those apparently qualified to count—but please note for the future. YOU HAVE BEEN WARNED.

Believe me, there were a whole lot more of such stupidities and carelessness. I'm not sure what the moral is but one thing is quite certain—just a little more thought and care would save a great deal of work and worry in the task of scrutinizing and carrying out the annual Council Election ballot.

However, it was all good fun. One learned quite a lot as regards one's "fellow man" and, if it's any consolation, the "sins and omissions" to which I've referred were committed by all sorts and sizes of members. But *do* let's see if we can't do better next time.

The final "pay-off" for this sadder and wiser scrutineer came when he got back to his car near the British Museum, late in the afternoon, tired and disillusioned at what he had learned. The blessed parking meter was *still* reading "2 hours"—I had wasted that 6d. after all!

G. R. M. G.

Electrical Engineers Exhibition 1961

THE Tenth Electrical Engineers Exhibition will be held at Earls Court, London, for five days commencing March 21, 1961. The Association of Supervising Electrical Engineers will again present awards for outstanding new products in the industrial and domestic fields.

Society News

London Meeting
Friday, January 20, 1961

Presidential Address
" Military Communications "

A survey of radio and signals communications methods and problems of the past, present and future.

By Major-General E. S. Cole, C.B., C.B.E. (ex-G2EC),
Director of Telecommunications, War Office

at the

Institution of Electrical Engineers, Savoy Place, Victoria Embankment

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

Trans-Tronic Super-60 Kits of Radio Parts

ADVERTISEMENTS have appeared recently in the National press for a kit of radio parts which it is claimed can be assembled in a few minutes to make four different receivers for the medium and long wave bands and three kinds of short range transmitters using a 3 volt battery.

The Society has been informed by the G.P.O. that the use of the kit of parts (advertised as Trans-Tronic Super 60) is licensable under the Wireless Telegraphy Act 1949. Although there is no objection to the use of the components of the kit as a receiver under a broadcast receiving licence, provided the equipment does not cause interference to other users of radio, the Post Office is not prepared to issue licences for use of the Trans-Tronic kits either as transmitters or transmitter/receivers and anyone so using the equipment is liable to prosecution.

It is understood that the manufacturers of the kits (Brayhead Products Ltd. of The Power House, Headstone Lane, Harrow, Middlesex) have been advised accordingly and members of the public, firms selling the equipment, etc., who inquire about licensing of the kits are also being similarly advised.

Bulletin Contributors

THE Editor is always pleased to receive offers of technical articles but in order to avoid possible disappointment later, intending contributors should first submit a synopsis outlining the scope of the proposed article.

Amongst those who attended the Christmas meeting of the London Member's Luncheon Club on December 16, 1960, were (left to right) Dr. R. L. Smith-Rose, Mrs. Smith-Rose, Mr. S. E. Vanstone (G2AYC), Chairman of the Club, Mrs. Vanstone, Major-General Eric Cole, C.B., C.B.E., Mr. John Clarricoats, O.B.E. (G6CL), Mr. A. O. Milne (G2MI), Mrs. Milne, and Mr. P. H. Wade (G2BPJ). Standing, Mr. D. C. Jardine (G5DJ), Hon. Treasurer of the Club. (Photo by G3NMR.)

R.S.G.B. QSL Bureau

MEMBERS may be interested to know the results of a recent survey made by one of the Society's QSL Bureau Sub-Managers, Mr. G. Voller (G3JUL), who handles cards for licensees holding call-signs in the G3LAA-G3MZZ series. In one year, Mr. Voller dealt with 40,000 cards and dispatched about 5,000 envelopes, weighing in all more than 3 cwt. The series covers about 1,230 individuals, of whom about 950 regularly collect their QSLs. After repeated reminders, there are only 133 people who do not.

About 50,000 QSL cards are held by the Bureau for non-collectors and instructions are therefore being given to all sub-managers to destroy on March 1, 1961, all cards for which there are no collection envelopes and which have been held unclaimed for three months or more.

Every effort is made by the R.S.G.B. QSL Bureau to persuade licensees to collect their cards but as some have been in store for more than a year they are becoming an embarrassment. Only about one in ten of those who do not collect their cards is a member of the Society.

Another Pirate Fined

AT Leeds Juvenile Court on November 25, 1960, a 16-year-old youth pleaded guilty to a charge of using wireless telegraphy apparatus without a licence contrary to Section I (1) of the Wireless Telegraphy Act, 1949. He was fined £1 and ordered to pay 3 gns. costs.

MULLARD AWARD 1960
NOMINATIONS INVITED

THE terms and conditions governing the Mullard Award, are as follows:

(1) *The Award is offered annually by Mullard Limited during the pleasure of the Directors of that Company.*

(2) *The Award will take the form of a gift in kind (preferably electronic or electrical apparatus and/or books) to the value of £25, and a plaque.*

(3) *The Award will be made to the member of the Radio Society of Great Britain resident in the United Kingdom who (in the opinion of a Committee consisting of three representatives of Mullard Limited and three representatives of the Council of the Radio Society of Great Britain) has, through the medium of Amateur Radio during the preceding calendar year, rendered outstanding personal service to the community by his own endeavour or by his own example of fortitude and courage.*

(4) *The presentation of the Award will take place during the month of April each year on a date and at a place to be decided by the Committee.*

(5) *In January of each year, the Radio Society of Great Britain shall, through its Official Journal, invite nominations for the Award. Each such nomination shall be supported by at least three Corporate Members of the Society and shall be accompanied by a brief factual account of the personal service rendered by the nominee.*

In accordance with Rule 5, the Council invites nominations for consideration for the Mullard Award for 1960. Such nominations should be sent in writing to the General Secretary at R.S.G.B. Headquarters to arrive not later than February 14, 1961.

Wired Television

WITH the increasing use of wired television, members may like to know that where interference is caused to such services using carrier frequencies embracing the bands assigned for amateur operation, the Post Office refers complainants to the relay company concerned. The Post Office normally looks to the relay companies to attend to their systems to prevent the interference.

Amateur Radio Courses

AN Amateur Radio course is being held at Risley Evening Institute and Youth Centre, Tottenham, London, N.17, on Monday evenings. The course, which is mainly practical, is intended to be of pre-R.A.E. level. There will be opportunities for constructional work. Further details may be obtained from J. D. Harris (G3LWM), 2 Lambton Avenue, Waltham Cross.

Details of a course in preparation for the Radio Amateurs' Examination may be obtained from the Head of Electrical Engineering Dept., Carshalton Technical Institute, Nightingale Road, Carshalton, Surrey.

Amateur TV News

EARLY in November 1960, G3OAT/T (Blundisham, near Huntingdon) received 625 line pictures from G2WJ/T (Dunmow, Essex) to set up a new record path length of 49·7 miles. Since then, G3KKD/T, G3NOX/T, G2WJ/T and G3GDR have joined forces to set yet another record for the relay of amateur TV signals. Pictures originated by G3KKD/T (Ely) were retransmitted by G3NOX/T (Duddenhoe End, Saffron Walden) to G2WJ/T who in turn retransmitted them to G3GDR at Abbotts Langley, Herts., a total distance of 80 miles.

Full reports on both these achievements will appear in *CQ-TV*, No. 44 of which is to be published later this month.

The British Amateur Television Club's booklet *Slow Scan Television* is obtainable price 2/6 from Don Reid, 21 Silverdale, Sydenham, London, S.E.26.

Admiralty Great Circle Map

THE Admiralty Hydrographic Chart (No. 5085) of the world is a great circle map on the azimuthal equidistant projection showing the true bearing and distance from London of every position on the globe. The natural scale is 1 : 63, 360,000 or 1,000 statute miles to the inch. The chart measures 27 in. square and is available from nautical suppliers, chart agents and depots or on order from H.M.S.O. or agents price 6/-.

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12.00	North East Scotland
145·55 Mc/s	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
145·3—145·4 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from Affiliated Societies and from non-affiliated societies in process of formation will be welcome.

Third Boy Scout International Jamboree-on-the-Air

MEMBERS who took part in the third Jamboree-on-the-Air and who would like a souvenir participation certificate should write, enclosing a 3d. stamp, to L. R. Mitchell (G3BHK), " Katoomba," Tyneham Close, Sandford, Wareham, Dorset. The Boy Scout International Bureau station VE3JAM at Ottawa has already forwarded QSL cards to all stations contacted during the event.

Ex-Gs in Canada and the U.S.A.

NORMAN F. THOMPSON (W8HYO), 1368 Roslyn Avenue, Akron 20, Ohio, is compiling a list of licensed Canadian and U.S. radio amateurs who originally hail from the United Kingdom.

Mr. Thompson, formerly of Sunderland, Co. Durham, will be pleased to receive the following information regarding such amateurs: (i) Name, present call and address; (ii) Name of former hometown in the U.K.; (iii) Former U.K. call-sign if any.

Colour Film Available on Loan

A 16mm. colour film (with sound track) entitled *Tufnol in the Making* is available on loan to R.S.G.B. Groups and Affiliated Societies from Tufnol Ltd., Ellison House, 11 Connaught Place, London W.2. Applicants should state whether a projector and operator are available.

Silent Keys

CYRIL ATKINSON (G3GGF)

We record with sorrow the death recently of Cyril Atkinson (G3GGF) of Swinton, Lancs., at the early age of 37 years.

To his widow, we extend our sympathy in her tragic loss.

C. R. GREENLAND (G4HD)

It is with deep regret that we report the death of C. R. Greenland (G4HD) of Westbury, Wilts., on November 22, 1960, at the age of 49 years.

Well-known on the DX bands, particularly 28 Mc/s, he was always ready to help others and devoted much of his time to the Talking Books repair scheme. His last constructional achievement was the completion of a full-range electronic organ.

Sympathies are extended to his mother, brother and other members of his family in their bereavement. L. H.

DR. J. S. W. NUTTALL (G4BO)

We deeply regret to record the death on December 15, 1960, of Dr. John Stanley Wardleworth Nuttall (G4BO) of Birkenhead at the age of 81 years. Licensed in 1936, " Doc," as he was called by his many friends on Top Band and 7 Mc/s, was particularly well known for the high quality of his transmissions. He brought a scientific mind to bear on all his experiments and his craftsmanship in building gear was acknowledged throughout the Merseyside area.

Doc's courtesy and encouragement to the newcomer on the air and his keen sense of humour endeared him to all and will long be remembered.

To his daughter, son-in-law (G3ADI) and granddaughters we express our heartfelt sympathy in their bereavement.

GEORGE WESTERN (G3LFL)

It is with deep regret that we have to record the sudden death during the early hours of Boxing Day, 1960, of George Western (G3LFL) of Torquay, honorary secretary of the Torbay Amateur Radio Society. He was 49 years of age.

Licensed in 1956, George was very well known on the lower frequency bands, particularly 3·5 Mc/s, and as a sightless amateur often joined in the 7 Mc/s nets of the Radio Amateur Invalid Bedfast Club.

The Society was represented at the funeral by Messrs. E. E. J. Hayman (G3ABU) and B. E. Symons (G3LKJ).

To his widow (G3NQD), two sons and daughter we extend our deepest sympathy at this time. B. E. S.

Rules for National Field Day 1961

RULES for N.F.D. 1961 are practically the same as for the 1960 event. A minor alteration regarding aerials has been made in Rule 9 (*a*).

1. **Duration.** The Contest will commence at 17.00 G.M.T. on Saturday, June 3, and end at 17.00 G.M.T. on Sunday, June 4, 1961.

2. **Eligible Entrants.** Any group of members within the British Isles, which for the purposes of the contest comprise the prefix zones G, GC, GD, GI, GM and GW, may enter. The group may be a local R.S.G.B. group, a club or an Affiliated Society.

3. **Operators.** Operators of portable stations competing in the contest must each hold a current British Isles (G.P.O.) Amateur (Sound) Licence and must be fully paid-up Corporate Members of the Society at the time of the contest.

4. **Stations.** 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 Representative. It will be permissible for two groups within a single region, each operating a single station, to amalgamate for the purpose of scoring; if this is done, frequency bands must be allocated between the two stations as detailed above. Single-station entries will be accepted from stations operating on not more than three of the frequency bands listed above.

5. **Licences.** Each station must be licensed to use a different call-sign.

6. **Applications.** Each group intending to compete must notify the R.S.G.B. Contests Committee, 28-30 Little Russell Street, London, W.C.1, of the name of the group, location and the name and full postal address (in **BLOCK LETTERS** please) of the T.R., A.R., A.S.R., or member responsible for their entry, not later than **MONDAY, MAY 1, 1961.** Stationery and the latest information on the contest will be sent to this member.

Details should be set out as follows:

Call-sign station "A"..... Call-sign station "B".....
The bands to be used by these stations are:

Band	1·8 Mc/s	3·5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s
Call-sign						

7. **Tents.** Stations must be operated from tents.

8. **Apparatus.** No apparatus may be erected on the site prior to 12.00 G.M.T. on June 3, 1961. This rule includes aerials and aerial fittings as well as tented accommodations for the stations, but does not apply to a tent to be used for storage purposes.

9. **Aerials.** Any aerials may be used, subject to the following limitations:
   (*a*) All aerials must be constructed from wire of total cross-sectional area not greater than 14 s.w.g. with the exception, however, that vertical radiators of any construction may be used.
   (*b*) No part of the aerials shall exceed a height of 45 ft. above ground level.

10. **Transmitters and Receivers.** Equipment at any "A" or "B" station must not exceed three transmitters and one receiver. Reserve equipment may be kept available, but not connected.

11. **Power Input.** Total d.c. input power 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.**

12. **Power Supply.** Power for any part of the station shall not be derived from supply mains.

13. **Type of Emission.** The contest is restricted to the use of c.w. (A1) only.

14. **Contest Exchanges.** An exchange of reports must be made and acknowledged before points may be claimed. In contacts made by competing stations the report 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. RST579001, 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.

15. **Contacts.** Only one contact with each specific station, whether fixed, portable or mobile, may count for points on each band during the contest. Duplicate contacts should be logged without claim for points.

16. **Group Contacts.** 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.

17. **Scoring.** Points will be scored on the following basis:

(*a*) Fixed 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*) Portable and mobile stations in the British Isles ...	*3 points
(*f*) Portable and mobile stations in the rest of Europe including Eire	4 points
(*g*) Portable and mobile stations outside Europe ...	6 points
(*h*) Portable and mobile stations in the British Commonwealth and Empire	12 points

* An additional 2 points may be claimed **on 1·8 Mc/s and 3·5 Mc/s ONLY** for contacts with a portable or mobile station in any other British Isles prefix zone (e.g., GM-G, GM-GD, G-GI, GW-GC contacts on 1·8 and 3·5 Mc/s score 5 points). The six British Isles prefix zones are listed in Rule 2.

18. **Summary Sheets.** An entry will be accepted as valid only if the completed summary sheet has been signed by the T.R., A.R., A.S.R., or member whose name has been notified to the Contests Committee in accordance with Rule 6, who will be solely responsible for the conduct of the event within his group, however constituted.

19. **Operators' Signatures.** Contacts made by an operator whose personal signature does not appear on the cover sheet(s) of the appropriate log(s) may be disallowed.

20. **Entries.** Each station's entry shall consist of extracts from the station log on the printed log sheet, a separate extract being submitted for each band worked, together with a cover sheet for each band, and a summary sheet. The points claimed must be totalled for each band. Forms for this purpose will be supplied by Headquarters. Entries must be addressed to the R.S.G.B. Contests Committee, 28-30 Little Russell Street, London, W.C.1, **postmarked not later than June 19, 1961. LOGS MUST BE KEPT AND ENTRIES SUBMITTED IN G.M.T.**

21. In addition to the ***National Field Day Trophy*** and miniature replica, 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.

22. **A certificate** will be awarded to each of the following:
   (*a*) The chief operator of the overseas station whose check log shows that he contributed the most points to competitors.
   (*b*) The non-transmitting British Isles member whose check log is adjudged the most useful by the Contests Committee.

23. The ***Scottish N.F.D. Trophy*** 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. **Care of Trophies.** The Trophies will be handed to the representatives of the groups concerned, who will be responsible for their safe keeping until their return is requested by R.S.G.B. Headquarters.

Contest Logs

THE Contests Committee have recently been requested to advise on the difficulty which arises, particularly in v.h.f. contests, when part of the required exchange is the signal report and this is amended *during the contact* by the issuing station due to changing conditions, turning of beams etc. Apparently some confusion is then created, in that the recipient does not know which entry has been actually recorded in the issuing stations' log, and may inadvertently lose points due to an apparent discrepancy in logs. The Committee have decided that, in most cases, it should be possible to resolve this during the contact e.g. " your signals are now 58 but I have recorded the original 44A032 in my log." However, in instances where this is not done, the station in doubt should indicate additionally the revised report on his log, and due consideration will be given by the Committee to the possibility of confusion when checking is undertaken.

Club Stations

WITH reference to the statement published on page 236 of the November 1960 issue of the R.S.G.B. BULLETIN, the G.P.O. have advised the Society that additional operators are authorized to operate a club station without any special limitations. This means that additional operators may avail themselves of the " temporary alternative address " and " alternative address " conditions set out in Sub-Clauses (1)(a) (ii) and (iii) of the Amateur (Sound) Licence.

Affiliated Societies' Contest 1961

DETAILS of the Affiliated Societies' Contest to be held on February 4-5, 1961, were sent to all societies affiliated to the R.S.G.B. at the beginning of January.

CONTEST NEWS

RESULTS — REPORTS — RULES

National 144 Mc/s Open Contest 1960

TAKE 10 watts up a mountain with a 6-over-6, be accurate in keeping the log, and you would probably give GW3KMT/P a run for his money. But on this occasion he is the overall winner of the National 144 Mc/s Open Contest, 1960, by more than 1,000 points. G2DTO/P on a " local mountain " near to Brighton came second, as he has done previously.

Recently a very potent signal has put Danbury (Essex) on the 144 Mc/s map and from there G3LTF lead in the High Power Section, followed by G3JWQ with a very creditable score from roughly the centre of the British Isles.

With double the power of the overall winner and no particular elevation G2HIF headed the Low Power Section, though his score was well down on the winner's total. Very close to the leader was G6GN.

Some interesting points are worth recording. For example, three transistorized transmitters were in evidence: G6NB whose best DX was 122 km (power unknown), G3LAR/P—

Results

Portable/Mobile Section

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	GW3KMT/P	17845	8	G3ION/P	4133
2	G2DTO/P	16511	9	G3OBD/P	3886
3	G3LCH/P	12967	10	G3FRV/P	2858
4	G3HGE/P	9827	11	G3LZT/P	2787
5	GW3KYT/P	9302	12	G3LAR/P	2475
6	G3FD/P	8706	13	GM3KYI/P	2334
7	G3JDN/P	5076			

High Power Section (Fixed Stations)			Low Power Section (Fixed Stations)		
Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3LTF	13698	1	G2HIF	6986
2	G3JWQ	11102	2	G6GN	6942
3	G3HBW	9098	3	G3LEV/A	4378
4	G3EGK	5728	4	G3NNG	3853
5	G3LTN	3696	5	G3IBI	1695
6	G3HWR	2646	6	G2DHV	699
7	GM3LDU	2050			

119 km with 0·036 watt and, with the same power, G2HCJ/M who wants to know if 163 km is a record? G3ION/P found conditions peculiar with a diode squelch type of effect on all signals. G3NNG noted some signs of an aurora. After the contest (this always happens) G3NNG heard GM2FHH at 599 and G3HBW making use of it. GM3LDU reported that tropospheric conditions were poor but confirmed there was a short aurora.

The Contests Committee is still wondering where one station really was for he was " out of this world " on a latitude of 260° W. Another station persists (having done it before) in being " well at sea! " If the regulation 10 miles per inch map were used, as it should be, it would be barely necessary to quote the letters indicating 100 km squares, as the nearest town is given. By horizontal lines northward, from the left-hand bottom corner of the particular square, anyone would be within 10 km of a given location. To estimate the tenths of each small square is easy and would indicate a location within 1 km and no one should be " out of this world " or " all at sea! " Incidentally, in measuring distances why not employ a solid rule marked in 10 km, not elastic as some use! (The Committee uses a clear plastic rule.) Put a drawing pin at 0 km and pin it down on the map at the QTH. This device can be rapidly swung to any other location and the correct distance instantly noted.

Check logs from G2HCJ, G2SG, G2UJ, and G3HRH are gratefully acknowledged.

National 420 Mc/s Open Contest 1960

ONLY two entries were received for the National 420 Mc/s Open Contest 1960. G. A. Jeapes (G2XV) put in the only entry for the High Power Fixed Station Section and R. Staniforth operating as G3EGV/P from Farnborough was the only entrant in the Portable Section. No entry was received for the Low Power Fixed Station Section. Activity was low and G2XV made only 14 contacts for 683 points. G3EGV/P made six contacts for 385 points.

Acting on the advice of the Contests Committee, the Council has therefore declared the event " No Contest."

G3NOX/T is thanked for his check log.

Second 1·8 Mc/s Contest 1960

THE size of the scores reported by the leading stations and the number of entries received show a very disappointing disparity—at least two stations who failed to submit entries were reported as exchanging serial numbers which would have placed them in the first three, and in fact one of these stations was tipped by at least three other competitors as a likely winner. The ding-dong battle between Messrs. I. T. Cashmore (G3BMY) and H. J. M. Box (G6BQ) continues, with the honours in favour of G3BMY this time. In support of his report that conditions appeared exceptionally good in the North of England, third place goes to M. G. Whitaker (G3IGW) of Halifax. The proportion of " new " call-signs reported in the logs was very high and prompted favourable comment from several old hands—a very encouraging sign when we are told that c.w. is a dying art.

Overseas contacts were reported with ZC4AK, HB9T, DL1FF and several OK stations. Leading contenders for the next award of the Maitland Trophy are GM6RI and GM3KHH.

Scoring rates in the closing hours of the contest were extremely low and tend to support the suggestion of several competitors that an earlier start and earlier finish to the " long " contests would be welcome. This would possibly discourage the few stalwarts who regularly add a bit of life to the tail end by rising early even though, for various reasons, they are unable to operate for the full period. Comment on this point would be most welcome.

Check logs from G2IM, G3BKT, G3ISX, G3KPJ, G3MEH, G3MWZ and G5GH are gratefully acknowledged.

Second 1·8 Mc/s Contest 1960

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3BMY	157	*	G3BTU	84
2	G6BQ	147	25	G3NYZ	80
3	G3IGW	144	26	G3KEP	79
4	G3JEQ	142	27	GM2HIK	76
5	G3KLH	138		G3NWD	76
6	G2MJ	134		G3KPU	76
7	GW3NAM	128	30	G3LUI	72
8	G3ERN	124	31	G4BD	71
	G3IAS	124	32	G2ZR	69
	G3KVG	124	33	G3MGL	67
11	G3KOR	120	34	G3OIT	66
12	G3DCZ	115	35	G2XP	65
	G3FM	115	36	G2HDR	61
14	G3MXH	109	37	G3CWW	59
15	G3JKY	102		G3ILO	59
16	G3NFV	100	39	G3OHH	58
17	G3NPI	98	40	GI3LZS/A	53
18	GW3NJW	94	41	G3GOX	50
19	G3LHJ	93		G3OJG	50
20	GM6RI	88	43	G3JFD	41
	GM3KHH	88		G3OCA	41
22	G3GNS	87	45	GM3AXX	37
	G3NNF	87	46	G6OO	24
24	G3KDV	85			

* Late entry.

First 1·8 Mc/s Contest 1961

THE rules for this contest, which will be " short," are as follows.

When: 21.00 G.M.T. on Saturday, February 25 to 03.00 G.M.T. on Sunday, February 26, 1961.

Eligible Entrants: All fully paid-up Corporate Members of the R.S.G.B. resident in G, GC, GD, GI, GM and GW.

Contacts: C.w. (A1) contacts only in the 1·8 to 2 Mc/s band.

Scoring: Contacts with stations in the British Isles (G, GC, GD, GI, GM and GW) will score one point only; contacts with stations outside the British Isles will score *three* points.

Contest Exchanges: RST reports followed by the contact number starting with 001. All reports must be acknowledged with " R."

Logs: (*a*) Must be tabulated in columns headed (in this order) " Date/Time G.M.T.", " Call-sign of station worked," " My report on his signals and serial number sent," " His report on my signals and serial number received," " Claimed Score."

(*b*) **The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5. The declaration must be signed.**

(*c*) Entries must be postmarked not later than **Monday, March 13, 1961.**

Power Input: The power input to the *final* stage or any preceding stage of the transmitter must not exceed 10 watts.

Awards: At the discretion of the Council of the R.S.G.B., the **Somerset Trophy** will be awarded to the winner and certificates of merit to the stations placed second and third. In addition, the **Maitland Trophy** will be awarded to the Scottish station with the highest aggregate number of points in this contest combined with the Second 1·8 Mc/s Contest 1960. A certificate of merit will be awarded to the non-transmitting member submitting the best check log in the opinion of the judges.

The General Rules for R.S.G.B. Contests published on page 341 apply to the contest.

Listeners' V.H.F. Contest 1961

THE Contests Committee is arranging a v.h.f. contest for listener members to coincide with the 144 Mc/s Open Contest on March 4-5, 1961. The General Rules for R.S.G.B. Contests on page 341 of this issue will apply. The following are the details of the listener event.

1. **Eligible Entrants.** The contest is open to all fully paid-up members of the R.S.G.B. resident in Europe. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are *not* eligible to take part if they own transmitting equipment for the 144 Mc/s band.

2. **Duration.** The contest will commence at 17.00 G.M.T. on Saturday, March 4, and end at 19.00 G.M.T. on Sunday, March 5, 1961.

3. **Scoring.** Entrants will be required to log stations operating in the 144-146 Mc/s band. Each complete log entry of a telephony transmission will score 10 points; for each complete entry of a telegraphy transmission 20 points may be claimed. In addition a bonus of 25 points may be claimed for the first station logged in each new county in accordance with the list given in the details for the 144 Mc/s Open Contest. The whole of the London Postal Districts will count as one county only. Stations outside the U.K. will score 25 points (50 points if on telegraphy) for each complete log entry.

4. **Entries.** (a) To count for points, logs must show, in columns, (i) Date/Time (G.M.T.); (ii) Call-sign of Station Heard; (iii) Report and Serial Number Sent by Station Heard; (iv) Your Report on the Signals Heard; (v) County of Station Heard; (vi) Call-sign of Station being worked; (vii) Bonus Points; (viii) Points claimed.

(b) Entries must be set out on R.S.G.B. Contest Log Sheets available from R.S.G.B. Headquarters or on one side only of foolscap paper.

(c) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and must certify that the entrant does not possess transmitting equipment for the 144 Mc/s band.

(d) Entries must be postmarked not later than March 20, 1961.

5. **Awards.** At the discretion of the Council, certificates of merit will be awarded to the winner and to the runner-up.

144 Mc/s Open Contest 1961

R.S.G.B. members throughout Europe are invited to take part in this popular v.h.f. contest. Both phone and c.w. may be used.

The details are as follows:

When: 17.00 G.M.T. on Saturday, March 4, 1961, to 19.00 G.M.T. on Sunday, March 5, 1961.

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe.

Contacts: May be made on either A1, A3, A3a or F3 in accordance with the terms of the Amateur (Sound) Licence.

Scoring: For each completed contact within the United Kingdom **10** points may be claimed; in addition a bonus of **25** points may be claimed for the first contact in each new county in accordance with the list below. The whole of the London Postal Districts will count as one county only. For contacts outside the United Kingdom, a flat rate of **25** points for each completed contact may be claimed.

Contest Exchanges: RST or RS reports followed by the band identification letter A, the contact number, the location and county (e.g. RST559A001 Digswell, Herts).

Logs: (*a*) Must be tabulated in columns headed in this order " Date/Time G.M.T.", " Call-sign of station worked," " My report on his signals and serial number sent," " His report on my signals and serial number received," " Location and County of station worked," " Bonus Points," " Points Claimed."

(*b*) **The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed. The location of the station must include the county.**

(*c*) Entries must be postmarked not later than March 20, 1961.

Awards: At the discretion of the Council, the **Mitchell-Milling Trophy** will be awarded to the winning entrant and a certificate of merit to the entrant placed second.

The General Rules for R.S.G.B. Contests published on page 341 of this issue of the R.S.G.B. BULLETIN apply to this contest.

LIST OF U.K. COUNTIES

England (G).

1. Bedford	15. Hereford	28. Nottingham
2. Berkshire	16. Hertford	29. Oxford
3. Bucks	17. Huntingdon	30. Rutland
4. Cambridge	18. Kent	31. Shropshire
5. Cheshire	19. Lancashire	32. Somerset
6. Cornwall	20. Leicester	33. Stafford
7. Cumberland	21. Lincoln	34. Suffolk
8. Derby	22. London (Postal Districts)	35. Surrey
9. Devon		36. Sussex
10. Dorset	23. Middlesex	37. Warwick
11. Durham	24. Monmouth	38. Westmorland
12. Essex	25. Norfolk	39. Wiltshire
13. Gloucester	26. Northampton	40. Worcester
14. Hampshire	27. Northumberland	41. Yorkshire

Scotland (GM).

42. Aberdeen	54. Fife	66. Renfrew
43. Angus	55. Inverness	67. Ross & Cromarty
44. Argyll	56. Kincardine	58. Roxburgh
45. Ayr	57. Kinross	69. Selkirk
46. Banff	58. Kirkcudbright	70. Shetland
47. Berwick	59. Lanark	71. Stirling
48. Bute	60. Mid-Lothian	72. Sutherland
49. Caithness	61. Moray	73. West Lothian
50. Clackmannan	62. Nairn	74. Wigtown
51. Dumbarton	63. Orkney	
52. Dumfries	64. Peebles	
53. East Lothian	65. Perth	

Wales (GW).

75. Anglesey	79. Caernarvon	83. Merioneth
76. Brecknock	80. Denbigh	84. Montgomery
77. Cardigan	81. Flint	85. Pembroke
78. Carmarthen	82. Glamorgan	86. Radnor

Northern Ireland (GI).

87. Antrim	89. Down	91. Londonderry
88. Armagh	90. Fermanagh	92. Tyrone

Channel Islands (GC).

93. Alderney	95. Jersey	96. Sark
94. Guernsey		

97. Isle of Man (GD). 98. All Stations outside the United Kingdom.

General Rules for R.S.G.B. Contests 1961

THE following rules apply to all R.S.G.B. Contests and are to be read in conjunction with the details for each individual contest published in the R.S.G.B. BULLETIN.

Rule 1. **Entrants** must operate in accordance with the terms of their licences.

Rule 2. **Unlicensed Stations.** Contacts with unlicensed stations will not count for points.

Rule 3. **Contest Exchanges.** An exchange of RST or RS reports followed by a three figure serial number starting with 001 for the first contact and increasing by one for each successive contact (i.e. 559001 or 58001) must be made before points can be claimed. All reports must be acknowledged. In the case of **v.h.f./u.h.f. contests,** the location and band identification letter (A for 144 Mc/s, B for 420 Mc/s and C for 1250 Mc/s) must also be exchanged. The location must be in distance and direction from the nearest town easily found on the 10 m. to 1 in. Ordnance Survey Maps (i.e. 559A001 10E Oxford or 56A001 10W Cambridge), unless otherwise stated.

Rule 4. **Contacts.** Only one contact on each band may be made with a specific station, whether fixed, portable, mobile or alternate address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. (This rule may be subject to variation in certain contests and reference should be made to the published details.) Proof of contact may be required.

Rule 5. **Entries** must be clearly written or typed ON ONE SIDE ONLY of R.S.G.B. contest log forms or on foolscap or quarto paper and must be set out in the form prescribed in the published details for the contest concerned. The cover sheet of an entry must be made out in the following form and all the information filled in:

Contest.....Date.....Claimed Score.....

Section (if any).....Call-sign.....

Name .....

Home address .....

Address of Station or Portable Location as transmitted. / National Grid Six Figure Reference (or Lat. and Long. or County Code number) ..... (where applicable—see contest details)

Transmitter.....Power input.....watts

Receiver..... Aerial(s).....

DECLARATION: I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the R.S.G.B. shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was.....watts.

Date..... Signed.....

Failure to complete the cover sheet or sign the declaration may involve disqualification of the entry.

Rule 6. **Submission of Entries.** Entries must be addressed to the Contests Committee, Radio Society of Great Britain, 28-30 Little Russell Street, London, W.C.1, England, and must be post-marked not later than the date stated in the published details governing the contest concerned. The name of the contest must be clearly shown at the top left-hand corner of the envelope. All entries become the property of the Radio Society of Great Britain.

Rule 7. **Multiple Operator Entries.** Unless otherwise stated, single operator entries only will be accepted. In those contests where multiple operator entries are allowed, such entries will only be accepted provided that:

(*a*) The call-sign of the operator concerned is recorded for each contact.
(*b*) The declaration is signed by only one operator who will be regarded as the entrant.
(*c*) The names and call-signs of all operators are listed on the cover sheet.

Rule 8. **Portable stations** must operate from the same site for the duration of a contest. Power must not be derived from public or private supply mains. No apparatus may be erected on the site prior to the day of the event. For the purposes of R.S.G.B. contests, **mobile stations** are stations installed in motor vehicles or vessels on inland waterways and so equipped that they are capable of operation in motion without any alteration.

Rule 9. The details relating to specific contests published in the *R.S.G.B. Bulletin* shall be regarded together with these general rules as the rules of the contest.

Rule 10. In the event of any dispute, the ruling of the Council of the Radio Society of Great Britain shall be final.

Rule 11. **Check logs** submitted by non-transmitting members for consideration for the award of certificates of merit should give in this order the following details: Date, Time (G.M.T.); Band; Call-sign of station heard, His report and serial number sent; Call-sign of station being worked.

R.A.E.N. Notes and News

BY E. ARNOLD MATTHEWS (G3FZW)*

THE inclement weather of 1960 will be remembered by many of us for a long time, and so will serve as a reminder that there is no such thing as " a safe area." Although many areas of the country experienced local flooding, the destruction of property and danger to life was in no way comparable to the East Coast inundations of 1953, nor did the situation build up with the appalling speed of the Lynmouth disaster. Yet the bad weather we have had should help to dispel the idea which still lingers in some areas that " there will never be any need for R.A.E.N. in this district."

For the county groups 1960 was a quiet year, and they used the time in various ways—some worked with a will to make a more competent team, some spread out to new districts, some tried new methods or new bands, and some just kept on keeping on.

Technically, the year will be remembered for the swing towards v.h.f. and for the introduction of RTTY. The most interesting feature about the use of v.h.f., however, is that many groups are using two bands (usually 160m and 2m) together with reasonable efficiency. It seems to be established that, whatever the purists say, such an arrangement can work and there is no argument as to the wisdom of choosing the scheme in preference to saying, " If you haven't got v.h.f. gear, you won't fit into our v.h.f.-equipped group," or, alternatively, " Sorry, OM, but we don't see what use we can make of your v.h.f. gear, we use Top Band! "

Of course, complications arise, especially when neighbouring groups have to work cross-band for inter-county contact. The general effect of this is to slow down traffic to a marked degree, and much patient experiment is needed to build up satisfactory message handling under such conditions. This is where we realize that, to be efficient, R.A.E.N. must be well organized in addition to being prepared. It would be fair to say that few groups can effectively handle traffic from outside their own area simultaneously with their internal work.

For the R.A.E.N. Committee, 1960 brought much hard work. Several long-term matters have required detailed consideration. The emergency use of Amateur Radio varies greatly in different countries, but all National Societies appear to agree that such use will be effective only if it is well organized, and the sum of British effort has been a useful guide to other countries, even under vastly different conditions of application. It must be recognized that R.A.E.N. is a much larger body than its counterparts in many countries and the repeated pattern of development in groups has enabled guidance to be given on the requirements for successful formation, training, and long-term maintenance of a group.

The general aim of R.A.E.N. Controllers is to work up a Group which can react well to the demands made by sudden local disaster relief operations. A group which is prepared for this type of work will be able to give a good account of itself in any type of relief operation because the training required for efficiency brings an awareness that neither speed, skill, equipment nor knowledge alone are enough but all must be combined with willingness to form a state of preparedness which makes all the difference between wearing a R.A.E.N. badge in one's lapel and being vaguely " in R.A.E.N." on the one hand, or having R.A.E.N. work always at heart and being " an active R.A.E.N. member " on the other.

East Coast Trunk Route

The R.M., G3ABB, reports that reorganization is proceeding, and the London-Suffolk 2m links are to be incorporated. It seems probable that the v.h.f. section will be extended well into Norfolk shortly.

Personnel

A nominal roll of officers has been issued to all officers, and a few spare copies are available to members requiring them. Applications, to the Hon. Secretary, R.A.E.N. Committee, must be accompanied by a stamped addressed envelope.

Will C.C.s. and A.C.s. please note that activity reports should be sent in by the 18th of the month preceding publication, if they are intended for inclusion in this column.

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* *1 Shortbutts Lane, Lichfield, Staffs*

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. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Licence Matters—Liberality and Intolerance

DEAR SIR,—The interpretation of Temporary Alternative Address Licence regulations (November 1960 issue) and the controversial issue of third party message handling, throws into prominence the strange mixture of liberality and intolerance shown by the Post Office since the war. Many conditions have been eased, thanks in no small measure to the efforts of the R.S.G.B. Others seem to be difficult to understand. For example: why is traffic handling barred ? If as suggested, it were confined to c.w. there is no doubt the general standard of operating would be immeasurably improved, for there is no room for mediocre standards in this sphere. As the G.P.O. Telegraph Service is " in the red " each year, the old bogy of potential loss of revenue does not hold water. Accusations that we should lose our amateur status, despite there being no question of monetary reward, is equally absurd. If " amateur " means unpaid—and I quarrel with this meaning in our case—then many of us are " shamateurs." We are, in the literal sense, " lovers " of our hobby but I would not label any of us professionals simply because we may receive some payment for writing, servicing or R.A.E. instruction.

I now take up cudgels on behalf of the B.R.S. and short wave listener. Presumably if he gains experience by building a transmitter he must " manhandle " it over to me for testing because I cannot operate " /A " from his address. I assume, however, I can take my *own* gear over to him. I just do not know. Even under the strictest supervision he must not handle the key, or even have the temerity to say " hallo," otherwise he is deemed to be " operating " the station. When he goes on the air with his own " ticket " he is launched into the *melee* of amateur bands with little or no practical experience. May we be thankful that we don't hurl " L " drivers on the road in the same way ? What about an amateur television station ? If a B.R.S. strays before the camera is he " operating " the station ?

Now we come to the last straw; if I call on a fellow amateur, maybe licensed for a matter of days, I am not allowed to operate, except under his supervision. After over 30 years on the air I somehow think I would get by. Apparently the Post Office have other views.

I cannot too strongly emphasize that I am not advocating wholesale relaxation of licence conditions but for heaven's sake let's have the existing ones administered with common sense.

Yours faithfully,

E. JOHNSON (G2HR).

Chingford, London, E.4.

More Talk About " Talk Power "

DEAR SIR,—One of the reasons why there is so much controversy over the subject of s.s.b. is that conflicting claims are continually being made regarding its superiority in " talk power " over normal a.m. transmission. Unfortunately Mr. Thornley seems to have fallen into one of the pitfalls with which the subject abounds. The best way of determining the relative " talk power " of two different modes of transmission is to observe the amplitude of the a.f. output of the receiver detector, provided the receiver gain, etc., remains constant.

If we take a transmitter of 100 watts carrier power, and modulate it to 100 per cent with a sine-wave tone, the peak instantaneous power of the transmission is 400 watts, but it is not safe to conclude that the peak instantaneous power of the sidebands is 200 watts. In fact, the R.M.S. power of each sideband is 25 watts, and the peak power of each sideband is 50 watts.

If this transmission is passed through a receiver of sufficient bandwidth to pass both sidebands, the effect of completely removing one sideband will be to reduce the a.f. output from the detector by 6db, not 3db as stated by Mr. Thornley. This is because of the phase relationship between the two sidebands, which is such that the vector resultant of the sidebands is in phase or exactly out of phase with the carrier. Under these conditions, the two sidebands produce twice the a.f. voltage at the detector which would be produced by one sideband, therefore removing one sideband reduces the " talk power " to a quarter. Removing the carrier as well makes no difference to the " talk power."

If we now increase the amplitude of the single sideband to the same peak instantaneous power as the original a.m. signal, the power is increased from 50 to 400 watts, an increase of 9db. So the " talk power " of the s.s.b. signal is increased by 9db because of the increase in power, but reduced by 6db because of the loss of the other sideband. The total increase in " talk power " is therefore 3db.

If, however, the receiver is selective enough to pass only the carrier and one sideband of the a.m. transmission, the a.f. output is reduced by 6db, so the apparent gain in " talk power " of the s.s.b. transmission is now 9db, a frequently quoted figure. It is obvious that this is only accomplished by mutilating the a.m. signal in the receiver, which should be taken into account as a separate factor, and not as having anything to do with the " talk power." The other sideband may not contain any extra information but it does give one " S " point more of effective signal.

Not only does reducing the receiver bandwidth by half give the s.s.b. signal an apparent advantage of 6db, but also theoretically improves the signal-to-noise ratio by 3db. The maximum possible advantage of s.s.b. over a.m. is therefore 12db, but the last-mentioned 3db improvement refers only to random noise, and does not necessarily apply to other types of " noise," such as interference caused by other stations, though in most cases the narrower pass band should reduce the effects of such interference. A factor which operates against s.s.b. if the receiver is not very well designed is the noise introduced by the local carrier injection oscillator (b.f.o.) which may more than offset any improvement of the signal-to-noise ratio obtained by reducing the receiver bandwidth.

It is hardly true to say that any change of the balance between carrier and sidebands of an a.m. signal will cause distortion. The removal of one sideband by selective fading will only result in a reduction of the detector a.f. output by 6db, but there will be no distortion. It is true that this will cause phase modulation, but this is immaterial since neither the detector nor the human ear is responsive to phase shift. The most serious effect of selective fading is when the carrier fades and the sidebands are relatively unaffected. This turns the signal into a d.s.b.r.c. signal, and severe distortion occurs at the detector; the effect is similar to gross overmodulation. If a.g.c. is in use, this turns up the r.f./i.f. gain at just the wrong moment, so that the distortion is often louder than the normal undistorted signal.

This effect can be prevented by using local carrier injection; during the carrier fade the signal is received as if it were a d.s.b.r.c. signal. Using this technique, the a.m. signal will be less affected by selective fading than the s.s.b. signal.

The foregoing does not affect my view that s.s.b. is worthwhile, but I hope it will help to explain some of the confusion which apparently exists about the case for and against the use of this mode of transmission.

Yours sincerely,

Hull, Yorks. A. G. DUNN (G3PL).

1960 N.F.D.—East Molesey Disqualification

DEAR SIR,—The East Molesey Group who are, in fact, the Thames Valley Amateur Radio Transmitters' Society, would like their friends and fellow competitors to know that, due to an unfortunate clerical error, they submitted a wrong declaration of power.

The Group have supported N.F.D. from the beginning, have always worked within the framework of the rules and are proud of their integrity and performance. However, in this case, due probably to the burden of everyday tasks, the individual responsible made a mistake. He has our sympathies and we trust our friends will lend us theirs.

Yours faithfully,

East Molesey, Surrey LESLIE COOPER (G5LC).
President T.V.A.R.T.S.,
Past President R.S.G.B.

Appreciation

DEAR SIR,—I have been a member of the R.S.G.B. since 1954 and I would like to place on record that since I joined I have been proud and happy to be associated with the Society. I have found the services you are striving to give us can, in this country, be found nowhere else. By and large I have mainly availed myself of the BULLETIN and the QSL Bureau and before going up to

University I used to attend the meetings at Crystal Palace. Sometimes, when I think of all the Society does for amateurs at so low a subscription, it really seems almost impossible but in fact is a wonderful feat of organization.

Yours faithfully,

London, W.1. BRIAN B. SILVERMAN (A.1328).

Message Handling

DEAR SIR,—The publication of practically all the correspondence received regarding "Message Handling" in the June BULLETIN shows, surprisingly, that it is all in favour. Now how can five people influence 8,000?

Many old-timers viewing Amateur Radio through the mellow glow of advancing years look nostalgically upon the years gone by when the hobby was in the "windjammer" stage, full of adventure and new frontiers, which they helped by sharing, but what about us, the present generation of post-war operators, what will G3ZAA say about us, what heritage are we making for him, for it is being made, now?

One thing we can do is to increase the standing of our hobby in the eyes of those unconcerned with Amateur Radio. Think of it this way. If your neighbour approaches you in the street will he say: "By the way, you were giving us a bit of trouble on the TV last night" or "That rope of yours is knocking against the apple tree" or will he say "Thanks very much for bringing round that message; my boy was very pleased"? We could have that choice, you know.

Message handling would make some of us known in our community for public-spirited good deeds, and Amateur Radio would be mentioned in the Press along with Rotarians, Tablers, Freemasons, and others who do good work by acts of help and kindness. Not that Amateur Radio has not had some share of this in the past, but would have a better share, and more prestige, and a bigger following, by being known as a service by the public, and the amateur would be regarded, like the first aid man, as an asset to the community.

I cannot foresee that the G.P.O. would be unduly obstructive, if safeguards were given. The net outcome would probably be some more mail, some more phone calls, and probably a telegram or two less, but the Services would no doubt welcome the move for the ability of operators will undoubtedly improve, some by specializing in message handling, others will tend to copy the better operating heard, and the younger generation, in whom the Service's are interested, will reap the benefits, including G3ZAA!

It is not supposed that dozens will take up the facility, if granted, immediately. A score or two, perhaps, and as only inter-G working is anticipated then the h.f. bands would not be concerned. But let us remember, with regard to G3KZR's remarks about JA and SV0 stations, that the request is that traffic be handled by c.w. only. Let us benefit by the mistakes of others. We do not wish to be accused of "clobbering" a phone band. As we said, equipment is expensive, s.s.b. equipment in particular, and the wrath of the gods upon anyone who sends a "Johnny loves Mary" message QRM-ing a DX round-table.

But doing message handling is doing something worth-while and given a good start it can do nothing but good, for our friends, for us, and for Amateur Radio.

Yours faithfully,

Acklam, Middlesbrough, Yorks. ALLAN L. TAYLOR (G3JMO)

DEAR SIR,—Since you asked for views about G3JMO's letter (February 1960 issue) herewith confirmation from one amateur at least that he could not care less about third party transmissions; nor, for the record, about QSL cards either!

Yours sincerely,

London, W.2. C. L. LOVELL (G3JUW)

Out-of-Band Operation

DEAR SIR,—I should like to warn all readers—and particularly newly-licensed amateurs—that it is never wise to assume that a station heard calling CQ is on frequency expecially if it appears to be near the band-edge. I recently heard three stations working below 7000 kc/s, two were in the U.K. (a GM3M and a G3N) and the other in the Netherlands. I did not measure the frequency of the PA station but the U.K. stations were working on 6996 kc/s and 6998 kc/s respectively. I gave them a call on 7004 kc/s but neither heard me so I wrote to inform them that they had been working outside the band.

In cases like this I assume that initially one station chooses a spot, either due to faulty calibration or sheer laziness over checking frequency. Other stations hear him and move down either to call him or to call CQ themselves, never for one moment realising that the first station heard was out-of-band.

My frequency checker is a Class D Wavemeter, the 1 Mc/s range of which is doubly useful as a 7 Mc/s marker.

Yours faithfully,

Prestatyn, Flintshire. J. P. EVANS (GW8WJ)

The European Band Plan

DEAR SIR,—May we bring to the notice of members the existence of the I.A.R.U. European band plan which allots 7000-7050 kc/s for the use of telegraphy and not telephony. In recent months this gentleman's agreement has been broken by many stations who are apparently unaware of the plan's existence. Recently we heard a member of Council operating phone in the c.w. part of the band. Surely it is a bad sign when a Council Member of the Society which originally proposed the plan breaks the agreement. May we suggest that the band plan be printed in the BULLETIN from time to time to remind old members and inform new ones of its existence.

Yours faithfully,

R. SMITH (G3LVW)
G. P. STANCEY (G3MCK)
L. D. STRANGE (G3NYA)

The University Union,
Leeds, 2.

Morse Keys

DEAR SIR,—I have followed with interest recent correspondence in the BULLETIN regarding c.w. operation and code practice awards and I feel it an appropriate time to comment on an interesting aspect of operation. Apparently no manufacturer now offers any *good quality* hand keys for sale—at least, I have not been able to find any advertisements for them.

From Service experience and observation of the surplus market I cannot remember seeing any keys of the hand type which are other than mediocre—I can only assume that there is no demand even in the Services.

Perhaps someone could describe the home construction of a really good key in a BULLETIN article.

Yours faithfully,

Southgate, London, N.14. L. E. PROFAZE (ex-G3KAB)

The First W7 to win Empire DX Certificate says Thank You

DEAR SIR,—Please be advised that my Empire DX certificate arrived today, in good condition along with the pin; for both I am very grateful. I am more proud of this award than any I have ever received and I can assure you it is a very difficult achievement from Washington especially considering most contacts were made with 150 watts.

My warmest thanks for the privilege of being the first W7 to claim this honour.

Please encourage the fellows to send confirmations especially from the more scarce areas. Perhaps a note in the BULLETIN might help. As an example I have been trying since October 20, 1958 to confirm GD4VH on 21 Mc/s with the help of GI3AXI and others but to no avail.

My best wishes for the continued success of the Society.

Yours faithfully,

Kirkland, Washington. F. J. KING (W7NRB)

Liverpool Street Lunch-time Rendezvous?

DEAR SIR,—Whenever I stroll through Liverpool Street Station, I always wonder how many radio amateurs there are working around that area. I have met several, just casually.

Might I therefore suggest that amateurs who work in that part of London and who would like to meet others during lunch time could, on a certain day of the week, rendezvous at a given point in the station? Our badges would serve for recognition purposes.

Yours faithfully,

Raynes Park, London, S.W.20. L. H. SHERSBY (G2GZ).

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out copy in the style used below.

DATES FOR YOUR DIARY

January 20.—Presidental Address at I.E.E., London, by Major-General E. S. Cole, C.B., C.B.E.
March 24.—Lecture Meeting at I.E.E., London.
April 23.—Region 1 O.R.M. at Blackpool.
April 30.—Region 3 O.R.M. at Trentham Gardens.
April 30.—North Midlands Mobile Rally, Trentham Gardens.
May 27.—International V.H.F./U.H.F. Convention, London.
May 28.—Southern Counties Mobile Rally.
June 18.—Longleat Mobile Rally.
August 12-13.—Derby Mobile Rally and Hamfest.
August 23-September 2.—National Radio and Television Show, London.
September 17.—Lincoln Mobile Rally and Hamfest.
October 21-22.—Jamboree-on-the-Air.

REGION 1

Ainsdale (A.R.C.).—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—February 14, George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby.—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield.—January 24, February 7, 21, 42 Jordangate.
Manchester (M. & D.A.R.S.).—February 13, 7.30 p.m.. Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Morecambe.—February 1, 125 Regent Road.
Preston (P.A.R.S.).—January 24, February 14, 28, 7.30 p.m., St. Paul's School, Pole Street.
Southport (S.R.S.).—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—January 18, February 1, 15, March 1, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—January 20, Room 4, Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

Barnsley.—January 21 (Annual Dinner), King George Hotel, Peel Street.
Bradford (B.A.R.S.).—January 24 ("Amateur Receiver Alignment," by D. Millard, G3OGV), February 14 ("Transistors, Pirates, and Direction Finding," by A. R. Bailey, M.Sc., G3IBN), 7.30 p.m., Cambridge House, 66 Little Horton Lane, Bradford, 5.
Cleckheaton (S.V.A.R.S.).—January 18 ("Tape Recording," by Philips Electrical), February 1 ("Further Notes on Industrial Electronics," by Dr. N. H. Chamberlain), 7.30 p.m., Labour Rooms, Railway Street, Cleckheaton. February 15, visit to Fane Acoustics Ltd., Batley.
Halifax (H. & D.A.R.S.).—January 17 (Annual Dinner), February 7 ("Transistors," by E. C. Bell), February 21 (Ragchew), Sportsman Inn, Ogden.
Leeds (L.A.R.S.).—January 18 (Visit to G.P.O. Parcels Office), January 25 (Film Show), February 1 (Transmitting Evening), February 8, 15 ("Amateur TV," by D. Watson), 7.30 p.m., Swarthmore Education Centre, 3 Woodhouse Square, Leeds, 3. February 19, 10 a.m., visit to Odeon Theatre.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street.

REGION 3

Birmingham (Bournville).—January 27 ("Birmingham City Radio Services" by G. Brown, G5BJ), February 10 ("Tape Recording"), 7.30 p.m., Deputy Staff Lounge, Cadbury Bros., Bournville. **(M.A.R.S.).**—January 24 (V.H.F. Lecture/Demonstration), February 2 (Amateur TV), 7.30 p.m., Midland Institute, Paradise Street, Birmingham. **(South).**—January 19 (Film and N.F.D. Discussion), 7.30 p.m., Friends Meeting House, Moseley Road, Birmingham. January 23, Club Night-on-the-Air on 1900 kc/s.
Stourbridge.—February 7, 8 p.m., Brotherhood Hall, Stourbridge.
Wolverhampton.—January 16, 23 (Two Metre Converter Construction Class by R. J. Thomas), January 30, 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Derby (D. & D.A.R.S.).—January 18 (Film Show), January 25 (Constructors' Exhibition), February 1 (A.G.M.), February 8 (Operating Procedure), February 15, 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W. Exp. S.).—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.S.).—January 19, February 2, 16, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Leicester (L.R.S.).—Mondays, 7.30 p.m. (Morse Tuition, 7.30-8.30 p.m.), Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—January 18 (Talk by Mr. Charlesworth), February 1 (Programme of Tapes), February 15 (BCI and TVI by representative of G.P.O.), R.A.E. Classes on intermediate Wednesdays, 7.30 p.m., Room No. 19, Technical College, Cathedral Street, Lincoln.
Melton Mowbray (A.R.C.).—February 2 (Shack visit and general discussion), 7.30 p.m., S. C. Scott (G3FVB), 39 Main Street, Asfordby, Melton Mowbray.
Newark (N. & D.A.R.S.).—February 7, 7.15 p.m. Northgate House, Newark.
Newark (Magnus G.S.).—Tuesday evenings and Friday afternoons in the Junior Physics Lab.
Nottingham (A.R.C.).—Tuesdays, Thursdays (R.A.E. class by G3LXL), 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Peterborough (P. & D.A.R.S.).—February 3, (R.A.E. Classes on Tuesdays and Thursdays at 7 p.m.), Peterborough Technical College.
Northampton (N.S.W.R.C.).—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.
Retford & Worksop (N.N.R.S.).—Tuesdays (Construction and Beginners night, including Morse tuition), Thursdays, 7.30 p.m., Club Room, Victoria Hall, Eastgate, Worksop.
Wellingborough (W.R.C.).—January 19 ("Techniques of piped TV" by P. Elson), January 26 (Open), February 2 (Demonstration of TV Servicing by D. F. Clarke), February 9 (Open), February 16 (Computors—Films by Unilever), 7.30 p.m., Silver Street Club Rooms over W.I.C.S. Fruit Shop.

REGION 5

Cambridge (C. & D.A.R.C.).—January 27 (Preliminary discussion of N.F.D. 1961), 7.30 p.m., "Jolly Waterman," Chesterton Road, Cambridge.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street, January 18 (Demonstration of Hallicrafters equipment by James Scott and Co.), St. Mark's Community Centre, Brooklyn Road.
High Wycombe.—January 25, 7.30 p.m., G3FAS, 51 Tyzack Road, Totteridge, High Wycombe. **(Chiltern A.R.C.)** January 26, 8 p.m., British Legion Hall, St. Mary Street, High Wycombe.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—January 17 (A.G.M. and Tape Recorded Talk), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Bexleyheath (N.K.R.S.).—January 26, 8 p.m. ("Bargain Night Junk Sale,") February 9, Congregational Hall, Bexleyheath (near Clock Tower).
Croydon (S.R.C.C.).—January 20 (Social), February 14, 7.30 p.m., "Blacksmiths' Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday in each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
East London.—January 15 (Series Gate Modulation" by P. Matthews, G3BPM), Lambourne Room, Town Hall, Ilford.
Enfield and District.—January 26 ("Technical Forum" and Junk Sale), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Guildford (G. & D.R.S.).—January 27 ("Aerials," lecture and demonstration, by F. Charman, B.E.M., G6CJ), 7.30 p.m., "The Cannons," Portsmouth Road, Guildford.
Harlow and District.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), Fridays (Club), 7 p.m., Montem School, Hornsey Road, N.7.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings Station).
Kingston.—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2 Sunray Avenue, Tolworth).
Mitcham (M. & D.R.S.).—January 27 (N.F.D. discussion), 8 p.m., "The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays, 11.30 a.m. (Audio Section last Tuesday in each month), Wednesdays (Morse Practice), 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood and South London (C.P. & D.R.C.).—January 21 ("A Visit to the U.S.A.", L. Pennelegion, G3FIO), February 7 (Morse Class Practical Work), 8 p.m., Windermere House Annexe, Westow Street, Crystal Palace.
Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, Harrow Road, Paddington, W.2.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
South Kensington (C.S.R.S.).—February 7 ("Radio Control of Models," by D. J. Laidlaw-Dickson), 6 p.m., Science Museum, South Kensington.
Southgate.—February 9 ("International Radio Conferences and their effect on Amateur Radio," by John Clarricoats, O.B.E., G6CL), 8 p.m. Arnos School, Wilmer Way, N.14.
Sutton and Cheam (S. & C.R.S.).—January 17 ("El-Bugs" by G3DCZ), "The Harrow," High Street, Cheam.
Welwyn Garden City.—February 9 ("Bring and Buy Sale,"), 8 p.m., Television School, Murphy Radio Ltd., Bessemer Road.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Friday, January 20, February 17 and March 17, 1961

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

REGION 8

Crawley (C.A.R.C.).—January 26 ("Ham Hop in Europe," by G3LEQ), February 9 (Informal), 8 p.m., "The Brewery Shades," Crawley.

(Continued on page 345)

REGION 9

Bath.—January 16 (Address by R. R., G5UH), 7.30 p.m., Committee Room, Bath Technical College.

Bideford.—First Thursday in each month, 7.30 p.m., alternately at T. G. Ward (G2FKO), 38 Clovelly Road (phone, Bideford 964) and D. H. Jones (G3BO), Rosebank, Westcombe (phone, Bideford 550).

Bristol.—January 20 (" Amateur Television," by Senior Technician G. B. Rogers, R.A.F.), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol, 1.

Exeter.—Second Thursday in each month, 8 p.m., Y.M.C.A., St. David's Hill, Exeter.

Falmouth.—First Wednesday in each month, Y.M.C.A., Falmouth.

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

Weston-super-Mare.—Second Wednesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.

Yeovil (Y.A.R.C.).—Wednesday, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—January 19 (Demonstration of Hallicrafters, Dow-Key and Hy-gain Equipment), February 13 (" Communications Receivers," by J. N. Walker, G5JU), 7.30 p.m., T.A. Centre, Park Street, Cardiff.

Penarth.—January 30 (Talk by GW2XZ), 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

Port Talbot.—February 14, 7.30 p.m., Railway and Transport Working Men's Club, Port Talbot.

REGION 12

Aberdeen (A.A.R.S.).—January 20 (Discussion on N.F.D. 1961), January 27 (" A Portable/Mobile Rig "), February 3 (Work Night), February 10 (" Hints and Kinks "), February 17 (Grand Sale), 7.30 p.m., 6 Blenheim Lane, Aberdeen. **(Luncheon Club.)**—February 7, 12.45 p.m., Royal Athenaeum Restaurant (Phone GM3HTL, Aberdeen 34928, for reservations).

REGION 13

Edinburgh (L.R.S.).—January 26 (Demonstration of Heathkit DX100U Transmitter), February 9 (" Model Control," by Fryer Tuck, GM3BBW), 7.30 p.m., Y.M.C.A., 14 South St. Andrew Street, Edinburgh.

REGION 14

Glasgow.—Second Friday in each month, 7.30 p.m., Woodside Halls, Clarendon Street, N.W. (near St. George's Cross Underground).

Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 16

Chelmsford.—First Tuesday in each month, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

Norwich.—Second Friday in each month, 8 p.m., " Golden Lion," St. John Maddermarket (near City Hall), Norwich. **(N. & D.R.C.).**—Fridays, 8 p.m., " Golden Lion," St. John Maddermarket.

REGION 17

Portsmouth.—Tuesdays, 7.30 p.m., Scarrs, 183A Albert Road, Portsmouth.

Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar.

Regional and Club News

Bristol.—About 60 members were present at the December meeting when Brian Auty, audio equipment designer for Radford Electronics Ltd., gave a talk on the design of High Fidelity Stereophonic Audio Amplifying Equipment. The talk was followed by a demonstration of some of the latest equipment by A. H. Radford (G6YA). On December 12, a visit was paid to the Central Telephone Exchange to see the Subscriber Trunk Dialling equipment and the TV Repeater installation. On January 20, Senior Technician G. B. Rogers, R.A.F., will be talking about " Amateur Television " and on February 3 there will be a special Film Show arranged by W. J. Dear (B.R.S.19985) to which ladies are invited. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol, 7.

Cambridge and District Amateur Radio Club.—About 25 members attended the November meeting at " The Jolly Waterman," Chesterton Road, when a lively " sale of surplus " was held. Visitors are always welcome to attend meetings, details of which may be obtained from the *Hon. Secretary:* A. H. G. Waton (G3GGJ), " Arkengarthdale," New Road, Barton, Cambridge.

It was a real Amateur Radio event at St. Aldred's, York, on August 6, 1960, when Mick Watson, G3JME (Hon. Secretary, York Amateur Radio Society) married Teresa Brown, daughter of G3HLT (Chairman, York A.R.C.). The chief usher was G3DTA (A.S.R., York A.R.C.) and this picture was taken by G3FYP and processed by G3GJY. G3JME met his future wife on a visit to G3HLT to help clear up some TVI.

Cheltenham.—There was a good attendance at the December meeting when there was a discussion on the proposed O.R.M. and 1961 Mobile Rally. *Town Representative:* John J. Yeend (G3CGD), 30 St. Luke's Road, Cheltenham.

Chester and District Radio Society.—Meetings at the Y.M.C.A., The Old Bishop's Palace, Chester, have been arranged for January 17 (Talk on Germany by GW3HEU, illustrated with transparencies), January 24 (" My Transmitter," talks by G3MGK and G3OPT), January 31 (" Oscilloscopes," by GW3HEU) and February 14 (" Electric Motors," by C. Richerwell). The next net night will be on February 7. *Hon. Secretary:* H. Morris (G3ATZ), 24 Kingsley Road, Boughton Heath, Chester.

Cornish Radio and Television Club.—There was an attendance of 28 at the December meeting when G3LPB gave a talk on wideband couplers and G2DDR described his visit to the R.S.G.B. Radio Hobbies Exhibition. Details of future activities may be obtained from the *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn.

Crawley Amateur Radio Club.—" Ham-Hop in Europe " will be the title of G3LEQ's talk at " The Brewery Shades," Crawley, on January 26. Plans for N.F.D. 1961 are already being discussed. Visitors and prospective members are always welcome at meetings. *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex.

Grafton Radio Society.—On February 3, F. C. Judd (G2BCX) will give a lecture entitled " Experiment in Sound ", at Montem School, Hornsey Road, Holloway, London, N. 7, commencing at 8.30 p.m. The demonstrations will include examples of electronic music and an original composition in " four-way " stereo. Visitors will be most welcome. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park.

Harrow, Radio Society of.—The A.G.M. was due to be held on January 13 while E. Thurlow of the P.O. Research Establishment is to give a lecture on January 27. Assembly of the new transmitter is being carried out by younger members under the supervision of the more experienced. Meetings are held on Fridays at 8 p.m. at Roxeth Manor Secondary School, Eastcote Lane, South Harrow. *Hon. Secretary:* S. C. J. Phillips, 131 Belmont Road, Harrow Weald.

Hastings and District Amateur Radio Club.—At the A.G.M., the retiring officers were re-elected, the Committee members now being G3HCK, G3HRI and G6KD. A film show is being arranged for January 17 while G6QB will talk about " Aerials for Difficult and Curious Situations " on January 31. " High Frequency Crystal Filters " will be G3BDQ's subject on February 14. *Hon. Secretary:* W. E. Thompson (G3MQT), 8 Coventry Road, St. Leonards-on-Sea.

Lothians Radio Society.—Recent events have included a demonstration of the Hallicrafters SX101A receiver and HT37 s.s.b transmitter under the call-sign GM3LAV/A. Details of future activities are given in *Forthcoming Events* under Region 13. *Hon. Secretary:* L. Lumsden (B.R.S.22359), 33 Hillview Drive, Edinburgh, 12.

Manchester Grammar School Amateur Radio Club.—The club station is active most weekdays from 1-2 p.m. on 7 and 14 Mc/s c.w. under the call-sign G3OKL and a new transmitter is being built. Contacts with other school radio clubs and with Old Mancunians would be appreciated. Four members have passed the R.A.E and several more are studying. *Hon. Secretary:* D. H. M. Reekie (G3OFC), Manchester Grammar School, Rusholme, Manchester, 13.

Paddington.—Meetings of the Group, in conjunction with the Paddington and District Amateur Radio Society, are held on Wednesdays at Beauchamp Lodge, Harrow Road, Paddington, W.2, commencing at 7.30 p.m.

Plymouth Radio Club.—Meetings are held on Tuesdays at 7.30 p.m. at Virginia House Settlement. The club is active on 1·8 and 3·5 Mc/s under the call-sign G3JYB/A. Details of other activities may be obtained from the *Hon. Secretary:* R. Hooper (B.R.S.22861), 2 Chestnut Road, Peverell, Plymouth.

R.A.F. Amateur Radio Society.—Plans are being made for the H.Q. station at Locking, G8FC, to take part in the Affiliated Societies' Contest on February 4-5 while a M.E.A.F. club station will be featured in the B.B.C. TV programme *Science in Life* on February 15. Details of membership, which is open to R.A.F. and ex-R.A.F. personnel and to civilians directly associated with the R.A.F. may be obtained from the *Hon. Secretary:* Sgt. K. Smethurst (G3GPE), R.A.F. Locking, Somerset.

Reading Amateur Radio Club.—On January 28, the club will meet at Palmers Hall, West Street, Reading, at 7.30 p.m. Following the election of officers for the coming year, G2BRQ and G3ASU will give a talk on low power equipment for 2m. *Hon. Secretary:* R. G. Nash (G3EJA), " Peacehaven," 9 Holybrook Road, Reading.

Reigate Amateur Transmitting Society.—The A.G.M. will be held at The Tower, High Street, Redhill, on January 21, commencing at 7.30 p.m. A society net is held on 80m at 11 a.m. on Sundays. Tickets, price 15/6 each, for the Annual Dinner at Laker's Hotel, Redhill, on February 11 may be obtained from the *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Stevenage and District Amateur Radio Club.—At the A.G.M., the following were elected: *Chairman*—K. Parker; *Hon. Treasurer*—V. Cundall (G3FAU); *Hon. Secretary*—A. E. Latham (G3JLA), 138 Broadwater Crescent, Stevenage. Transmitters for the club station and for N.F.D. are being constructed. Classes in preparation for the R.A.E. and Morse test are held regularly.

Surrey Radio Contact Club.—The Annual Social will be held at the " Blacksmiths Arms," South End, Croydon, on Friday, January 20, details of which may be obtained from the *Hon. Secretary:* S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, South Croydon.

Torbay Amateur Radio Society.—Attendance at recent meetings has been excellent, more than 30 members being present in December to hear Burn Symons (G3LKJ) lecture on television interference problems.

Wirral Amateur Radio Society.—The society is looking for a new meeting place, the former one being no longer available. On January 20, a talk on workshop practice is due to be given. Details of the venue may be obtained from the *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington (See *Forthcoming Events* for Region 1).

Representation

THE following are additions to the list of County Representatives published in the December 1960 issue:

REGION 4—LEICESTERSHIRE
W. A. Mead (G5YY), 82 Edward Avenue, Leicester.

REGION 17—BERKSHIRE
E. Smith (G3JMT), 26 Haddon Drive, Woodley, nr. Reading.

THE following are additions to the list of Town Representatives published in the December 1959 issue.

REGION 7—LONDON WEST
PADDINGTON (W.2, 9 and 10).
J. E. Alban (G3JEA), 172 Droop Street, Queen's Park, London, W.10.

REGION 8—SUSSEX
CRAWLEY-HORSHAM AREA
R. F. Fautley (G3ASG), 123 Ashdown Drive, Tilgate, Crawley.

Vacancy

Consequent upon the appointment of Mr. C. N. Chapman (G2HDR), as County Representative for Bristol, a vacancy exists for a Town representative for the City of Bristol. Nominations for his successor should be made in the prescribed form and sent to reach the General Secretary by not later than January 31, 1961.

Affiliated Society Representatives

THE following are additions to the list of Affiliated Society Representatives published in the December 1960 issue:

AINSDALE RADIO CLUB: R. J. Woodroffe (G2DQX), 72 Burnley Road, Ainsdale, Southport, Lancs.

BOURNVILLE RADIO SOCIETY: R. W. Kidner (G6KI), 160 Franklin Road, Bournville, Birmingham.

NORWICH & DISTRICT RADIO CLUB: O. F. Simkin (G3HYJ), 15 Hillside Road, Thorpe-next-Norwich, Norfolk. NOR. 48T.

SCARBOROUGH AMATEUR RADIO SOCIETY: P. B. Briscombe (G8KU), " Roseacre," Irton, near Scarborough, Yorkshire.

SLADE RADIO SOCIETY: N. B. Simmonds (B.R.S.21873), 5 Bowling Green Road, Stourbridge, Worcs.

Affiliated Societies

THE following are additions to the list of Affiliated Societies published in the October 1960 issue:

BISHOP RAWSTORNE SECONDARY SCHOOL RADIO SOCIETY
c/o E. Whalley, Out Lane, Croston, Nr. Preston, Lancs.

ROYAL NAVAL AMATEUR RADIO SOCIETY
c/o M. T. Matthews, *H.M.S. Mercury*, Leydene, Petersfield, Hants.

S.B.D. RADIO & TELEVISION SOCIETY
P.O. Savings Dept. (S.B.D.), Blythe Road, London, W.14.

S.T.C. (HARLOW) RADIO CLUB
c/o C. Waterman (G3NKX), Standard Telephones & Cables Ltd., Edinburgh Way, Harlow, Essex.

205 AMATEUR RADIO CLUB
c/o 205 Signal Squadron (Infantry Brigade Group), British Forces Post Office 24.

R.S.G.B. QSL Bureau Sub-Managers

THE following is a list of the R.S.G.B. QSL Bureau Sub-Managers showing the call-sign groups for which they are responsible:

G2 and DL2 calls:	**G. Verrill (G3IEC), 10 Seahorse Street, Gosport, Hants. (Certificates Manager.)**
G3, 4 and 5 two-letter calls & GC	**E. G. Allen (G3DRN), 65a Melbury Gardens, London, S.W.20.**
G6 and G8 calls:	**A. J. Mathews (G6QM), 62 Ashlands Road, Hesters Way Estate, Cheltenham.**
G3AAA-BZZ:	**C. C. Olley (G3AIZ), 157 Wanstead Park Road, Ilford, Essex.**
G3CAA-DZZ:	**C. A. Bradbury (B.R.S. 1066), 13 Salisbury Avenue, Cheltenham.**
G3EAA-HZZ:	**W. J. Green (G3FBA), 790 Rochester Way, Sidcup, Kent.**
G3IAA-KZZ, B.R.S. and A numbers	**T. D. J. Miles (G3NXR), 7 Hampden Road, Wantage, Berks.**
G3LAA-MZZ:	**G. C. Voller (G3JUL), 13 Marlborough Road, Ashford, Middlesex.**
G3NAA-OZZ:	**G. Verrill (G3IEC), 10 Seahorse Street, Gosport, Hants.**
GD calls:	**T. R. Moore (GD3ENK), " Glyn Moar," St. John's, Isle of Man.**
GI calls:	**W. H. Martin (GI5HV), " Swallow Lodge," Greenisland, Co. Antrim, Northern Ireland.**
GM calls:	**D. Macadie (GM6MD), 154 Kingsacre Road Glasgow, S.4.**
GW calls:	**J. L. Reid (GW3ANU), 28 Waterston Road Gabalfa, Cardiff.**

Envelopes for the *collection* of cards may be sent direct to the Sub-Manager concerned or to the QSL Manager (Mr. A. O. Milne). Outgoing cards should NOT be sent to the Sub-Manager unless they are in the call-sign group for which he holds envelopes. For example, the holder of a G3J- call may send cards for calls in the series G3IAA-G3KZZ to his own Sub-Manager, together with envelopes for the collection of cards, but he should not send to him cards in any other call-sign series. Sending cards for general distribution to the Sub-Managers only involves the cards in delay and the Society in needless expense.

Mr. Milne's address is 29 Kechill Gardens, Bromley, Kent.

For Your Bookshelf and Shack

R.S.G.B. PUBLICATIONS

A Guide to Amateur Radio (Eighth Edition) **Price 3/6 (by post 4/-)**

R.S.G.B. Amateur Radio Call Book (1961 Edition) **Price 4/- (by post 4/6)**

Service Valve Equivalents **Price 2/- (by post 2/6)**

AMERICAN PUBLICATIONS

Orders for the following American publications which are usually available from stock can only be accepted from residents in the United Kingdom and British Commonwealth. Prices quoted include cost of postage and packing.

Radio Amateur's Handbook, 1961 (*A.R.R.L.*) (*Available early March*)	34/-
CQ Sideband Handbook (*Cowan*)	25/-
Mobile Manual for Radio Amateurs (*A.R.R.L.*)	24/6
CQ Mobile Handbook (*Cowan*)	24/-
Antenna Book, 8th Edition (*A.R.R.L.*)	19/-
Television Interference—Its Causes and Cures (*Nelson Publishing Co.*)	16/-
CQ Anthology (*Cowan*)	16/-
Single Sideband for the Amateur (*A.R.R.L.*)	14/-
Hints and Kinks, Volume V (*A.R.R.L.*)	10/-
Course in Radio Fundamentals	10/-
How to Become a Radio Amateur (*A.R.R.L.*)	4/6
Learning the Radiotelegraph Code (*A.R.R.L.*)	4/6
QST (*A.R.R.L.*) Published monthly - (p.a.)	43/6
CQ (*Cowan*) Published monthly - (p.a.)	44/-
73 Magazine (*A.R.P.Co.*) Published monthly (p.a.)	30/-

Prices for American publications are subject to alteration without notice.

R.S.G.B. MEMBERS ONLY

Society Tie (all silk)	16/6
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