R S G B

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

JULY, 1958

BULLETIN

2/6 Monthly

VOL. 34, NO. 1

SPECIAL IGY ISSUE

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Circuit diagram supplied with each unit. Fully valved **£1.5.0**

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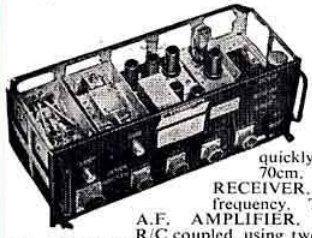

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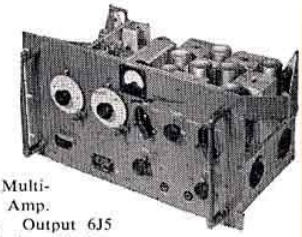

Frequency 95-150 Mc/s (2-3 Metres). Air Tested 15 Valve Superhet. Valve Line-up: 1st and 2nd R.F. Amp. VR.136 (EF54); 1st Local. Oscillator V.R.65 (SP61); 2 Oscillator Multipliers V.R.136 (EF54); 3 I.F. Amp. V.R.53 (E.F.39); A.G.C. 6Q.7. Output 6J5 Muting V.R.92 (EA.50); Noise Limiter V.R.92 (EA50); B.F.O. 6J7; Mixer V.R.136 (EF.54); De Mod. 6Q7. Normally Crystal Controlled but can be tuned over 95 to 150 Mc/s. Power supply required: 240-250 volts at 80 mA.6·3 volts at 4 amps. Size 19×10×10 in. Standard Rack Mounting.
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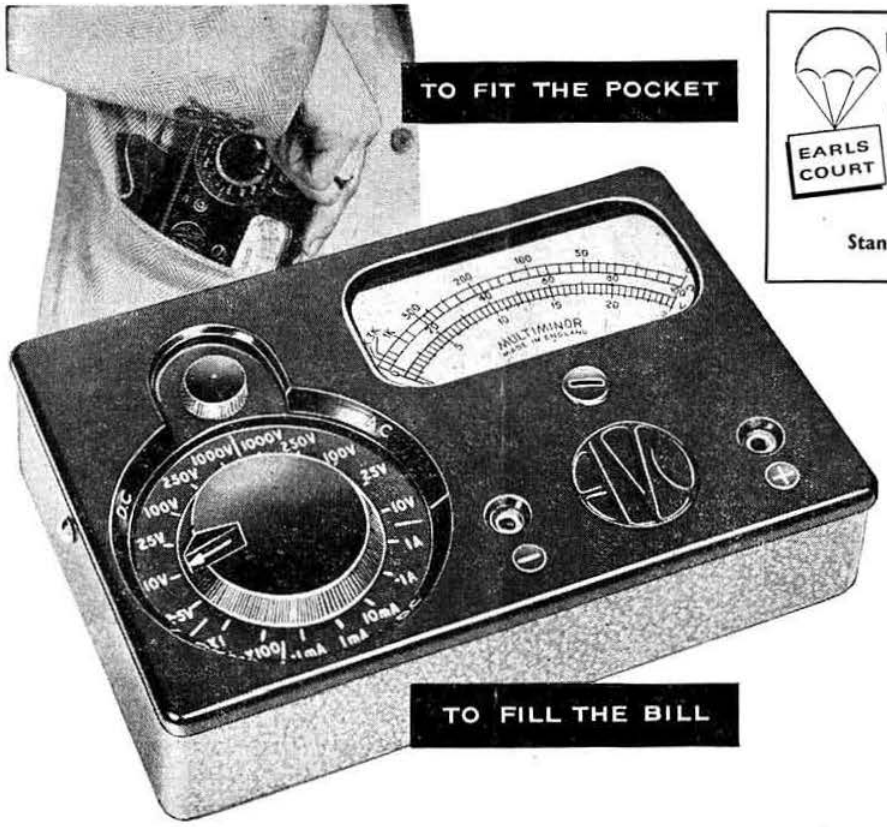

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0— 2.5V.	0— 25V.
0— 10 V.	0— 100V.
0— 25 V.	0— 250V.
0— 100 V.	0—1000V.
0— 250 V.	
0—1000 V.	**D.C. Current**
	0—100μA
	0— 1mA
Resistance	0— 10mA
0—20,000Ω	0—100mA
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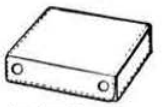

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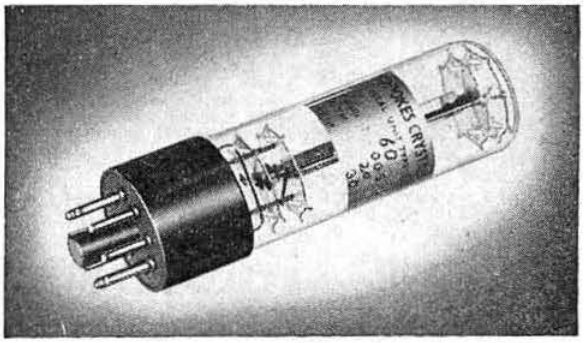

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at 7/6 each.

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1384	1727	2430	10,534	
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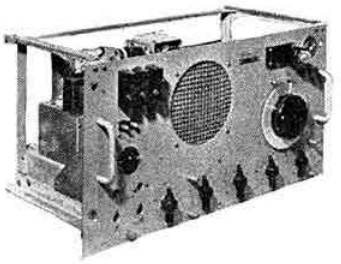

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Volume 34 No. 1
July 1958

R.S.G.B. BULLETIN

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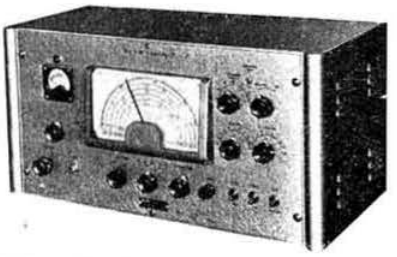

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Current Comment

discusses topics of the day

Bad Godesburg to Geneva

SHORTLY after this issue appears, delegates from most of the National Amateur Radio Societies in Europe will be on their way to Bad Godesburg, Germany, to attend the fourth of a series of post-war I.A.R.U. Region I Conferences. The first Conference took place in Paris in 1950 to mark the twenty-fifth anniversary of the foundation of the International Amateur Radio Union there in 1925. At that meeting the R.S.G.B. delegates—with the experience of the World Radio Conference in Atlantic City fresh in their minds—suggested that an organisation should be formed to safeguard and protect the interests of radio amateurs in the European portion of Region I. The suggestion was well received, as it had been earlier that year when it was first put forward by the General Secretary of the R.S.G.B. during the S.S.A. Silver Jubilee celebrations in Stockholm.

The societies represented at the Paris Conference in 1950 decided to set up a Region I Bureau, which was placed in the hands of the R.S.G.B., who offered to finance the project for the first three years. The societies concerned also agreed to meet again when the three years had elapsed to re-examine the arrangement and consider future policy.

This second Conference took place in Lausanne during May 1953. A small *ad hoc* committee was set up which reported to the main administrative committee and put forward a proposal for establishing three funds to which each society should contribute on a *per capita* basis. The delegates present agreed, on behalf of their respective societies, that these three funds should be established; the first would be used to cover the running expenses of the Division (as it was now to be called); the second to pay for the cost of holding committee meetings (an Executive Committee having been set up) and the third to pay for the cost of sending I.A.R.U. delegates from Region I to attend the next World Radio Conference.

At the third Conference, held at Stresa, Italy, during June 1956, the General Secretary of the R.S.G.B. who had acted as Honorary Treasurer to the Division since its formation, was able to report that all three funds were well established. In the two years that have passed since then, the societies in Region I have continued to meet their financial obligations—in some cases at sacrifice to themselves—with the result that at the end of 1957 the three funds stood at £391, £323 and £1,360 respectively.

At the Bad Godesburg Conference the Executive Committee, and later the delegates in Plenary Assembly, will decide who is to represent the Region I organisation at the World Radio Conference in Geneva next year. The appointed delegates will form part of the official I.A.R.U. delegation and their expenses will be met from Fund 3.

It is interesting to recall that the cost of sending two R.S.G.B. delegates to serve on the I.A.R.U. delegation to the World Radio Conference held in Atlantic City eleven years ago amounted to nearly £1,500. On that occasion the whole cost was borne by the R.S.G.B.

Today, as we enjoy the privilege of operating on a variety of frequency bands ranging from 1·8 Mc/s to 10,000 Mc/s, it is worth remembering that some of those bands became available to us only because the R.S.G.B. delegates present at the Atlantic City Conference were able to state a good case on behalf of the Amateur Service.

Those who are selected to represent the I.A.R.U. at the Geneva Conference will undertake an even greater burden of responsibility than that which was borne by the delegates who attended the Atlantic City Conference for the simple reason that, during the intervening eleven years, the demands for spectrum space have increased very considerably.

Of one thing we can be certain, the United Kingdom Administration, with its warm and lively appreciation of the work done by radio amateurs over many decades, will see to it that the Amateur Service is given fair treatment at the Conference Table.—J. C.

The I.G.Y.

THE R.S.G.B. I.G.Y. project has been in operation for twelve months and it is fitting that a review of the activities and achievements is now made. In the several pages of this month's issue that are devoted to I.G.Y., two reports are included, the first giving a summary of the general programme, and the second an outline of results obtained in the v.h.f. field, in which sphere the major part of the work has taken place. An introduction to telemetry is included, and although this is essentially a new subject as far as the British radio amateur is concerned, noteworthy results have already been achieved in the reception of telemetered signals from earth satellites.

Although the I.G.Y. terminates officially on December 31, this year, it is apparent that the eighteen months between July 1957 and December 1958 are but the commencement of a long period of scientific research, particularly in regard to the study of conditions in the

(*Continued on page 25*)

Telemetering Information from Satellites

Basic Information for Amateur Participation

By N. G. HYDE, Grad. Brit.I.R.E. (G2AIH)*
I.G.Y. Area Activity Co-ordinator.

INFORMATION on conditions existing in the upper atmosphere is conveyed from an artificial satellite to earth through a branch of science known as telemetry. Telemetry may be defined as the measurement at a remote point of variable quantities and the reproduction of the measurements, in a form suitable for display or recording, at some convenient location.

An elementary method of telemetering involves adjusting the current in an electrical circuit to correspond to the quantity being measured, and determining the magnitude of the current by an ammeter located at the remote point. Such a method is frequently used to measure, over an extended circuit, the volume of liquids in a tank (Fig. 1). The moving contact of a variable resistor is operated through linkage by a float, and thus the resistance of the circuit is inversely proportional and the meter reading is directly proportional to the level of the liquid. This is the basic current system of telemetry and a common practical application is found in the electrically-operated petrol gauge of a motor car.

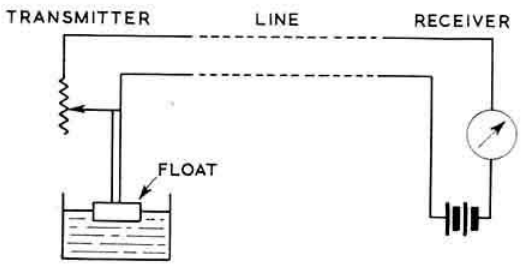


Fig. 1. Basic current system of telemetry.

A telemetry system thus involves some form of transmitter, a receiver capable of interpreting the transmitted information in a manner suitable for display or recording, and an interconnecting medium. The link between transmitter and receiver may be either a wire or radio circuit; as a radio circuit is used in connection with artificial satellites, radio telemetry systems only will be considered here.

Possibly the first application of a radio link was for telemetering the data from meteorological balloons. In this field at least three separate channels of information are required, namely temperature, humidity and pressure. This necessitates multiplex working, in which several channels of communication are transmitted over a single r.f. carrier. Data on any one channel are transmitted in the form of a pulsed code; information is conveyed by varying the pulse width and the time interval between pulses.

*114 Tattenham Grove, Epsom Downs, Surrey.

Two methods of providing a multiplex radio link are in general use, namely frequency division and time division. In the frequency-division system (Fig. 2) a separate sub-carrier is used for each channel. These sub-carriers, which are in the audio frequency range, are modulated by the information in each channel, and the resultant varying frequencies are then combined linearly and used to modulate the transmitter. Sub-carrier frequencies are so chosen that there is no interference between the sidebands of adjacent channels as a result of modulation. At the receiver, the channels are separated by band pass filters, and the information derived from each channel, which has the same form as that used to modulate the sub-carrier, is subsequently displayed or recorded.

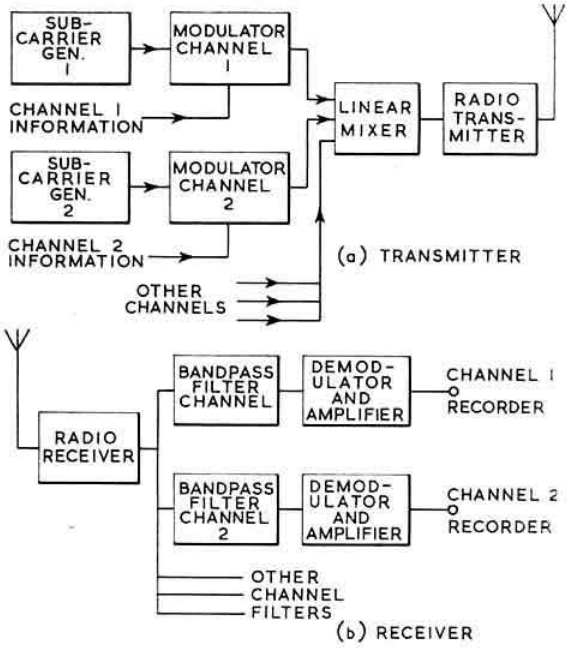


Fig. 2. Frequency-division multiplex system.

The time-division multiplex system (Fig. 3) employs a form of switching so that each channel of information modulates the r.f. carrier for an allotted period of time in a cyclic sequence. The channels are sampled by a commutator and the series of pulses generated by each channel then modulate the transmitter in a cyclic sequence. At the receiver the pulses are applied to a commutator which is synchronised with the commutator at the transmitter; the output of each channel from the receiver commutator thus carries the same information as the corresponding channel at the transmitter.

The pulses on each channel are then integrated and interpolated by a low pass filter for display or recording.

Commutation may be either by mechanical or electronic methods. The channel switching frequency varies from 750 c/s up to 6 kc/s or more, depending on the transmitter band width required; the higher the switching frequency the wider is the permissible band width. Synchronisation between transmitter and receiver commutators is effected in a manner similar to that employed in television.

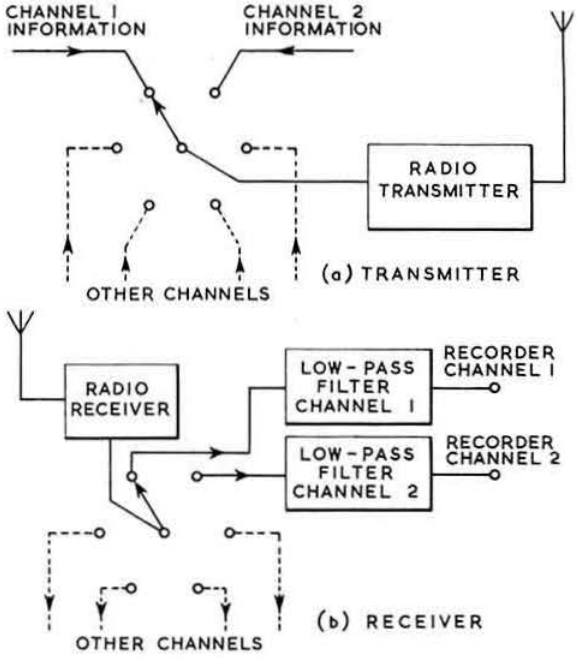


Fig. 3. Time-division multiplex system.

U.S. I.G.Y. Satellite Programme

Several types of artificial earth satellite are being launched from the United States during the International Geophysical Year, each providing data on a combination of different studies. All initial satellites will be in an orbit forming an angle of approximately 35 degrees to the equator; the region in which they are directly overhead at some point in their orbit lies between latitudes of 35° N and 35° S. Radio frequencies of 108 and 108·03 Mc/s are employed for transmission; the choice of frequencies within the v.h.f. range, which are little affected by the ionosphere, results in a more accurate tracking system than would be obtained by the use of lower frequencies.

Primary ground recording stations are located along the East Coast of the United States and the West Coast of South America. This provides a chain of receiving stations on a line running approximately north and south, and permits one observation to be made during each orbit of a satellite. The nearest region to the British Isles at which the satellites will be directly overhead is northern Algeria. In spite of this, and also the high transmission frequencies, reports indicate that signals will be receivable in this country.

One group of satellites carries miniature tape recorders, and will be used to obtain complete synoptic data, that is, information on cloud cover, meteor density, atmospheric circulation, magnetic field strength, etc. These satellites will not transmit continuously but will carry a receiver which will initiate transmission of the recorded data on interrogation from a primary ground recording station. A view of the tape recorder is shown in Fig. 4 from which the size can be judged by comparison with the paper clip in the foreground.

Extensive amateur co-operation is required with a second group, known as Lymanα environmental satellites.† These satellites telemeter information continuously on the following studies: (i) Intensity of solar radiation in the Lymanα region of the hydrogen spectrum; (ii) Satellite temperatures; (iii) Effects of collision between micrometeors and the satellite.

In addition, telemetering channels are available for the measurement of battery voltages, and the provision of calibration, identification and synchronizing signals. Calibration signals are of a standard level, against which the level of the data signals can be compared.

Measurements of ultra-violet solar radiation from the atomic hydrogen of the Sun, and having a wavelength of 1215·7 Ångstrom units are obtained by ionisation chambers sensitive only in this region. Data on instantaneous values of radiation are telemetered continuously; data on peak values of radiation occurring in each orbit resulting from solar

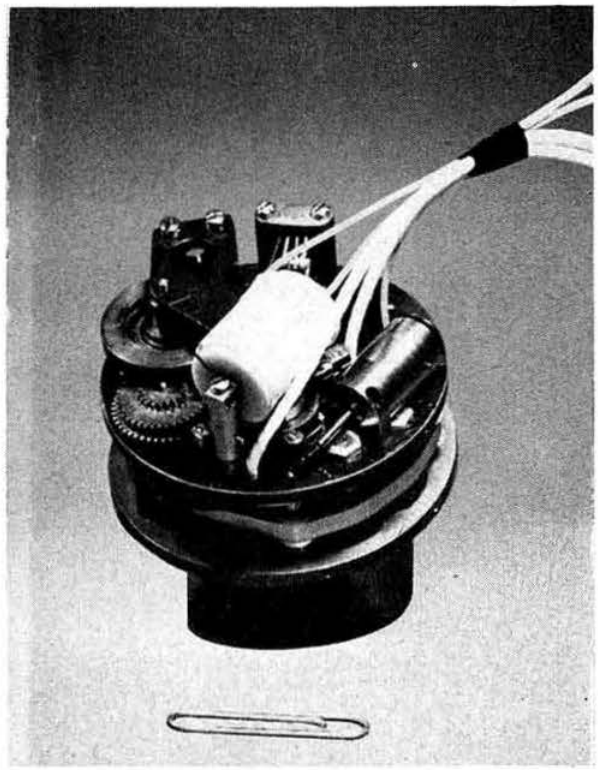


Fig. 4. Tape recorder developed for satellite instrumentation. Note the paper clip in the foreground for size comparison.

† One source of electromagnetic radiation by the Sun occurs through the emission of ionized gases. It has been found that the emission of hydrogen results in strong ultra-violet radiation (α type rays) having a wavelength of 1215·7 Ångstrom units, where 1 Ångstrom unit is equal to 10^{-8}cm. This was first observed by Lyman in 1904, and is consequently referred to as Lymanα radiation. Emission of hydrogen greatly increases during sunspot periods, when clouds of the gas are ejected under high pressure at speeds of several hundred thousand miles per hour.

flares are stored in a telemetry memory unit, transmitted continuously during the succeeding orbit and recorded at the primary recording stations. An additional requirement necessary for determining the value of solar radiation is a knowledge of the aspect of the satellite with respect to the Sun; this is achieved through silicon solar aspect cells positioned along the equator of the satellite.

The possibility of a solar flare occurring while the satellite is passing over one of the primary recording stations is remote, and for this reason extensive amateur co-operation in all parts of the world is required. The greatest contribution to the programme would be a usable recording of the satellite's transmissions made during the occurrence of a solar flare, with the satellite in full sunlight passing directly over the recording station.

Satellite temperatures are measured by three thermistors, one located in the instrument compartment, one on the outer shell near the equator and one on the outer shell near to one pole of the satellite.

Collisions between meteoric particles and the satellite can be measured by several methods. One method utilizes erosion gauges consisting of glass film resistors mounted on the outer surface of the satellite. Erosion of the resistive element by impact of the particles will occur and hence by measuring the resistance the effects of collision can be estimated. A second method is to use a cadmium-sulphide detector, formed by a photo-resistive element covered by an opaque material; the covering material will be worn away by the impact of micrometeors, permitting more sunlight to reach the photo-sensitive element, thus causing a change in its resistance. Some particles will be large enough to puncture the outer shell of the satellite; the effect of these is studied by providing two pressurised zones each having a slightly different initial pressure. Puncture of either or both zones is determined by monitoring the differential pressure. The number of collisions is measured by sensitive microphones attached to the outer shell of the satellite connected to counting circuits which indicate the cumulative number of collisions.

Telemetry Code

Information on the studies previously described is telemetred by a time-division multiplex system employing 17 physical channels, one of which is used for synchronisation and the remaining 16 for the transmission of information. The information applied to each channel takes the form of audio-frequency impulses (bursts) the intelligence being conveyed by (i) the actual frequency, which is continuously variable to follow instantaneous changes, and is in the range 5 to 12·5 kc/s; (ii) the duration of the audio frequency impulse, and (iii) the time interval between impulses. Impulse duration and the duration of intervals between impulses varies from 4 to 30 milliseconds. This system results in 48 different information channels being available, which are allocated as shown in Table I. The frequent repetition of certain study channels, together with the continuously variable audio-frequency employed, permits continuous telemetering of instantaneous values.

Each telemetering recorder is individually calibrated, and a typical set of graphs is shown in Fig. 5. These are not sufficiently accurate for data interpretation, but from an amateur point of view they enable any recordings likely to be of value to the I.G.Y. programme to be determined.

This information on U.S. Satellite telemetry has been based upon " Scientific Telemetering for U.S.N.C.-I.G.Y.", *QST*, January, 1958.

Russian Satellites

The first two Russian satellites employed telemetering systems operating on radio frequencies of 20·005 and 40·002 Mc/s. The telemetering was in the form of i.c.w. signals having a duration from 0·05 to 0·7 second. The radiation on the two channels was complementary (i.e. the combined output of two receivers, one tuned to 20·005 and the other to 40·002 Mc/s, was a continuous tone).

Typical telemetering signals radiated from *Sputniks 1* and *2* are shown in Fig. 6.

Sputnik 3

The third Russian satellite (known as 1958 Delta) which was launched in May this year is in an orbit forming an angle of 65 degrees to the equator. Transmissions are on a frequency of 20·005 Mc/s only, and are receivable at most of the inhabited parts of the world at some time during the satellite's orbits. The time duration of one complete orbit is 106 minutes: the apogee (that is, the greatest altitude from Earth reached by the satellite) is approximately 1,175 miles (1,880km).

The satellite is conical in shape, approximately 11 ft. 5 in.

TABLE I

Telemetry Channel Assignments

Lyman-alpha Environmental Satellite

Burst No.	High Frequency Burst		Burst Duration		Interval between Bursts	
	Channel	Function	Channel	Function	Channel	Function
1	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
2	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
3	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
4	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
5	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
6	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
7	C	Meteor count, units	C1	Long calibrate	C2	Battery volts
8	D	Meteor count, tens	D1	Package temperature	D2	Polar skin temperature
9	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
10	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
11	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
12	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
13	A	Instan. Lyman-alpha	A1	Polar erosion A	A2	Battery volts
14	B	Solar aspect	B1	Differential pressure	B2	Short calibrate
15	E	Meteor count, hundreds	E1	Polar erosion B	E1	Equator skin temperature
16	F	Peak Lyman-alpha	F1	Equator erosion	F2	Cadmium sulphide cell

(3·57m) long, and having a maximum diameter of 6 ft. (1·73m). The weight of the satellite is approximately 23 cwt. (1,372 kg.) and the weight of the payload, that is, instruments, radio equipment batteries, etc., is approximately 19 cwt. (968 kg.). Solar batteries are fitted in addition to those of the electro-chemical type.

A multi-channel telemetry system having a high data-handling capacity is incorporated, which enables information on the following studies to be obtained over the entire orbit: (i) Air pressure and composition of the upper atmosphere; (ii) Concentration of positively charged ions; (iii) Electric charge of the satellite, and the intensity of the Earth's electrostatic field; (iv) Intensity of the Earth's magnetic field; (v) Intensity of corpuscular radiation from the Sun; (vi) Composition and variation of cosmic radiation, distribution of photons and heavy nuclei in cosmic rays; (vii) Impact of micrometeors on the satellite; (viii) Internal and surface temperatures of the satellite.

It is also possible that one of the channels is used to monitor battery voltages. The correct temperature range for operation of the instruments in the satellite is maintained by a regulating system which automatically effects a change in the co-efficients of reflection and radiation of the satellite's surface. Devices are fitted which enable the co-ordinates of the satellite's trajectory to be measured. The telemetered data is received at radar stations and is automatically reduced and transmitted via landline to the co-ordinating and computing centre.

According to amateur observations, a continuous series of pulses varying in width from 30 to 150 milliseconds is being radiated.

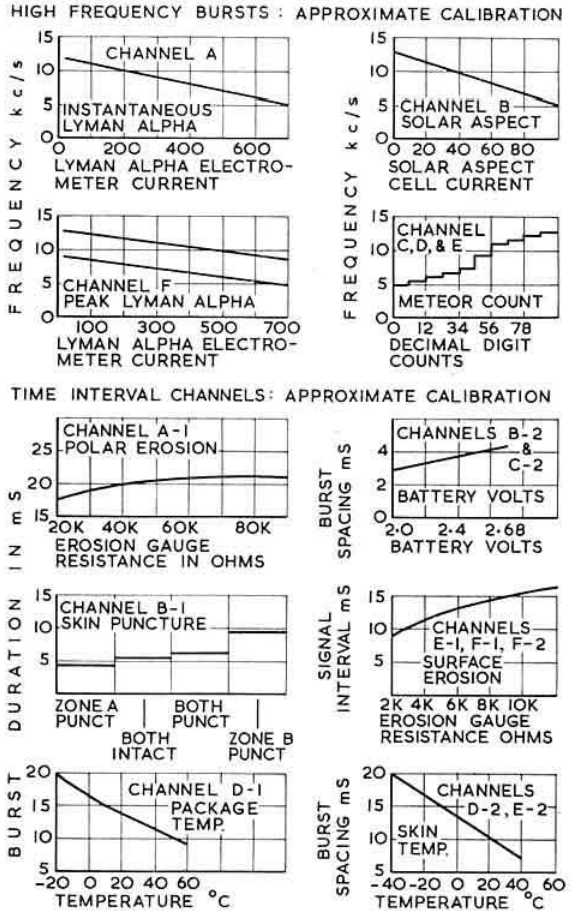


Fig. 5. Approximate telemeter calibration curves.

Amateur Activities

The activities of the Wirral and London recording groups were mentioned in last month's BULLETIN. Further details of the Wirral work are now available. Film recordings of *Sputnik 3* transmissions together with a 50 c/s timing waveform have been made by H. M. Synge (G3BOC). The transmissions consist of a cyclic sequence of four impulses; one impulse group is shown in Fig. 7. It appears that each group consists of impulses approximately 30, 70 and 140 milliseconds long, preceded by what is thought to be a synchronizing pulse. From the histogram produced by G3BOC, changes in impulse duration can be observed. Cyclic changes in amplitude occur from fading of the signal, possibly caused by changing polarisation due to rotation of the satellite or Faraday rotation in the ionosphere.

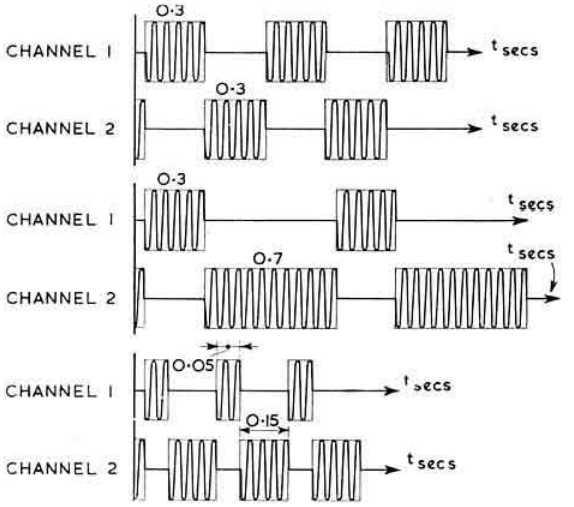


Fig. 6. Diagrammatic representation of typical telemetry signals radiated from Sputniks 1 and 2.

Telemetry Recording

Some notes on the practical aspects of visual recording have been compiled by W. E. Blocksidge (G2FNI), also of the Wirral group. Recording on magnetic tape was first attempted by a number of amateurs. Early results were poor as a result of the low signal-to-noise ratio, due to noise and interference on the transmission. Attempts were made to transfer the signal from magnetic to paper tape but this was not successful due to the poor frequency response of the pen recorder.

The next step was to transcribe the signals on to film from an oscilloscope. A double-beam tube was used, with the signal applied to the upper pair of Y-plates and a 50 c/s timing waveform applied to the lower pair. The internal time base of the 'scope was switched off and the film was run across the face of the tube, using a constant speed motor. The results obtained from this method proved to be very satisfactory, and the histograms produced, from which Fig. 7 was obtained, revealed all the characteristics of the signal.

As the tape was transcribed on to very short lengths of film it was not possible to ascertain whether there was any repetition of the code groups. G2FNI remarks, however, that despite the apparent regularity of the signal to the ear, it

has n fact a highly irregular formation and contains many channels of information. Although the transmission may sound to the ear like a Morse signal, there is no significance whatsoever attached to this.

Magnetic tape recordings should preferably be made on a high-quality twin track tape recorder. The telemetry signal should be recorded on one channel, and timing signals, preferably those radiated by MSF, should be put on the other. Whatever method of timing is employed, it should be accurate to within 10 seconds. A single track recording without the timing signals would be valuable in the event of an unusual occurrence having taken place during the recording.

G2FNI offers the following hints in connection with the reception of *Sputnik* signals, and transference of recordings from magnetic tape to film:

(i) The output of the communication receiver must be entirely free from 50 or 100 c/s hum.
(ii) The b.f.o. must be stable. However, should there be drift, no attempt should be made to retune the b.f.o. otherwise the recording will be spoilt.
(iii) Maximum high-frequency response is essential; the receiver tone control and variable bandwidth i.f. stages should be adjusted to give maximum h.f. response. Crystal or audio filters should not be used.
(iv) If a noise limiter is incorporated it must be of a type that does not clip the a.f. waveform.
(v) The receiver should be operated at optimum signal-to-noise ratio, that is, a.g.c. off, full a.f. gain and as little r.f. gain as possible.
(vi) The telemetry recording should not be interrupted with a voice commentary for timing purpose. If timing must be by voice announcements, a staccato sound should be made to give an indication of the exact time, as a voice recording is unrecognisable on film. There should be no gap between the telemetry and timing signals.

Purpose of Amateur Recordings

At the present time it is unlikely that signal recordings of U.S. satellites can be made in the U.K. of sufficient clarity to permit the transcription of telemetering. There is good reason to expect, however, that in the future U.S. satellites will pass over the U.K., and thus provide signals that will enable amateur recordings of the telemetry to be made.

Soviet satellites already pass over the U.K. and thus recordings of considerable value can be made. The R.S.G.B. I.G.Y. organisation is collecting tape recordings of the telemetering of *Sputnik 3*, reducing these to sets of figures of pulse width and supplying this information to Rocket and Satellite World Data Centres. Soviet scientists have particularly asked for this assistance and it is to be hoped that the R.S.G.B. contribution will be of value to them.

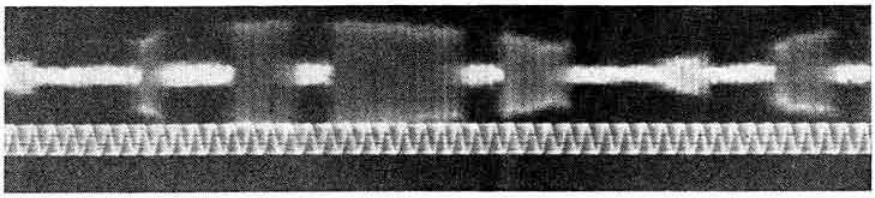
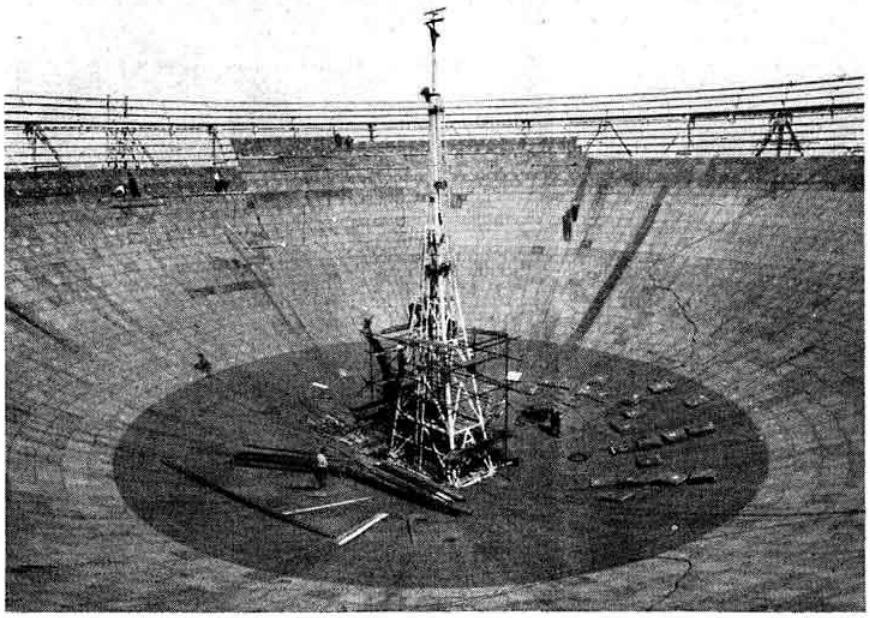


Fig. 7. Recorded pulse groups received from Sputnik 3.

References

(1) " Scientific Telemetering for U.S.N.C.-I.G.Y." *QST*, January, 1958.
(2) " Radio Telemetry," Nichols and Rauch, John Wiley and Sons.
(3) " Artificial Earth Satellites," V. Vakhmin, *Radio* (Moscow) No. 6, June 1957.
(4) " Observation of Radio Signals from an Artificial Earth Satellite and their Scientific Values," A. N. Kazantsev. *Radio* (Moscow) No. 6, June 1957.



A new film, " The Inquisitive Giant", shows the building of the fully steerable radio telescope at Jodrell Bank Experimental Station in the University of Manchester. This picture shows the inside of the great 250 ft. diameter bowl. In the centre is the 62½ ft. aerial mast on which the aerial is mounted. To change the aerial the bowl is inverted and the aerial lowered on to a platform on a diametral girder. The reflecting surfaces are 14 gauge steel plates, each specially shaped and curved for its particular place.

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I.G.Y. V.H.F. Programme—Progress to Date

By C. E. NEWTON (G2FKZ)* and G. M. C. STONE (G3FZL)†
R.S.G.B. I.G.Y. Co-ordinators

MANY years will pass before a full analysis of I.G.Y. work is carried out but having now completed twelve months of the Society's programme, we are in a position to make some cursory observations regarding the R.S.G.B. I.G.Y. V.H.F. project.

The purpose behind this v.h.f. programme is four fold: (i) to analyse the origin of different air masses and relate these to tropospheric propagation conditions; (ii) to attempt to determine simple methods by which short term predictions of conditions may be made; (iii) to analyse contacts and reports of signals received by auroral reflection; (iv) to observe solar noise radiation.

With reference to (i), an analysis on these lines has apparently never been done, yet it is a field which offers a big return both scientifically and to Amateur Radio operators.

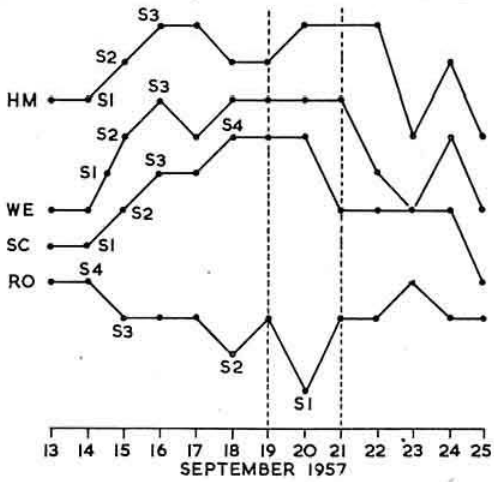

Fig. 1. The above graph by J. H. Cant (G6FU) of Farnborough, Hampshire, shows a typical example of the short range signal being reduced in strength under good tropospheric conditions. HM=Holme Moss, 175 miles; WE=Wenvoe, 120 miles; SC=Sutton Coldfield, 105 miles; RO=Rowridge, 50 miles. The television signal strengths are graded S0 to S5 maximum.

There are observers situated all over the British Isles who are regularly taking readings of barometric pressure and water vapour properties of the atmosphere. It was argued at one time that this sort of information was available from the Meteorological Office and as a result these observers were wasting their time on such work. The Meteorological Office does not supply information on the fine vertical atmospheric structure in the first thousand feet or so. However, in the Bristol area there are observers, whose activities are co-ordinated by C. N. Chapman (G2HDR) situated from sea level to 720 ft.; these observers take readings which allow the structure of the first 700 ft. of air mass to be studied very closely. Initially it was not certain whether, in fact, upper air characteristics would be determined from surface observations, but it appears that much information can be obtained since on a number of occasions temperature inversions and abnormally high lapse rates have been observed. The Edinburgh observers under J. F. Shepherd (GM3EGW), though situated from sea level to about 420 ft. a.s.l. have also provided very interesting results.

The passage of fronts usually have a very pronounced effect on v.h.f. conditions. To study these effects, general surface synoptic charts (prepared by the Meteorological Office) are very useful in predicting the movements of fronts. The *Manchester Guardian* also prints a simplified weather map, which at the Society's request is now marked with arrows which indicate the expected direction of movement of weather systems. This enables an observer to be aware of the expected trend of the weather. Such information will indicate the origin of the air mass, its direction of movement and its characteristics.

Most operators know that the back edges of anti-cyclones are usually associated with the best propagation conditions. There are good reasons for this but what is not known, and this is a subject for study, is what type of fading is associated with different types of air mass. For example, Azores anti-cyclones which contain warm moist equatorial air are believed to exhibit quite different fading characteristics from those associated with polar anti-cyclones which are cold and often very dry. It is also thought that the speed of an air mass moving across the country, or the rate of build-up of an anti-cyclone will show certain characteristic effects on radio fading.

It is hoped that by analysing the many signal reports and information on meteorological conditions now being collected, to produce a guide to amateur v.h.f. propagation forecasting. The amateur will thus be able to derive more enjoyment from his hobby since his participation in spells of good conditions is more likely. The information derived from this analysis may also prove of value to the scientists studying v.h.f. radio wave propagation.

Results to Date

So far, of course, little new information has been discovered; in fact, some investigations now in hand would have to be carried out for many years to obtain a true appreciation of the phenomena involved. However, one of the most interesting facts so far observed has been the actual *reduction* in signal strength noted on stations about 50 miles away under conditions of good tropospheric propagation. The graph submitted by J. H. Cant (G6FU) for September 1957 (Fig. 1) is a good example of this effect.

The vapour/barometric pressure graphs that observers are preparing are also very useful in indicating the types of air mass and their speed of travel. The time difference for similar readings can be noted and speed of travel deduced. The graphs by W. H. Horniman (G2WH) (Fig. 2) show a good example of where a rapid rise in vapour pressure foretells the end to a spell of good propagation conditions; in this case the best conditions were over the 19th and 20th of the month in question. These situations are being studied in relation to propagation effects; for example, during this period all observed signals in the band 45—450 Mc/s exhibited a slow to very slow fading rate. It now appears almost certain that, contrary to the belief of many operators,

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the worst tropospheric conditions (from an amateur point of view) are during the passage of fronts whether they be cold, warm or occluded.

One further analysis relating to anti-cyclones is an attempt to estimate conditions that are associated with different parts of a weather system. As is well known, the air mass rotates and the changing directions for optimum propagation are being investigated.

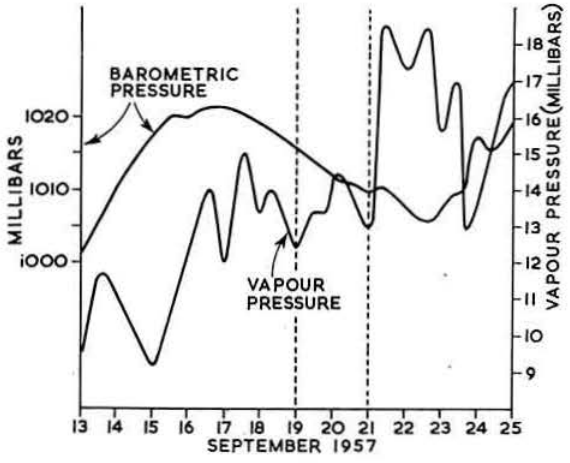

Fig. 2. This graph by W. D. Horniman (G2WH) shows the very sudden rise of vapour pressure which usually ends any spell of good conditions and should be compared with Fig. 1. Note that the back edge of the anti-cyclone is associated with the best conditions.

Fading

Fading of v.h.f. signals is being studied by some observers in great detail. Typical is the work of L. V. Dent (G3GDR): using specialized equipment, a check is made of commercial pulse stations operating in the 70-80 Mc/s band. By this method very accurate signal strengths can be recorded. However, one point is clear: much of the very fast flutter effect is most probably caused by aircraft, and is in no way a tropospheric effect. Using pulse type equipment it is often possible to see aircraft echo signals and simultaneously to note a beating effect on the direct signal which changes as the range of the aircraft changes. Fig. 3 shows two fading graphs plotted every 10 seconds for 26 minutes. That for February 10 and 11 (World Days) was drawn up during a very bad spell of conditions whereas the other (February 14 and 15) was during greatly improved conditions.

Fig. 4. Geographical distribution of typical auroral reflection contacts/reception reports.

A point noted by many observers is that even over short paths, 50 miles or less, considerable changes of signal level can occur if the path is a difficult one, whereas at considerably greater distance the changes seem less if the path is a good one.

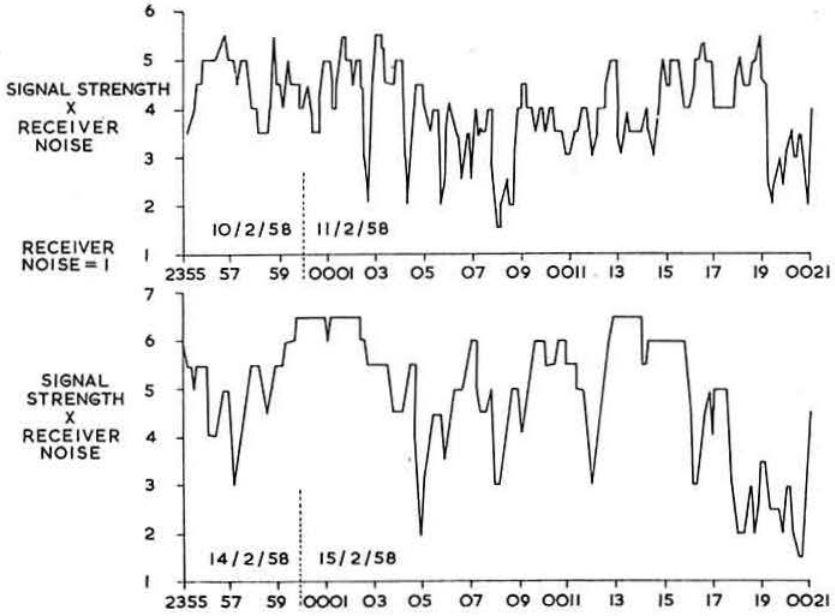

Fig. 3. These graphs prepared by L. V. Dent (G3GDR) of signals from a v.h.f. pulse station situated 75 miles away show contrasting types of fading. Both are to the same scale of multiples of the receiver noise.

Auroral Propagation

In the past the study of auroral reflection propagation has been carried out mainly in the United States. Amateurs in Europe are less well situated geographically to participate in regular auroral propagation since the zone of maximum auroral occurrence is far north of the British Isles. However, at the times of sunspot maximum the auroral zone expands out from the pole and auroral propagation is therefore much less rare.

To make a study of the aurora it is necessary to make visual observations, observations by radar reflection technique and by communicating by auroral reflection. The Amateur Radio

movement is perhaps the only organised body which is studying the extremes of auroral propagation, prompted largely by the DX interest of such work. However, by collecting many reports together it is possible, knowing the north/south and east/west limits of communication together with the beam aerial bearing for optimum signals, to provide a considerable amount of information on the nature of the auroral reflecting medium.

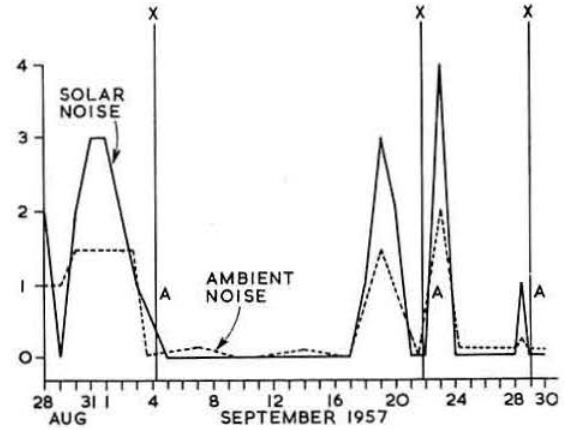

Fig. 5. Solar noise compared with times of occurrence of auroral propagation (points A) is shown by this graph prepared by W. Tyler (G3CGQ).

A map is shown in Fig. 4 on to which has been plotted the geographical location of typical stations participating in auroral reflection communication or reception. Significant facts to be observed are that the most northerly stations in Scotland are able to make contacts over a broad east/west area. The farther south the station the more restricted is the east/west propagation; however, long distance contacts are still possible and, in fact, the greatest ranges have been achieved this way, e.g. G5YV (Leeds) contacted two Swiss stations during the afternoon of September 29, 1957.

It has thus been established that auroral reflection propagation can be achieved up to about 400 miles in an east/west direction and about 600 miles in a north/south direction. Future fields of study are not only to increase knowledge of the type of auroral propagation already noticed but to see whether single hop " Sporadic E " type propagation is possible through the region of auroral ionisation. If so, contacts with Iceland would be possible. (The several reports of the reception of a station in Iceland have not been subsequently confirmed.) An even more remote possibility is for double hop propagation to the more northerly parts of the American Continent through the two regions of auroral ionisation intercepted by a great circle path.

Time now is rather short for auroral investigations and for this reason every amateur, whether an I.G.Y. observer or not, is requested to submit reports of auroral propagation to ensure the maximum coverage of any particular opening.

Solar Noise

F. W. Tyler (G3CGQ) has been studying solar noise on the 144 Mc/s band employing a rotateable/tiltable multi-element Yagi aerial (R.S.G.B. BULLETIN, February 1958).

The occurrence of intense outbursts of noise is usually associated with flares on the Sun. Since the great aurorae are produced by charged particles given off by these flares observations of noise bursts can be used to predict when the particles, which travel much more slowly than the radio noise, are likely to reach the earth's atmosphere. Fig. 5 shows a typical record for September 1957 when auroral occurrence was particularly high.

* * *

It is hoped that this brief and rather sketchy summary will provide some insight into the work going on concerned with the analysis of v.h.f. radio wave propagation. At a later date, it is planned to produce a small book containing a comprehensive record of the results achieved, not only in the v.h.f. field, but all aspects of the R.S.G.B. I.G.Y. programme.

I.G.Y. Progress Report

By G. M. C. STONE (G3FZL)
R.S.G.B. I.G.Y. Co-ordinator.

BRITISH radio amateur activities during the I.G.Y. were initiated by a paper written by Dr. Smith-Rose, the Director of the Radio Research Station at Slough, which was published in the R.S.G.B. BULLETIN for March, 1957. After a meeting of the V.H.F. Committee of the R.S.G.B. a proposal that two I.G.Y. Co-ordinators be appointed was put to the Council and following their agreement, the R.S.G.B. I.G.Y. Programme commenced. An appreciation of the situation made by C. E. Newton (G2FKZ), D. W. Furby (G3EOH) and the writer was published in the April 1957 issue of the BULLETIN. No detailed programme had been planned at the time and in consequence the response to a request for voluntary observers was, in general, poor. However, in May, a meeting of an *ad hoc* I.G.Y. group was held and a detailed programme formulated. A further article was prepared and published in the June BULLETIN. The response was immediate, with many amateurs offering their assistance.

It was agreed that for the programme to be a success, a manual of very detailed instructions would have to be prepared to cover all aspects of the work. The preparation of this manual was itself a very large task involving the preparation and duplication of some 50 foolscap sheets per manual with an initial distribution of over 150 copies. As a result of this, the R.S.G.B. I.G.Y. Programme was some weeks late in starting since the copies of the manual were not ready until mid-August. It has since been found that the R.S.G.B. was not the only late starter, and thus, the foresight of the international I.G.Y. planning groups who decided to make the " Year " eighteen months is now apparent.

To ensure that all reports were of a uniform nature, special reporting forms were designed, printed and distributed at the same time as the manuals. Once the programme was under way the numbers of observers continued to increase but, as it is to be expected, others have fallen by the wayside, with a result that the " hard core " of regularly reporting observers is about sixty in number.

Finance

Unlike the A.R.R.L. I.G.Y. programme, the R.S.G.B. is receiving no outside financial support and thus the resources are very limited. For this reason the programme has been designed to give the maximum direct return to the Amateur Radio movement. For the same reason there is a severe limitation on space in the BULLETIN that can be devoted to

I.G.Y. matters. At the same time, however, many observers have incurred considerable personal expense in purchasing special instruments and apparatus and it is to these people that any possible success will be due, since without this effort only a very limited programme would have been possible.

Organisation

Area Activity Co-ordinators were appointed to co-ordinate the work of observers in their particular area. Individual observers sent their reports monthly to their A.A.C. for onward transmission to the Amateur Radio I.G.Y. Centre at R.S.G.B. Headquarters, in the case of v.h.f. and meteorological reports, or to Vic. Collins (G2HOF) in the case of h.f. reports. The reports are collected at these two centres and passed on to the I.G.Y. Co-ordinators, G2FKZ, G3FZL (originally G3EOH and G3FZL—G3EOH had to withdraw for domestic reasons.) Here the reports are examined and separated into groups covering the various different study aspects. The fact that a report has been received is marked on a master register so that quick reference can be made to any particular report. In view of the large amount of work associated with the collecting of reports, no more than a cursory analysis has been, or can be made until the end of the I.G.Y. However, various reports have been made on the initial results obtained typical of which are those published in this issue of the BULLETIN.

Programme

Now that many months reporting have been completed, the resulting pattern of the study programme can be seen. The reports cover the following aspects :—

(i) H.F. band trans-auroral path propagation.
(ii) V.H.F. band ionospheric propagation on 50 Mc/s.
(iii) V.H.F. tropospheric propagation in the amateur 70 Mc/s, 144 Mc/s and 435 Mc/s bands; and in the television/broadcasting Bands I, II and III.
(iv) V.H.F. auroral propagation in the 144 Mc/s band.
(v) Study of solar noise.
(vi) Meteorological conditions of a type necessary to study v.h.f. tropospheric propagation.
(vii) Reception of radio signals from artificial earth satellites.

H.F. band trans-auroral path propagation is being studied by examining records of amateur contacts in the 21 and 28 Mc/s bands and the regular reception of WWV on 10, 15, 20 and 25 Mc/s. The original intention of organising regular schedules has proved difficult and has thus made no significant contribution to the results obtained to date. As a guide to observers, G2HOF produces a monthly forecast of propagation conditions over the paths of particular interest.

Results concerning v.h.f. ionospheric propagation are obtained from amateur contacts and reception reports in the 50/52 Mc/s amateur band. For the period of the I.G.Y. the licensing authorities of several European countries have allowed transmission in the 50 Mc/s band. Unfortunately British licenses do not, in general, allow such operation during the hours of 09.30—midnight, the period when contact with the U.S.A. is possible and as yet there does not appear to be much transmitting activity in the U.K. However, the authorities in Eire have allowed certain amateurs to operate during daylight hours on the 50 Mc/s band and Harry Wilson (EI2W), the Co-ordinator for both the A.R.R.L. and R.S.G.B. I.G.Y. programmes in Eire, has carried out work worthy of special mention. However, many cross-band 28/50 Mc/s contacts have been made and in general activity has been very high, especially during December/January.

V.H.F. tropospheric propagation is being studied by amateur contacts and reception reports of stations in the 70 Mc/s, 144 Mc/s and 435 Mc/s bands with by far the greatest emphasis on 144 Mc/s. As a measure of v.h.f. conditions when amateur band activity is low, regular reports are made on the reception of Band I, II and III television and broadcasting stations. In addition, a few suitably equipped

The I.G.Y. Calendar

July 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24/31	25	26	27	28	29	30

September 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24	25	26	27	28	29

December 1958

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

World Calendar for the period up to the end of 1958 showing the regular world days and other I.G.Y. data.

amateurs are monitoring commercial v.h.f. pulse stations operating in the 70/80 Mc/s band. The composite result is that a very good general coverage of v.h.f. band conditions is being obtained.

V.h.f. auroral reflection communication is a completely new field of study in Europe. At the time of the last sunspot maximum v.h.f. technique was very much inferior to that of the present day and in any case, no special record of auroral propagation was made. However, the reports received are now very numerous with a result that it is possible to determine the apparent limits of east/west and north/south auroral reflection propagation. The study of the limits of communication will provide additional information concerning the nature of the aurora when added to the information being gathered by other workers by radar and visual observations. Nearly all reports concern the 144 Mc/s band with several covering the 70 Mc/s band. As yet no auroral echoes have been seen by the observers logging the signals from the commercial pulse transmitters operating in the 70/80 Mc/s band since only poor aerials were in use during the intense auroral activity of last autumn. (This failing has since been rectified.) No reports have been received of auroral reflection propagation in the 435 Mc/s band.

A beacon station, GB3IGY, has been set up and run by K. E. S. Ellis (G5KW) to provide a regular transmission in the 144 Mc/s band for the study of tropospheric and auroral reflection communication. In addition this station has been used to radiate other information concerning I.G.Y. alerts and Special World Intervals and also, during the initial phase of *Sputnik 2*, to radiate information on orbit times and other data concerning the satellite. It is hoped, in the near future, to increase the number of beacon stations operating in the 144 Mc/s band to ensure a wide coverage of the British Isles.

High Power Operation

The G.P.O. has authorized a small number of amateurs to use transmitters of up to 1 kW input in the band 145·6—145·8 Mc/s and on 421·5 Mc/s. The technical difficulties of building equipment for such use has meant that very few stations will be operating with the full power before the end of the I.G.Y.

However, a number of interesting projects are only possible with such high power, notably forward scatter and meteor scatter reflection propagation. There is no practical experience in the U.K. of meteor scatter contacts and it is hoped to establish some definite schedules for this purpose in the near future.

A more ambitious project, the spanning of the Atlantic on 144 Mc/s, has been proposed by Walt. Morrison (W2CXY) of New Jersey. Again the difficulty of making the equipment in the limited time available has prevented any tests to attempt the crossing. However, a few stations will soon be ready to co-operate in this project with W2CXY.

Met. Readings

Meteorological readings are being taken of barometric pressure and the water vapour content of the air determined by the use of a wet and dry bulb thermometer and many observers have devoted themselves to this activity. Quite large discrepancies have been noticed in the readings of observers, even those comparatively close together. Some of this may be due to instrument inaccuracies but it is apparent that many local pockets of different air exist even when conditions are stable. This makes it very difficult for an individual observer to make use of his readings to predict v.h.f. band conditions. However, the aim is not only to correlate such conditions with weather conditions but also to try to establish a set of simple rules so that a lone amateur can make reasonably accurate forecasts of v.h.f. band conditions when meteorological readings are taken and used together with observation of the characteristics of signals in the various v.h.f./u.h.f. bands.

A limited amount of observation has been carried out of solar noise in the v.h.f. band. The difficulty preventing more work is the necessity of constructing special steerable aerials which has not proved possible with the limited time available to observers already engaged in many other projects.

Earth Satellites

No programme was originally planned for the participation by U.K. amateurs in satellite observations. This was because of the lack of available information concerning the Soviet programme and also because the initial U.S. satellite orbits were planned to be equatorial, i.e. did not pass over the British Isles. The release of *Sputnik 1* changed the scene entirely. Although many British amateurs received signals from *Sputnik 1* only a few made records of their observations. However, the Royal Society summoned together all bodies interested in the study of satellites. As a result liaison was established between the R.S.G.B. and the British Astronomical Association, and Mr. Heywood of the B.A.A. appointed joint B.A.A./R.S.G.B. co-ordinator of *Sputnik 2* observations. On release of *Sputnik 2* all efforts were devoted to the tracking of the satellite during its first 48 hours aloft. A number of Doppler tracking stations, operating simultaneously, forwarded readings to Norwood Technical College. These results were passed to Cambridge for use in initial calculations concerning the orbit of the satellite. A more leisurely study was made of the reports and several papers have been written by Mr. Heywood concerning the observations.

The programme for *Sputnik 3* was limited to the recording of telemetry signals and the observation of anomolous propagation, since official bodies have now established a network of Doppler/interferometer tracking stations of sufficient quality to preclude the necessity for amateur observations concerning the nature of the orbit. Many thousands of feet of tape have been collected by two groups, one in the Wirral and the other in London and the coding signals are being reduced to tables of pulse width/time to be sent to the Satellite World Data Centres.

Since the study of satellite radio signals is so new no definite field of interest has yet been established. Yet it is apparent that a wealth of information can be derived from this source and the R.S.G.B. satellite programme will be continued and will, it is hoped in the near future, be extended to cover U.S. satellites also.

The Future

Although, as stated previously, no detailed results can be expected until the end of the I.G.Y., the activity to date indicates that there are many amateurs interested in making scientific observations which are certainly of value to Amateur Radio and many of which may prove useful to professional scientists. The energy and enthusiasm with which observers have undertaken the frequently boring task of compiling thousands of individual readings has shown that perhaps such activities as have been undertaken specifically in support of the I.G.Y. should be continued as part of the regular activities of radio amateurs.

The I.G.Y. has stimulated an interest in scientific matters which goes beyond the limitations of boundaries, colours or races and has provided a pattern of international friendship and co-operation of a sort never previously achieved. Let us support any efforts to continue activities started during the I.G.Y. for the benefit of mankind as a whole.

IF YOUR FRIEND WHO IS A NON-MEMBER WOULD LIKE TO SEE A COPY OF THIS SPECIAL I.G.Y. ISSUE ASK HIM TO WRITE TO HEADQUARTERS FOR MEMBERSHIP DETAILS

World Data Centres

How I.G.Y. data are collected and centralised

Indexing some of the thousands of microfilm tables of ionospheric data which come in to the I.G.Y. World Data Centre at Slough from all parts of the world. (Crown Copyright reserved)

INVESTIGATIONS of the characteristics of transistors or the design of radio receivers can, if necessary, be carried out in isolation in a single laboratory without reference to similar work being done elsewhere. Quite the reverse is true in geophysical research when the Earth and its atmosphere as a whole must be considered as the laboratory. The recording instruments may be located in some small room or even a wooden hut, but the measurements will be concerned with such things as an earthquake on the other side of the world, atmospheric ionization at heights of several hundred miles, or the location of an artificial satellite far above the ionosphere. Measurements of this kind may not be of much interest when considered by themselves, but they gain enormously in value when examined in conjunction with complementary data obtained in other parts of the world.

During the International Geophysical Year, and in many countries large and small, an unprecedented effort is being devoted to making frequent observation of many geophysical phenomena on a scale which would not be practicable under normal circumstances. The very large quantities of data now being accumulated will provide material for research for many years and the vital importance of ensuring that the data will be readily accessible has been recognized throughout the planning stages of the I.G.Y.

The method adopted for handling the I.G.Y. data has been to establish three or four World Data Centres for each of the fourteen scientific disciplines into which the programme of observations has been divided. Each W.D.C. has for its objective the collection of a complete set of the I.G.Y. data in its own discipline and the provision of facilities for consulting and copying items of information which may be needed by interested individuals or organizations in neighbouring countries.

A typical example of a W.D.C. is the Centre at the Radio Research Station at Slough. This Centre is one of four at which data relating mainly to the ionosphere and atmospheric noise are being collected; the others are in similar laboratories at Boulder (U.S.A.), Moscow, and Tokyo. Each observing station sends its tables of data or photographic records to at least its parent centre which makes copies for any of the other three to which copies have not been sent.

One or two million sheets of data are expected to have accumulated at Slough by March 1959. The handling of such a large amount of material raises two problems: providing sufficient storage space and devising a method of finding quickly any information which may be required. Most of the original full-sized photographs and data sheets are being transferred to 35mm. microfilm which allows about 800 items to be condensed into the space occupied by 60 cigarettes. Any microfilm frame can be selected and projected to full size on a micro-film reader when required. A card-index system provides a satisfactory means of locating quickly any data which are wanted. The incoming data are indexed on cards according to the observing station and the month during which the measurements were made. For each station the data are subdivided into categories corresponding to one of the dozen " projects " which are included under the corresponding term " ionosphere." The final result is that out of the large quantities of data in stock, any required item can be made available within one or two minutes.

A good deal of the ionospheric research in progress is fundamental in character but R.S.G.B. members will not need reminding of the importance of the ionosphere in radio wave propagation. It is not too much to hope that some of the problems concerning the reflexion and scattering of radio waves by the ionosphere will be solved when the I.G.Y. data have been studied.

An Effective Multi-band Aerial of Simple Construction

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

IMMEDIATELY after the war the writer was stationed in North Buckinghamshire until demobilized at the end of 1946 and when amateur transmitting licences were restored in February of that year, had already designed and erected a multi-band aerial in preparation for the word " *GO!* ". Since only an average size back garden was available it was not deemed worth while to construct a beam for the DX bands. Operation on 1·8 and 3·5 Mc/s was an important requisite, but efficient operation on 7, 14 and 28 Mc/s. was also desired. The aerial to be described was evolved and proved to work splendidly from 1·8 to 28 Mc/s. Two versions of it were tested; one using open-wire tuned feeders and the other using a 34 ft. open-wire stub fed at its base by either 72 ohm co-ax or 72 ohm twin-lead. As an alternative to using an open-wire stub, 300 ohm ribbon feeder could be used but would, of course, introduce a certain amount of loss since, on all bands except 1·8 Mc/s, there is a large amplitude standing wave on the stub. The system proved so successful that the writer continued to use it even after his return to Chelmsford where ample space was available for a number of different arrays. It was, in fact, in regular use right up to the summer of 1955 when G5RV departed for Venezuela. Many fellow amateurs who have copied the design are using it with considerable success.

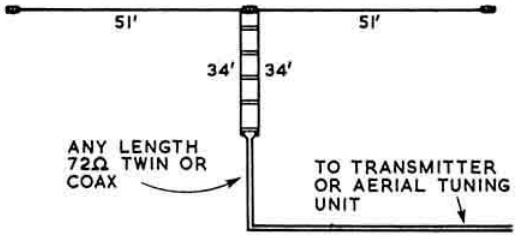

Fig. 1. Construction of the multiband aerial described in the text.

Construction

The aerial consists essentially of a 102 ft. flat-top split in the centre where a Pyrex type insulator is inserted, a 34 ft. long open-wire stub (spacing is unimportant) and sufficient length of 72 ohm co-ax or twin-lead feeder to reach the transmitter. Alternatively, open-wire feeder may be employed from the centre of the aerial right back to the transmitter output or a.t.u. The aerial should be supported at the optimum height for the band which is considered most important for DX working; that is, a half or full wavelength above ground. It is perhaps better to arrange this for 14 Mc/s at which frequency the aerial is designed to present a fairly close impedance match to 72 ohm co-ax or twin-lead via the 34 ft. stub which, in this case, acts as a one-to-one impedance transformer, i.e. a half-wave line. Details may be seen in Fig. 1 and Fig. 2.

Operation

On 1·8 Mc/s the transmitter end of the feeder (whatever type is used) is jumpered (i.e. the two feeder wires are connected together or the inner and outer of the co-ax joined, and the top plus " feeder " is used as a Marconi aerial with a series-tuned coupling circuit and a good earth connection. Despite its relatively small effective height at this frequency, the aerial performs remarkably well and with 10 watts all the British Isles and several European countries were worked regularly.

On the 3·5 Mc/s band, the electrical centre of the aerial commences at about 15 ft. down the centre stub (in other words, the middle 30 ft. of the dipole is folded up). Despite the fact that the remaining 15 ft. length of stub presents a reactive termination to the 72 ohm feeder, no difficulty was found in loading the system easily on this band and results were most satisfactory. WAC was made on 3·5 Mc/s c.w. with 75 watts input while phone contacts were made with many European countries.

The aerial functions as two half-waves in phase on 7 Mc/s with a portion " folded " at the centre. Again, although the 72 ohm feeder sees a somewhat reactive termination it loads perfectly satisfactorily and the system radiates most effectively.

At 14 Mc/s the aerial really comes into its own. On this band it functions as a three half-wavelength aerial with a very effective all-round low-angle polar diagram which is excellent for DX. Since the impedance at the centre is about 100 ohms, a satisfactory match to the 72 ohm feeder is obtained via the 34 ft. of half-wave stub. The DX results obtained on this band particularly, surpassed the results obtained with most normal 14 Mc/s radiators except, of course, a rotary beam. Between 1946 and 1955 the writer amassed a total of 227 countries worked, mostly on 14 Mc/s, mostly with the aerial described here. By making the height a half-wave or a full wave above ground at 14 Mc/s and then raising and lowering the aerial a bit at a time while observing the standing-wave ratio on the 72 ohm twin-lead or co-ax feeder by means of a s.w.r. bridge, an excellent impedance match may be obtained on this band.

On 21 Mc/s, the aerial works as a slightly extended two-wavelength system or, more properly speaking, two full waves in phase and is capable of good results, especially when using tuned feeders thus avoiding any mis-match loss. On 28 Mc/s it consists of two one-and-a-half wavelength in-line aerials fed in phase. Here again, results are better with a tuned feeder to minimize losses although it works satisfactorily with the 34 ft. stub and 72 ohm feeder.

When using tuned feeders, it is recommended that a suitable aerial tuning unit be employed as shown in Fig. 2. The feeder taps should be adjusted experimentally to obtain

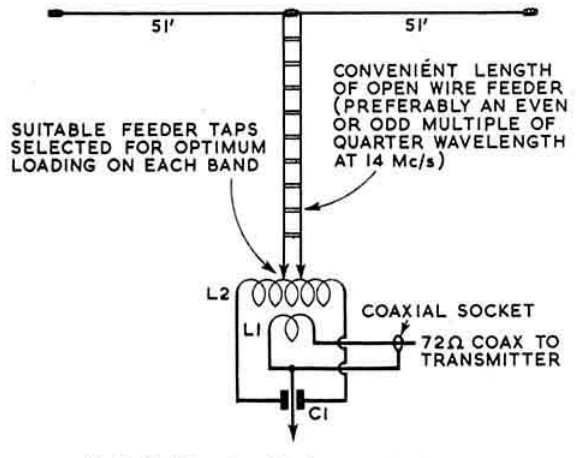

Fig. 2. Multiband aerial with tuned feeders.

* *184 Galleywood Road, Chelmsford, Essex.*

optimum loading on each band using separate plug-in or switched coils. Connection from the a.t.u. to the transmitter should be made with 72 ohm co-ax in which a suitable TVI suppression (low pass) filter may be inserted.

However, as already stated, this does not prevent the aerial loading well on all bands and it is considered that any mismatch loss occasioned by this fact is made up for by the versatility and proved excellent radiating properties.

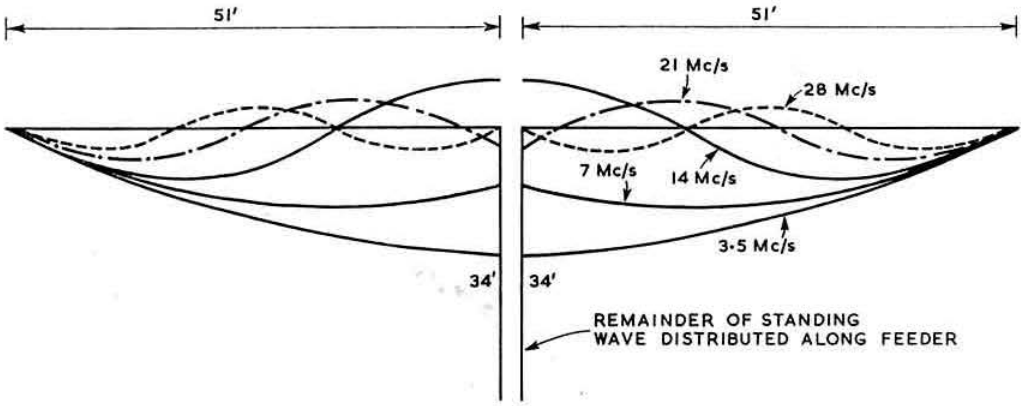

Fig. 3. Standing wave distribution at various frequencies (wave amplitudes not to scale).

Fig. 3 shows, diagrammatically, the standing wave distribution on the flat-top for the various bands except 1·8 Mc/s where the aerial plus feeder functions as a capacity top loaded semi-vertical wire. It will be noted that on all bands except 14 and 28 Mc/s the lower end of the 34 ft. stub will present a reactive impedance to the 72 ohm line or co-ax feeder.

Conclusion

The writer has often described this array on the air to other amateurs and it is known that many have used it with considerable success. Amongst others known to have used it are G2AJF (now VE3EHR), G3ACC, G4OT and the late G2SA and G6LB.

A Fine Achievement

A FAIRLY new member of the Hastings and District Amateur Radio Club is Mr. A. C. (John) Pointon of Bexhill-on-Sea, Sussex. Last January, John, who is blind, decided that he would like to take up Amateur Radio although he knew absolutely nothing about it. With the help of the President of the Hastings Club (L. H. Thomas, G6QB) who coached him on technical subjects and J. Taplin, G3HRI (another member of the Club who is blind) who coached him in Morse by means of tape recordings, John Pointon was able to pass the Post Office Morse test on May 5 and the R.A.E. four days later. He is now licensed as G3MTX—altogether a very fine achievement.

Berkshire County Amateur Radio Association

PRENTISS M. BAILEY (W1AZW), 49 Pleasant View Drive, Dalton, Mass., U.S.A., wishes to correspond with a U.K. amateur who expects to tour the U.S.A. during the period September 1958 to June 1959. Mr. Bailey is anxious to arrange for a British amateur to attend a meeting of the Berkshire County Amateur Radio Association, to talk to members about Amateur Radio in this country.

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IN THE GALLERY

National Publicity Co. Ltd.

THE Society's Advertisement Managers, The National Publicity Co. Ltd. have moved to 20/21 Red Lion Court, Fleet Street, London, E.C.4. Telephone FLEet Street 0473/6.

Rare Counties in North Wales

MEMBERS of the Army Wireless Reserve Amateur Radio Society will be operating under their own call-signs from some of the rarer counties of North Wales during the weekend of July 19 and 20. C.w. only will be used. Until July 26, members will also be operating GB3AWR on 1·8, 3·5 and 7 Mc/s (phone and c.w.) and on 14, 21 and 28 Mc/s (c.w. only).

Project Vanguard

MEMBERS may obtain a reprint of the article " Project Vanguard Report No. 21: Minitrack Report No. 2: The Mark II Minitrack System " by Roger L. Easton which appeared in the *Journal of the British Interplanetary Society*, May-June 1958, by sending a stamped addressed envelope measuring not less than 6½ in. by 9½ in. to the Secretary, British Interplanetary Society, 12 Bessborough Gardens, London, S.W.1.

B.B.C. Colour TV Tests

THE B.B.C. has issued a report on the series of colour television tests carried out up to Spring 1957. The results are described as promising. The B.B.C. believes that the system used (an adaptation of the American N.T.S.C. system) is capable of giving acceptable results. The report, B.B.C. Engineering Monograph No. 18 "The B.B.C. Colour Television Tests: An Appraisal of Results" is published at 5/-.

Pitfalls of the Squier Overtone Oscillator

By D. T. BRADFORD (VQ4EV, ex-G3GBO)*

FROM time to time one hears complaints about the Squier system for exciting crystals on their overtones. The remarks passed suggest that those concerned either do not fully understand the operation of this type of oscillator or that their circuit constants are far from correct. The present article is intended to help amateurs who find the Squier difficult to get going.

Firstly a few words about the system. Almost any quartz crystal will oscillate easily on its third overtone, although the " through capacity " of the holder has some effect on the manageability of the oscillator. That is, if we imagine the quartz slab being replaced by air, the resulting simple condenser so formed should have as low a capacity as possible. For this reason miniature vacuum mounted crystals are generally more tractable than FT243 types, while these are more manageable than 10X types. However, this does not mean that the larger 10X crystals cannot be used; far from it, but greater care should be exercised to get just enough turns on the feedback winding.. Whatever the type of crystal the output frequency may be slightly different from an exact multiple of the marked frequency (unless of course the crystal is specifically ground for overtone use) and is usually a few per cent *lower*, but not necessarily so.

The Circuit

The basic circuit is shown in Fig. 1a. The tuned circuit in the anode of the valve is tuned to an odd multiple of the crystal frequency (usually three times but fifth and seventh multiples have been used successfully); in the case of the example shown, this is 21 Mc/s. In the grid the crystal (fundamental frequency 7 Mc/s) is placed in series with a coupling or " tickler " coil which usually has of the order of 20-30 per cent of the turns on the main tuning coil. These two coils are often drawn as one large coil tapped at the h.t. feed point (see Fig. 1b) and in practice this is more convenient, as coupling between the two coils is then close and feedback is in the positive direction. It is, however, important to consider the tapped coil as *two separate* coils, fed at a common by-passed h.t. point.

* *P.O. Box 30175, Nairobi, Kenya*

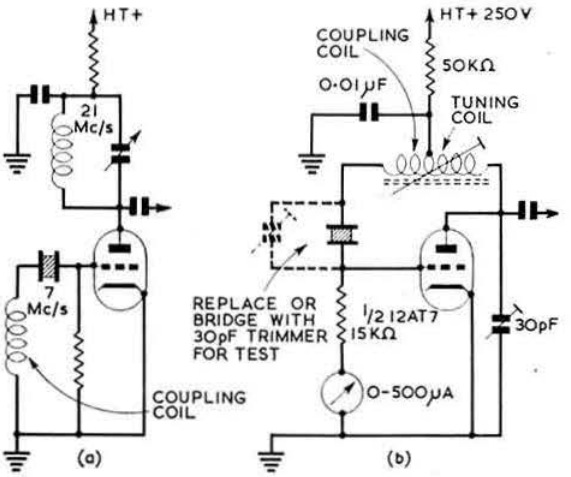


Fig 1 (a). Basic overtone oscillator circuit. (b) Practical circuit diagram in which the tuning and coupling coils are drawn as one tapped coil. As explained in the text, it is important to consider the tapped coil as two separate coils fed at a common by-passed h.t. feed point.

The easiest way to get the oscillator working is with the aid of a communications receiver covering the required frequency. First tune the receiver near the output frequency then replace the crystal with a 30pF condenser. The circuit should at once oscillate as an s.e.o. Next tune the trimmer (or coil slug if used) until the oscillation so produced is heard in the receiver. Check that the oscillator is on (or very near) the correct frequency and that you are not listening to a harmonic. This is important, for if the tuned circuit resonates on the crystal fundamental frequency it will readily oscillate on its fundamental like an ordinary tuned anode crystal oscillator. This may also be the case if the coil resonates at an *even* harmonic of the crystal (i.e. 14 or 28 Mc/s). Remove the 30pF trimmer and replace the crystal. Oscillation should once again occur, although slight rocking of the trimmer or coil slug may be necessary to find the correct adjustment. Now tune the receiver to the crystal controlled oscillation near 21 Mc/s.

Adjusting the Feedback

If the circuit fails to oscillate, more turns are probably required on the coupling (or tickler) coil to increase feedback; in this respect the circuit is somewhat similar to a regenerative detector. If too much feedback is being used the oscillator will pull the crystal possibly several kilocycles, whilst the oscillator may even pull itself free and oscillate, without being crystal controlled, on a frequency determined by the tuning coil slug or trimmer setting. In such cases, turns should be removed from the coupling coil one at a time until the stage ceases to oscillate when tuned off the crystal overtone frequency. The frequency of crystal controlled oscillation should only vary a few hundred cycles when the circuit is tuned off frequency before oscillation ceases altogether.

Checking the Output Frequency

When crystal controlled oscillation is obtained, tune the receiver to the even harmonics and the fundamental frequency of the crystal. If all is well nothing should be heard, although beware of image signals if a superhet is used! Should signals be heard on 7 and 14 Mc/s it is a sign that the tuned circuit is resonating on the fundamental or an even harmonic and the tests with a small capacitor replacing the crystals should be carefully repeated. Incidently when the crystal " takes off " on its fundamental, the output on the required overtone (say 21 Mc/s) is much reduced. Output on the required overtone should be nearly as much as the output would be on the fundamental of the crystal; moreover output should only be obtained on the wanted overtone, and harmonics of that frequency. Nothing should be heard on frequencies that are not in direct harmonic relationship with the required overtone, i.e. in the case of a 7 Mc/s crystal " taking off " on its third overtone (21 Mc/s) signals might be heard on 42, 63, 84 Mc/s etc. but not on 7, 14, 28, 35, 49, 56 Mc/s etc. In any case the possible harmonics should be relatively weak. The idea that in a Squier circuit a weak output is obtained on the crystal frequency, and some of its unwanted multiples, is entirely false.

In some cases a receiver may not be available to cover the overtone frequency (e.g. for outputs above 32 Mc/s most receivers will be useless). In this event the tuning coil will first have to be roughly checked with a g.d.o. to ensure that it tunes over the required range. Afterwards a micro-ammeter should be connected in the earthy end of the grid leak of the oscillator to measure grid current (as shown in

(*Continued on page 23*)

An Electronic Transmit-Receive Switch

By A. STUART McNICOL (GM3UU)*

EVERY amateur discovers sooner or later that for best results the same aerial must be used for transmission and reception. In the early days simple manual change-over switches were used. Co-axial cable introduced a complication which resulted in many stations installing such devices as the Air Ministry Type G switch unit, a co-axial change-over relay. Such a relay was in use at GM3UU for two years and worked well, but several disadvantages were obvious. A separate 12 volt d.c. supply was required, and the relay plus transformer and metal rectifier took up quite a lot of space. Occasionally faulty contacts gave some trouble, and as the transmitter h.t. transformer was controlled by the same switch as the relay transformer (to prevent the transmitter going on with no load) it was impossible to work " break-in." In any case the thump of the aerial relay would have been intolerable if it had been keyed.

Recently *QST* published descriptions of two commercial electronic relays which looked interesting[1] [2] but there were two difficulties. Each used a 6AH6 valve, which is not easily obtainable in Great Britain and whose characteristics are, even yet, quite unknown to the writer. The second, and more frustrating matter, was the use in each of the relays of a specially designed ferrite-cored transformer which, it was suggested, was beyond an amateur to duplicate.

The manufacturers, however, each stated their relays did not introduce any appreciable loss in the aerial circuits, and with low power transmitters a gain of several decibels in the receiver was claimed. Finally all the power for these relays was already available in the average transmitter. The challenge was too good to ignore, and the method, or lack of method, in meeting it may either interest or amuse the reader.

Circuit

The circuit (Fig. 1) is very simple, the novelty being its insertion into the tank circuit of the transmitter at the r.f. end of the tank coil.[2] In order to prevent any misunderstanding the relay circuit is shown coupled to the tank coil of a pi-coupler. In this position the incoming signal passes through the transmitter tank circuit and benefits by the step up effect of the tuned circuit, plus the additional discrimination against unwanted signals from outside the band. The received signal passes through an EF50 valve, which acts as an amplifier. The amplified signal is then passed via the aperiodic transformer to the input of the receiver.

When the transmitter is in operation the r.f. voltage is applied to the EF50 grid after being stepped down by the potential divider formed by the condenser C1 and the grid/cathode capacity of the EF50. The input condenser of the unit is chosen to give a suitable step down voltage to the grid of the EF50, and for a p.a. with 1,000 volts anode modulated the recommended capacity is about 2·5 pF. For c.w. only the capacity can be doubled, with improved input to the receiver. For other voltages the capacity can be altered proportionately. This condenser should have a working voltage at least double the p.a. h.t. voltage.

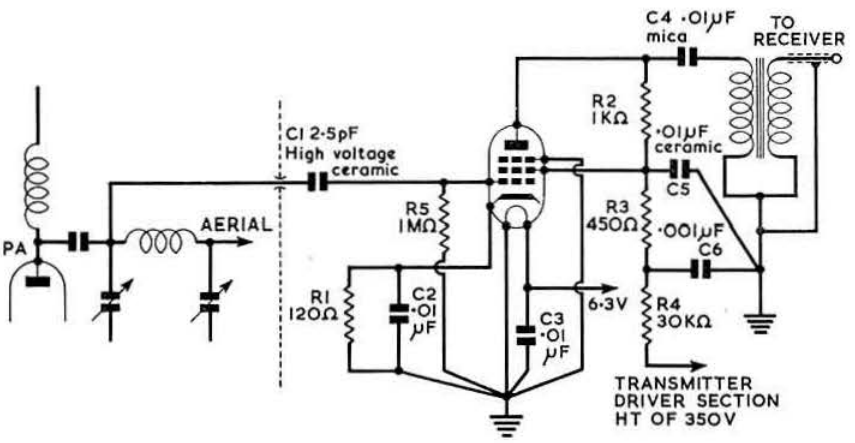


Fig. 1 Circuit diagram of the GM3UU T-R switch. The valve is an EF50. Construction of the wide band output transformer is described in the text.

Design

The only information regarding the 6AH6 given in the *QST* articles was that an h.t. supply of 100 to 150 volts at 13 mA was required. Because of the wideband design of the units it was assumed that the valve would be of the television type. Valve data tables showed the EF50 took a total of 13 mA at 250 volts while its performance in wideband Service receivers under rugged conditions made it a natural choice to start with, especially as several were in the junk box,

The transformer was a bit more of a puzzle. The ferrite core provided a clue to its construction, so a 6 in. piece of $\frac{3}{8}$ in. diameter ferrite rod was bought and a piece about $2\frac{1}{2}$ in. long used as the core for the experimental transformer. The length was chosen because it would fit comfortably into the available screening can!

It was obvious that the primary winding would have to be reasonably aperiodic on all amateur bands, rather like a good r.f. choke. A coil wound for ordinary broadcast frequencies had, many years ago, been used successfully as an amateur band r.f. choke, so available literature was consulted to find the turns specified for a ferrite cored aerial for broadcast reception. Accordingly a winding of 50 turns of 36 s.w.g. enamelled wire was close wound on to the rod, which had first been covered with a layer of waxed paper from an old condenser. The secondary consisted of 10 turns wound on top of the primary from which it was separated by another layer of waxed paper.

To test the transformer the station receiver was first tuned to a suitable signal in the 21 Mc/s band. The primary of the ferrite cored transformer was then connected between the aerial and earth, and the secondary between the aerial and earth terminals of the receiver. The result was a substantial loss in strength! It seemed unlikely that any moderate variation of the secondary turns would make much difference, so a secondary winding of 50 turns, close wound, was substituted for the ten turns. This proved effective and no loss in strength was audible. The receiver was then tuned to

* *Edgehill, Brighton Road, Cupar, Fife.*

stations in each of the other bands, and no noticeable loss in strength could be detected.

There seemed no good reason for not starting off with the other component values similar to those mentioned in *QST*, except for minor departures made as a matter of convenience when other components were already available.

It would be an easy matter to omit these revelations, and leave the innocent to assume that the design was the result of weeks of toil in a well equipped laboratory. The disclosure is made intentionally, to encourage the improvisation of circuits and components by other amateurs who also do not have such facilities. Possibly some of the assumptions made in arriving at values were based on false reasoning: the annoying fact for any critic is that the arrangement works!

Construction

The unit may be built into any available box which will provide complete screening. In the prototype a screening can from a Command transmitter oscillator unit was used, but any container at least 2 in. by 3 in. by 3 in. should suffice. The whole unit is built on the " lid," which is then put onto the box.

If no high voltage condenser is available for the input condenser, a piece of television co-axial cable can be employed, using the core as one plate and the screening as the other. As a rough guide the screening should be trimmed back until it overlaps the core by about 2 in.

Between the pins of the EF50 there is a metal screen separating the grid side from the anode and output transformer. The screen in the prototype is made of aluminium and cut large enough practically to divide the interior of the screening box into two separate compartments, but an absolutely tight fit is not necessary.

The ferrite transformer has been described already but it will be found that the rod cannot be cut with a hack saw. However, if the rod is held on a vice, or even overlapping the edge of a table, and given a tap with a hammer it will fracture easily. After the two windings were put on the rod, occupying about $\frac{13}{16}$ in. of the $2\frac{1}{2}$ in. rod, one end of the rod was glued, with suitable paper packing, into a bakelite flash lamp bulb holder from which the metal parts had been removed. The holder was obtained from the local multiple store, and provided a firm mounting for the transformer.

The output from the screening box should be by co-axial cable right into the receiver. For easy dismantling the prototype was fitted with an output co-axial socket, and a piece of co-ax cable about 6 in. long leads from a co-axial socket on the transmitter back shield to a plug fitting into the screening box socket.

For best results the unit should be placed as near as possible to the anode of the p.a., preferably on the transmitter chassis.

Operation

There are no adjustments to make except that the transmitter must be tuned to the band on which the receiver is working. The prototype did not work when first tested, but the fault lay in a defective EF50, which fortunately was suspected immediately: a substitute EF50 had signals romping in. With the receiver a.v.c. on and gain turned down a first QSO on c.w. was made with W1MHG on 21 Mc/s. Next, contact was with I1AJG on 28 Mc/s n.b.f.m. then EL1P and VQ2FC on 21 Mc/s c.w. were all worked without touching the gain or h.t. switches of either transmitter or receiver. Further tests showed that reception was excellent on all bands from 3·5 to 28 Mc/s so long as the transmitter was tuned to the same band. If signals are as loud on 14, 21 or 28 Mc/s with the transmitter lined up on another band, then either the shielding of the unit is inefficient or the circuit is defective.

If the transmitter is fitted with a clamper valve it will probably be found impossible to use " break-in " working owing to valve hiss from the transmitter. However, with the p.a. h.t. switched off during reception, all the other uses of the unit can be realised.

Although clamper valves have been employed for several years at GM3UU, frequent doubts have arisen as to their efficiency; and first a simple half wave metal rectifier bias unit, then screen voltage control by two VR150s was introduced. The pleasure of being able to work " break-in " (and the doubtful pleasure of hearing a DX station come back to another while you are still calling it) leads to much more efficient operation, and the modifications are strongly recommended to get the full benefits of the Transmit-Receive switch.

Warning

The apparatus described in this article was evolved by " cut and try." In particular the EF50 valve is not designed to handle more than 100 volts on the grid. This voltage should therefore be kept below 100 by limiting the p.a. voltage and/or the size of the input capacitator. Alternatively a constructor may decide to take a calculated risk.

The original unit was installed in a p.a. using two 807s with an anode voltage of 620 at 150/180 mA, with an input capacitator (C1) of 5pF. It has functioned for many months without any trouble. The method of design employed is not for the timid, or those bogged down in theory. They will still be proving it cannot work when the venturesome builder has made DXCC with stations worked since the unit was installed!

References

[1] "The Model 380 T-R Switch," *QST*, November 1955.
[2] "A Novel Electronic Transmit-Receive Switch," Samuel Sabaroff (W3DM), *QST*, June 1957.

Pirate at Work

SGT. Street, G3JKX (R.A.F., Finningley, nr. Doncaster) recently received ten QSLs confirming QSOs on 21 Mc/s. Not having operated on that band he will be pleased to send the cards to the pirate on receipt of a stamped and addressed envelope. The G.P.O. have been advised of the misuse of Sgt. Street's call.

Squier Overtone Oscillator (Continued from page 21)

Fig. 1b). Tuning is then varied and at resonance grid current should rise from zero, showing oscillation. The grid current should fall to zero again on passing through resonance. If a deflection is shown all the time on the meter, irrespective of tuning position, the circuit is self-oscillating (s.e.o.) and is not properly crystal controlled; coupling coil turns should therefore be reduced as described earlier. Conversely if no current is indicated there are probably not enough turns on the feedback winding. If on increasing turns only a steady grid current reading can be obtained with no sharp peak indicating resonance it would show that either the crystal is unserviceable or that the tuned circuit does not cover the required frequency (re-check with a reliable g.d.o.). Having obtained a satisfactory grid current reading a receiver can be used to check the fundamental of the crystal to make sure that it is *not* giving output on that frequency.

Finally, do not use more h.t. on the oscillator valve than is necessary for the required output as some crystals fracture more readily in their overtone mode.

Provided that the pitfalls described are avoided the Squier oscillator is a very useful circuit for mobile and portable gear, saving the weight and consumption of multiplier stages. It is also valuable as a means of quickly multiplying into the v.h.f. spectrum, again saving valves, power, and unwanted harmonics.

Technical Topics

By PAT HAWKER (G3VA)

FOR some time now interest has been growing in electronic " T-R " (transmit-receive) switches which allow a single aerial to be permanently connected to both the transmitter and receiver, without a change-over switch or relay. An electronic T-R switch permits full break-in working on c.w. and is also a boon to the s.s.b. enthusiast and those using voice-operated change-over systems.

The basic principle behind most of the designs published recently is to connect a low impedance aerial feeder in the usual manner to the transmitter while a parallel connection is made to the receiver via a protective valve switch which stops any appreciable r.f. power from reaching the receiver: see Fig. 1. The switch itself usually comprises a sharp cut-off valve arranged so that when the r.f. power from the transmitter is applied to its untuned input circuit, grid current flows and by means of a grid-bias resistor this applies considerable bias to the valve, reducing the anode current practically to zero; thus very little power appears in the output circuit which is coupled to the receiver. When the transmitter is off the valve functions as a low-level amplifier passing incoming signals to the receiver: the transmitter output stage then presents a high impedance to the aerial feeder so there need be little loss of signal.

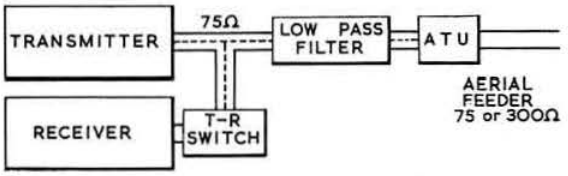


Fig. 1. One method of incorporating a T-R switch into the station layout.

So far so good, but in practice there are several difficulties to be overcome if there is to be no degradation of the incoming signals, no blind spots and no risk of valve insulation break-down from excessive r.f. voltages; the T-R valve may be prone to parasitic oscillation producing spurious signals, or there may be noise radiation from the power amplifier during key-up conditions because of excessive standing current. Another important snag is that a T-R valve biased in this way will tend to generate harmonics and can thus be the cause of TVI. It is important—though not always easy—to have correctly matched impedances to the transmitter and T-R input.

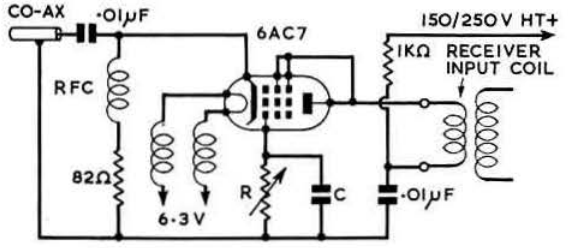


Fig. 2. Circuit diagram of an experimental T-R switch. The values of C and R determine the recovery time of the valve and can be adjusted either to " listen-through " or remain quiescent throughout transmission periods; suggested values: C—0·01 μF, R—2 Megohms. If the input coil on the receiver is connected to chassis parallel feed could be used. Alternatives to the valve shown could be the 6AK5, 6AH6, EF50, etc. In some cases, it may be better to omit the bifilar heater chokes.

At the moment, there still seems to be plenty of scope for further experimenting if someone is to come up with a 100 per cent foolproof T-R switch. As a start, the circuit of Fig. 2 has given good service with a 100 watt c.w. transmitter though it is not claimed that this switch has been cleared for TVI. The circuit comprises a sharp cut-off pentode, triode-connected, as a grounded-grid amplifier with untuned input. This is a low-noise circuit so that when properly matched its addition will improve rather than impair the signal-to-noise ratio of most receivers, thus allowing full break-in working even with DX stations. Alternative ideas and circuits can be found in the 1958 *A.R.R.L. Handbook*, *QST* June 1957, *CQ* October 1955, and the BULLETIN January 1952. This is a really worthwhile operating aid and we look forward to seeing some snag-free designs. (We publish in this issue a description of a T-R Switch developed by Mr. A. Stuart McNicol, GM3UU. —Editor.)

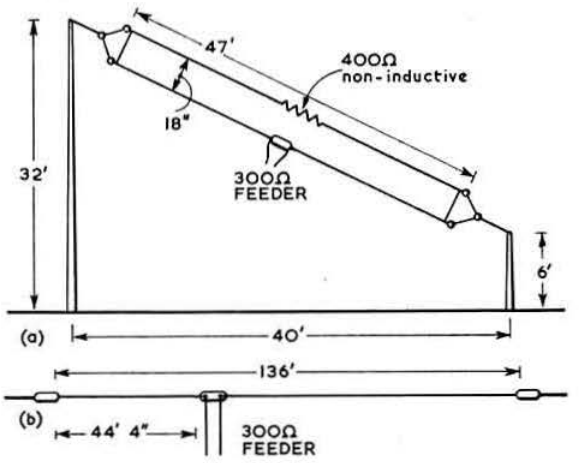


Fig. 3 (a) The " T2FD " aerial. (b) The twin feeder Windom.

Simple Aerials using 300-ohm Feeder

Despite the current popularity of co-axial feeders, many amateurs have a sneaking preference for 300 ohm ribbon feeder; one reason is the ease of checking for excessive standing waves by the well-known twin lamp system or by the even simpler method of running a neon bulb along the line. Then there are no " balun " difficulties at the aerial end of dipoles as the ribbon is a balanced feeder, and—a severely practical point—the flat type of ribbon feeder can usually be run out through windows or over doors to try out aerials without drilling.

Two simple multi-band aerials which use 300 ohm feeder and which, although not new, have not been featured previously in the BULLETIN are shown in Fig. 3. Fig. 3 (*b*) is a modern adaptation of the famous off-centre fed dipole or Windom aerial and with the dimensions given (taken from 1958 *A.R.R.L. Handbook*) is said to provide a reasonable match on 80, 40, 20 and 10 metres; the dimensions can be scaled down if the lower frequency bands are not required. Provided that there is no excessive radiation from the feeder, the radiation patterns will be those of any normal 136 ft. aerial. Fig. 3 (*a*) is the so-called " T2FD " (terminated tilted folded dipole) introduced some years ago in *CQ* (November 1951, February 1953, June 1957). With the dimensions given it is said to perform effectively on 3·5, 7 and 21 Mc/s as a more or less omni-directional aerial.

High Stability Oscillator

After the excitement that followed the introduction of the series-tuned Colpitts oscillator (the " Clapp " or " Gouriet ")

it seemed for a time as though the traditional search for high-stability oscillators had slackened. Lately, however, there are signs that interest in the subject has revived, as some of the less desirable features of the series-tuned Colpitts have become more apparent. Some time ago *QST* put up a strong case for the e.c.o. and followed this (October 1957) with an article by W4ELZ in favour of the old high-C Colpitts circuit as a means of reducing the effects of temperature and vibration. Yet another circuit that has attracted interest recently is the " class A Colpitts " (see Fig. 4) described in *Radio and Television News* of June 1957. It is claimed to possess the advantage of remaining stable over a much wider frequency range than the series-tuned circuit. The design shown is an experimental arrangement for 3·5—4 Mc/s but it could be readily adapted for many applications, while the stability could probably be further enhanced by increasing the capacitance across the tuned circuit.

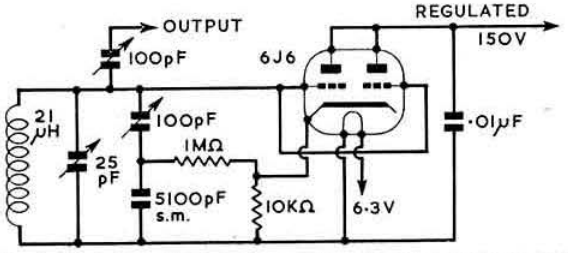


Fig. 4. The ' class A " Colpitts oscillator described in "Radio and TV News."

Modern Services Receiver

The design of new communications receivers for the Services has often many points of interest to amateurs. A recent issue of the *A.T.E. Journal* (April 1958) describes the compact R210 (2·5—16·5 Mc/s) with its 10 in. by 7½ in. panel and 14 in. deep aluminium alloy case. To facilitate the servicing of the receiver it is divided into detachable hinged units which can be opened out to give access to the underside of the sub-chassis while the set is still operational. Frequency drift (0·002 per cent. per degree Centigrade) is said to compare favourably with that of crystal controlled oscillators; valves and electrolytic capacitors are located near the outside edges (finned) to assist cooling. A film dial 52 in. long makes it possible to select any 10 kc/s channel without previous " netting "—and remember this is from one knob tuning without electrical bandspread. Overall noise factor is better than 6 db.

Poor Outlook for DXers?

An article in *British Communications and Electronics* (May 1958) paints a gloomy picture for DX work in the coming years. It points out that there appears to be a tendency for a series of high maximum sunspot cycles to be followed by a series of cycles having low maxima. It is not improbable, the article states, that the maxima of the next one or two cycles will be considerably lower than that of the present and recent cycles, and that it is possible that radio services may be faced with several decades of what, from a radio point of view, could be considered as virtually sunspot minimum conditions. The article concludes by advocating the laying of a cable to some part of the Commonwealth in the equatorial belt where ionization is higher, and the building there of all main commercial transmitters. So unless you can emigrate, have sufficient room for a 7 Mc/s beam, or know where to pick up several thousand miles of cheap surplus cable, you had better make good use of that 28 Mc/s beam while the band is still open.

Briefly Noted

" Continuously Loaded Whip Antennas " (*QST*, May 1958). A description of short helical wound aerials for increased efficiency for mobile or fixed operation where space is at a premium. Another space saver is " Half-size Ground Plane for 10 Metres " (*QST*, April 1958) with 4 ft. radials and radiator with loaded elements. Transistorised d.c. to d.c. converters are discussed in two articles in *CQ*, March 1958, and a design for a 125 watt transistorised power supply for mobile work is given in *QST*, April 1958. A transistorised electronic keyer is described in the same issue of *QST*.

Ceylon Radio Amateurs Closed Down

IN a letter to Society Headquarters, dated May 31, 1958, Mr. G. H. Dulling, (4S7GD) of Parakaduwa, Ceylon, reported that all amateur transmitting equipment in the Island had been called in by the Postmaster General and Director of Telecommunications, Ceylon. This step was taken in view of the state of emergency then existing in Ceylon.

Mr. Dulling stated that unlicensed stations operating on a variety of wavelengths had started a campaign of abuse against the authorities and as a consequence the Prime Minister had advised the P.M.G. to take possession of all transmitting equipment in the Island.

Mr. Dulling suggests that it may be some little time before 4S7 calls are heard again.

Coincidence

THOSE Londoners who had to slog it on foot to their nearest N.F.D. site last month may not have realised that just 21 years earlier a similar inconvenience was avoided just in time. From May 1 to May 27, 1937, 25,000 London bus drivers and conductors were on strike. An announcement that the dispute had been settled appeared on the same page of the *Daily Herald* dated May 28, 1937 as did a preview of N.F.D., held that year on June 5 and 6.

Sgt. Street, (G3JKX,) noticed the coincidence when looking through some old newspapers.

Current Comment Continued from page 7

upper atmosphere and interplanetary space. Within the next few years more artificial satellites will be launched, some at high altitudes outside the influence of the Earth's atmosphere, and will thus remain in orbit for many years; power for operating the instruments and telemetry equipment will be derived from solar batteries. Without doubt other satellites will be used to probe further into space and provide knowledge of conditions around and on the surface of the Moon, and in the vicinity of the nearer planets—Mars and Venus.

Most of the information gained by satellites will be passed back to Earth through radio telemetry systems. To obtain accurate tracking of a satellite it is essential that the radio transmissions are little affected by the ionosphere. For this reason the trend is towards the use of higher frequencies, which opens up an interesting field for the v.h.f. experimenter in the development of stable low-noise v.h.f. and u.h.f. receivers.

All those participating in the Society's I.G.Y. project can be gratified by the results so far achieved, and by the knowledge that they are being recognized by scientific institutions in this country. The results have been obtained through team work. May we hope that this will continue for a long time to come after December 31, 1958!—N.H.

Multi-stage Grid Bias Units

By J. MacINTOSH, F.C.C.S., A.M.Brit.I.R.E.
(GM3IAA, ex-VS1AA)*

WHEN VS2AA was licensed in 1946, a new transmitter had to be built, the prewar equipment at VS1AA having completely disappeared during the Japanese occupation of Malaya. The two doubler stages and the final in the new transmitter each required separate grid bias supplies, as experiments were being conducted with oscillator keying, while a fourth source was necessary to provide bias for screen keying of the first doubler stage.

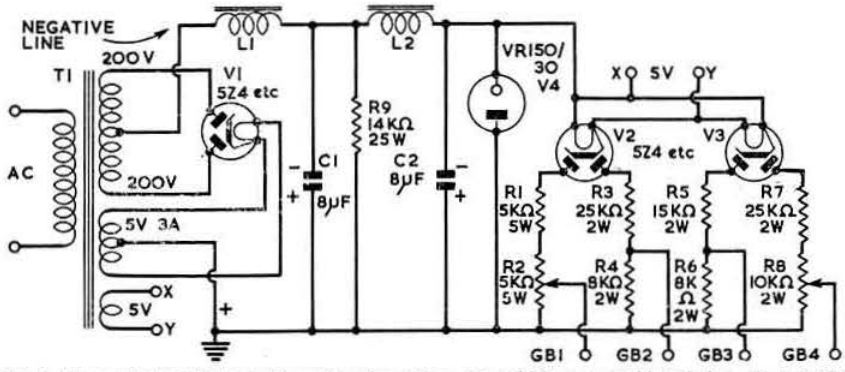


Fig. 1. The original grid bias unit used by the author. L1 and L2 are smoothing chokes. V1, 2, 3, 5Z4, 5U4G, 80, etc. V4, Brimar VR150/30.

Circuit Description

Fig. 1 shows the bias circuit finally decided upon, which is based upon a circuit given in the *Radio Amateur's Handbook*, 1945. V1, V2 and V3 may be any of the usual full wave rectifiers (5Z3, 5Z4, 80, 5U4G, etc.). Choke input is used to improve the voltage regulation and the voltage available at the input to choke L1 may be taken as 200 volts $\times 0{\cdot}9 = 180$ volts. A VR150/30 voltage regulator stabilizes the voltage. The bleeder R9 is not strictly necessary and if further economy were desired, the second choke L2 could be omitted and the value of C2 increased to 16 or 32μF. The values of the resistors R1 to R8 may be varied to suit requirements. Note that R2, R4, and R6 may well form the grid leaks of the stages concerned.

In the case of GB1, which provides protective bias to the final, R1 is the dropping resistor which adjusts the voltage across R2 to the figure required for cut-off with no grid current flowing, i.e. under key up conditions. GB2 and GB3 provide bias for the first and second doublers respectively, additional grid leak resistors being provided in series with R4 and R6.

GB4 provides negative bias to any screen being keyed and a value of about 40 volts is usually suitable. When the positive voltage is disconnected from the screen grid of a beam tetrode, the anode current does not drop to zero, so to prevent a signal being radiated, it is necessary to apply a negative voltage to the screen when the key is up.

*Broom Park, Cradle Hall, Inverness.

Connections to Voltage Regulators

Care must be taken to connect the VR150/30 in the correct sense: pin 5, the anode, should be wired to the positive side of the circuit, which is *earth*; pin 2, the cathode, going to the negative line.

This circuit gave excellent service for some years but although it furnished protective bias, the voltage was not stabilized. As more grid current flowed, so the negative bias increased accordingly.

Reconstruction of Unit

During reconstruction of the transmitter, it was decided to modernize the grid bias unit. Fig. 2 is the result. The choke input filter has been retained, together with L2, C1 and C2. The bleeder has been dispensed with, although in effect the two resistors R8 and R9 act as such. The choke L1 need not be of the "swinging" type—any ordinary choke will do.

GB1 to Final Amplifier

This tapping provides a regulated voltage of about 105 volts negative; actually, it is a little in excess of this figure, as will be explained later. It will be observed that the two cold-cathode gas-filled voltage stabilizers (or regulators), V2 and V3, are arranged in parallel. There is no description of this arrangement in the data sheet issued by Standard Telephones and Cables Ltd. in respect of the G55/1K, and manufacturers do *not* recommend using voltage regulators in parallel owing to the difficulty experienced in getting the two regulators to ignite together. It is therefore necessary to use resistors R3 and R4 in series with V2 and V3 respectively. Without these resistors, it will be impossible to induce V2 and V3 to ignite together: only one regulator will ignite, depending on which has the lower resistance. This may well result in damage to the functioning regulator, if the grid current is in excess of approximately 30 mA.

With the resistance values for R3 and R4 shown in Fig. 2 different specimens of VR105/30 were found to ignite together. If it is found impossible to obtain simultaneous ignition, R4 should be increased in value to 1000 ohms and R3 adjusted until both voltage regulators function together.

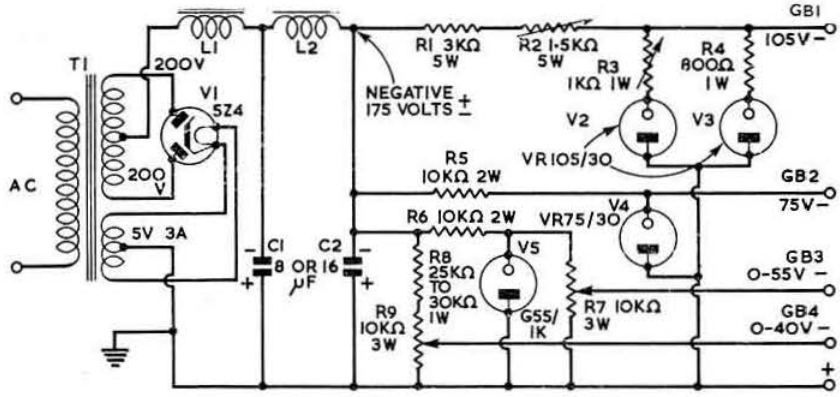


Fig. 2. Grid bias unit providing two fixed and two variable negative voltages. V1, 5Z4, 5U4G, 80, etc.; V2, 3, Brimar VR105/30; V4, Brimar VR75/30; V5, S.T. & C. G55/1K.

Changing over the regulators may help. The object to aim at is to obtain simultaneous ignition while keeping the resistance values of R3 and R4 as low as possible. It should not be overlooked that grid current will flow through these resistors R3 and R4 resulting in a negative voltage which must be added to the 105 volts negative provided by V2 and V3.

Dropping Resistors

Resistors R1 and R2 are chosen to drop about 70 volts at 15 mA, V2 and V3 each taking about 7·5 mA. Using Ohms Law and dividing 70 by 0·015A, the value of the required dropping resistor works out at 4666 ohms. Grid current to the final amplifier—in the writer's case, two 35Ts in push-pull —runs up to 70 mA on some bands but adequate drive, even on 28 Mc/s, is given by 50 mA. The voltage regulators V2 and V3 will carry a maximum of 80 mA so the safety margin is set by 80 less 15 mA = 65 mA. Grid current, therefore, may run up to a maximum of 65 mA but it is advisable to keep within the maximum rating of the voltage regulators.

GB2 Doubler Two

The value of R5 is obtained in the manner already described. The voltage to be dropped is approximately 100 volts, at, say, 10 mA. The value of R5 is, therefore, 100 divided by 0·01A, equal to 10 K ohms. V4 is a Brimar VR75/30 and provides a well regulated voltage of about 75 volts within its current rating of 5 mA to 40 mA.

GB3 Doubler One

V5 is a Standard Telephones and Cables regulator type G55/1K which provides a regulated voltage of 55 volts. As a variable voltage was required, R7 was wired in parallel with V5. If a variable voltage is not required, R7 should be disconnected; V5 will then pass about 12 mA or so. The operating current is 2 to 30 mA. A wiring diagram for the G55/1K is shown in Fig. 3.

GB4 for Screen Grid Keying

This voltage is supplied from the bleeder resistors R8 and R9, the latter being variable. This tapping is not regulated, but as very little current is drawn, other than by R8 and R9, this does not matter. The value of R8 is so chosen that R9 gives a variation of 0 to 40 or 45 volts.

As already mentioned, when the screen grid of a beam tetrode is keyed, the anode current does not drop to zero, so to ensure that the anode current is completely cut off, it is necessary to apply a negative voltage to the screen. In actual practice, a permanent negative voltage is applied to the screen grid and this works perfectly. When the key is up, the negative voltage takes over and the anode current drops to zero; when the key is down, the negative voltage is swamped and has no effect whatsoever, the anode current rising to its working value. It might be thought that only the difference between the two voltages would be applied to the screen grid, e.g. 105 volts positive less 45 volts negative = 60 volts positive. This is not so, however, since the source of positive voltage is much better regulated than the negative. The former is derived from a voltage regulator, while the latter is fed to the screen through a high value resistor, recommended values for this resistor being between 200 and 500 ohms per screen volt. The writer favours a value of between 75 K ohms and 100 K ohms although even higher values have been used quite successfully.

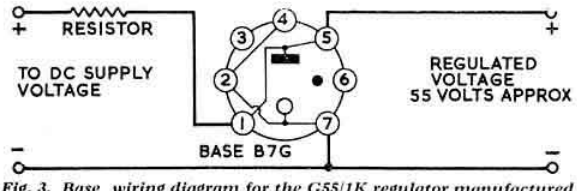


Fig. 3. Base wiring diagram for the G55/1K regulator manufactured by Standard Telephones and Cables Ltd. Removal of the regulator from the socket disconnects the voltage from the load in this arrangement (see text).

Conclusion

If grid current to the final amplifier is unlikely to exceed 25 mA, it would be quite in order to use only one VR105/30.

The grid bias voltages given in the case of GB1, GB2 and GB3 will, of course, be in addition to any drop across grid leaks in use. The negative voltage from GB4 is fed to the screen grid concerned through a decoupling resistor of 75 K ohms or 100 K ohms. This resistor should be connected directly to the screen.

The writer did not adopt the connections shown in Fig. 3 because with R7 (Fig. 2) not in circuit, removal of V5 wired as shown in Fig. 3 would result in GB3 bias being disconnected. The connections adopted were pin 5 to earth and pin 7 to the negative line.

The mains transformer should be chosen to suit the maximum voltage required. The one shown in Fig. 2 happened to be on hand. A secondary winding furnishing 150 volts at about 75 mA would suffice, but the dropping resistors would require alteration to smaller values. Conversely, a higher voltage than 200 would require larger value dropping resistors. In the case of GB3, with R7 in circuit and using the resistance values shown against R6 and R7, it will be found that the current passed by R6—13 mA in the test case—divides almost equally between V5 and R7. The test was made under no-drive conditions. Adjustment of R7 will enable a standing negative bias of up to 55 volts to be applied. If a grid resistor of say 25,000 ohms is in use, and under driven conditions a grid current of 1 mA flows, then there will be a drop of 25 volts across the grid resistor. If the moving arm of R7 is at the negative end, giving 55 volts, the total negative grid bias will be around 80 volts, i.e. 55 + 25 volts under driven conditions. Immediately the drive is removed the grid bias voltage will drop to 55 volts. Under no-drive conditions, R7 can be so set that the doubler either passes no current or a little current. In the latter case, care should be taken to ensure that a signal is not radiated by the stage concerned if that particular stage is being keyed, or drive applied to the following stage.

W.A.C. Claims

MEMBERS are reminded that six cards are required for the Worked All Continents award issued by the I.A.R.U. W.A.C. claims from R.S.G.B. members resident in the U.K. should be sent to Mr. G. E. Verrill, 10 Sea Horse Street, Gosport, Hants, for scrutiny. Cards are required from each of the six continents; namely, Europe, Africa, Asia, Oceania, North America and South America.

Can You Help?

● D. Serrao (VP4TC), c/o Red Lion Hotel, Kingsbury Square, Aylesbury, Bucks, who urgently requires details of the types of valves used in the U.S. Army Transmitter type BC401-A manufactured by Collins Radio Co.?

R.S.G.B. QSL Bureau—Important Notice

The R.S.G.B. QSL Bureau will be closed from Friday, July 18, to Tuesday, August 12, inclusive. Members are asked not to send cards or correspondence to the Bureau which would normally be delivered between these two dates. Envelopes for the collection of incoming cards should be sent direct to the appropriate Sub-Managers as usual.

FOUR METRES AND DOWN

By F. G. LAMBETH (G2AIW)*

Morocco heard on Four Metres — Two shows signs of Life

ONCE again the 4m band has proved that it is sometimes a DX band and is a potential producer of exotic call-signs at other than the regular " opening " times. G5MR has been successful in working North Africa (FA9VN and FA3JR) as did G5KW last year. Accordingly, it is a pity that this band is not more actively populated by those v.h.f. men who also like a bit of DX. Possibly the restriction on band operation in some areas and the limit on the " life " of the band, have a lot to do with this, but we cannot help thinking that more active enthusiasm for operating 4m could easily lead to an extension, and possibly even relaxation of the restrictions. Let this column know of your successes (or, perish the thought, failures!)

Between 10.30 and 11.45 G.M.T. on June 24 **G5MR** worked four Algerian stations all at S9+ 'phone both ways. They were FA9VN, FA8MB, FA3JR and FA9UQ. At times, the signals were so strong they were blocking G5MR's receiver. FA9VN reported that the band had been wide open since 08.00 G.M.T.

CN8CK and CN8MG in Casablanca were heard the same day between 13.00 and 13.30 G.M.T., CN8CK's signals being S9+ 'phone. Unfortunately neither of them appeared to tune the British band.

Two Metres Opens Again

Towards the end of the period there have been one or two " peeps through the mist " and continental stations have been heard by G5YV. Northern Ireland and the Channel Islands (GI3GXP and GC2FZC) have also been in evidence. The band has appeared open up to about 150 miles, but there are still apparently not enough people about to turn possibility into reality. Fading on DX signals is still apt to be severe, but settled weather could work the oracle and give us some of the old fashioned 2m DX QSOs.

On the night of June 28, GI3GXP, GD3UB and at least one GM were heard at good strength in Cambridgeshire.

Station Reports

B.R.S. 20133 (Melton Mowbray) has an impressive list of stations heard. The first (GI3GXP) was located after G3HBW had advised of his presence on 144·02 Mc/s. '20133 ends by what he calls a huge loud moan—the second 144 Mc/s Field Day, the I.S.W.L. Listening Contest and the chance of a Certificate of Merit for the best listener's log in the Field Day—all happen on July 6, when '20133 will be in Rome! He is very grateful for 32 QSL cards out of 36 for the First Field Day report. **B.R.S. 19162** (Dewsbury) has been fairly active apart from the immediate Whitsuntide period. Conditions had been very poor but they got much better with the weather improvement towards the end of the period. The outstanding station in the list is G6JY (Newcastle-on-Tyne) a direction rarely heard at Dewsbury. We are all glad to know that '19162 is fairly fit again and hope the improvement will be maintained. **B.R.S. 18572** (Mitcham) has logged many stations lately, although activity generally was low. An interesting phenomenon was noticed on June 15 when G3KHA was working G4DC. Just before G3KHA went over on one occasion his signal went up from S8 to S9+, but when G4DC came back he said that the signal went right down into the noise level at that same time. (This has been noticed sometimes before).

G5DW (Ashcott, Bridgwater) has regrettably been ill, and although he is about again, he cannot use his right arm, so c.w. skeds are out for the moment. All good wishes for a complete recovery, O.M.

G8VZ (Princes Risborough) found conditions a little better, also activity, finishing off the period with good conditions on June 14/15. On May 19 signals from north and west were good with very little fading, but activity was low. G3IKV and G5YV from the north and G3KHA from the west were well received, but fading set in at 21.30 G.M.T. on all signals over 25 miles. On May 24 signals were rock-

During the First 144 Mc/s Field Day 1958 G3DIV/P operated from Brightling Needle using the 5-over-5 aerial shown in this picture. *(photo by B.R.S. 21651.)*

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

bottom—pressure was 1005 mb and G3ENY was 339 (usually 57/89). The 25th was also very poor, but an improvement gradually set in until the end of the month. On May 31 G2HCG reported to G8VZ that there was a possibility of aurora and the band was accordingly monitored between 21.30 and 21.45 G.M.T. G2PD, G5YV and G3KUH were heard well from the north with slight roughening on G5YV's c.w. twice for about 5/10 seconds at a time but otherwise no auroral conditions were observed. On June 11 the northern stations were well received and G3CCH (Scunthorpe) was a nice signal most of the evening of June 13. On that day the three regular skeds were better than for a long time, the pressure (1026 mb) being the highest since May 1. For the rest of the period signals were very good from north and west, with fading setting in later.

G3COJ reports that **G3AYC** (B.B.C. Ariel Radio Club, Langham) is now on 2m, running 12 watts to a BC950A, a cascode converter into an AR88 and a 6-over-6 J-Beam slot aerial. During the first four evenings spent on the band, many QSOs were made, the best being PA0WAR.

G3FKO (Bristol) says his /P and /M activities lately have been confined to the Manchester area, Longleat Rally Two Metre Control and " the so-called Activity Night—June 16." Indeed, this latter appears to have been the emptiest for months. Whilst in Manchester on random nights during the June 1 to 13 period, the stations in the list were worked from a position 10 miles s.e. of Stockport (1,350 ft. a.s.l.) and from an hotel in W. Didsbury. G3FKO offers congratulations to those in the north west on the high level of local activity and comments on the number of TV local oscillators they have to contend with in the 2m band. They all seem to follow the Band Plan.

G3GRA (Plymouth) sends a short list of DX and says that G3KHU and himself hope to combine in some portable tests to prove whether Dartmoor is responsible for lack of signals in an otherwise ideal QTH. **G3DIV** (Eastbourne) has sent some photographs of the first 144 Mc/s Field Day site at Brightling Needle, Sussex. The photos were taken by B.R.S. 21651. The car is " by " G2FTS and the aerial is a 5-over-5 with 300 ohm feed. The 6J6 p.p. converter is on top with the loudspeaker, the power pack and modulator under the table top.

G3JR (Barnes) has been making extensive tests on indoor quad aerials. The results to date are as follows:

Two element quad (bi-square loops) 6½ db over dipole.
Three element quad (bi-square loops) 9 db over dipole.
Four element quad (bi-square loops) 10½ db over dipole.

The previously used 5 element wide spaced Yagi (gamma matched, same height) gave 9 db gain over a dipole. All results quoted were checked by G3EYV at Clapham on an accurately hand-calibrated S meter. Tests are now continuing with a five element quad. All these aerials can be directly fed with 72 ohm co-ax with fairly low s.w.r. (better than 1·33/1) without a balun. All elements have two stubs except the driven element, which has one at the top only to ensure resonance.

The reflector is 21 in. square, the radiator 20½ in. square and the directors 19 in. square.

GD3UB (Port Moar, Ramsey I.o.M.) will be on 2m at 23.00 B.S.T. every night throughout the summer. Here's the chance to work GD (very rare) that many of you have been waiting for. Look very l.f. in the band.

G2NY (Preston) has skeds with the following stations:

PE1PL	09.00—09.15 daily (G2NY on 144·24 Mc/s).
G5DW	18.30—18.40 daily (G2NY on 144·210 Mc/s).
GI5AJ	19.00 Thursdays, Saturdays, Sundays only (G2NY on 144·210 Mc/s).
GM3EGW	23.00 daily (G2NY on 144·210 Mc/s).

Normal operating frequency is 144·210 Mc/s using 150 watts input and a 6-over-6 slot beam (shortly to have another 6-over-6 added to it). The aerial is 60 ft. high. A high power (1kW) rig is completed and will be used on 145·370 Mc/s only.

G2AHL (Guildford) managed to work G5YV at last on June 21 at 10.00 B.S.T. using the mobile rig (10 watts input) on the bench feeding into the home station slots.

G3JGJ (Paignton) says the new QTH is working out very nicely considering only a 4-element Yagi is in use. The 16-element array which used to be at Plympton is shortly going up again on the steel tower. The sked with GC2FZC has now been running for years. There are also skeds with G2RY (Bridport) at 18.00-18.20 B.S.T.; G3KHA (Bristol) 19.00-19.10 and GW3MFY 19.10-19.20 every evening and G8DA (Exeter) every morning at 07.00-07.30. G5BM (Gloucester) was heard strongly on June 17 (08.36 B.S.T.) but two long calls brought no results. Starting at the new QTH on May 4 G3JGJ heard 16 2m stations on Field Day, worked 18 and has heard a further 9 since, which is quite an improvement on previous efforts.

News from Wales

GW3GWA (Wrexham) has constructed a new transmitter/receiver for 2m portable work which takes less out of the batteries, and obviates the need for a petrol generator. The new rig runs 2 watts to a 6J6 final, phone only at present, but it is now being modified for c.w. On three recent tests, the furthest QSO was with G3IRS (Weston-super-Mare). The two sites visited were the Vron Hills, 8 miles s.w. Wrexham, and near Brymbo Hall, 3 miles n.w. of the town. G3IRS has been the only station heard so far beyond Worcestershire. During Field Day, on the old rig, 19 contacts were made, the best being G3GNS/P (Weston-super-Mare), although GI5AJ was heard on June 12 but not worked. GW3GWA hopes to be on the band quite a lot, so please look out for this enterprising station.

News from Scotland

GM6WL (Glasgow) has been continuing with the GI5AJ sked. On June 4 conditions improved unexpectedly and GI5AJ worked GM2FHH (Aberdeen). GM6ZV worked GI5AJ about the same time. GM3GAB (on behalf of Rolls Royce Club at East Kilbride) and GM3DIQ (for operation at home QTH) are busy building high power transmitters—Jock says it will be interesting to see who gets on the air first. His money is on East Kilbride, but it's anybody's bet!

GM2FHH (Aberdeen) says conditions there have been very poor, the only stations worked out of Scotland being G5YV and GI5AJ with G2NY heard. GM2FHH hopes better days are coming!

News from U.S.A.

There was a 2m auroral opening on the night of April 4 affecting W1, 2, 3, 8, 0 and VEs. A few W0s were getting out, notably K0EMQ. Stations in Kentucky, Tenessee and Virginia were received up north by this mode, but stations further south were out of range. The conditions persisted, in diminishing degrees, over April 5 to 6. There was then a blank until April 14. This opening was quite limited however, and affected only W1, 2, 3, 8 and 9. On the 15th, W1MMN, W2LWL, W3GKP and K0EMQ got in some work during the evening. There was only limited activity however on this date.

News from France

F9CQ (Paris) reports that on June 18 at 22.00, the time of his weekly sked with G2JF, he also managed to work G6HH/M and G5NF, who was running 20 watts to an 832. Owing to high noise level (S5) it became a little difficult; G2JF was often S6 (R5) and G5NF S5/6, but frequently dropping below noise level. G6HH/M was above noise only for short periods. F9CQ comments on the strange fact that no station was heard outside the sked time. Just before, the band was quite dead and at 22.00 a signal came up, only one, and it was DX! Conditions are about the same as in past years, but activity is very low! F9CQ hopes to try 70 cm skeds next year with a 400 watt p.a. but this is not built yet.

F8MX/A will be on the Coast from July 15 to September 15 with completely new gear, but still running 80 watts. So the blockhouse will be heard again this year, both on 145 and 435 Mc/s with instantaneous band switching.

On June 14 **F8GH** (Beauvais) had three contacts with Gs and F3LP had seven. Very encouraging.

Six Metres

G4LX (Newcastle-on-Tyne) noted sporadic E propagation and also possibly F layer—double hop—when ZE2JV was heard calling "Test" on May 27. ZE2JV was 569 at the time, and although sporadic E conditions were apparent, ZE2JV's note was T9X. CT1CO was heard on May 26 on two occasions, but did not reply to G4LX's calls. At 17.00 on May 26 Kirk o' Shotts TV sound had an indication of auroral propagation on it, but this disappeared after about an hour. On June 4 there was very considerable E layer propagation, French TV audio and video channels between 49 and 60 Mc/s being S9+. German and Italian sound channels were also clearly heard. On June 10 it is believed ZE2JV was heard again, but the signal was very QSB (RST339). On June 15, CT1CO was heard several times at around 559 to 579 and on the last occasion keying automatically. CT1CO never dropped below 559 in 66 minutes continuous monitoring! HB9QQ was also heard at 579 on the same day.

HB9BZ was heard on phone (June 4) by both G4LX and G2BDQ. He was in QSO with a GM3 station. G4LX would like to know who this GM3 was and what band he was on? Although it should be well known by now to European societies, most of whom receive the BULLETIN, it seems that Europeans do not monitor 52·5 Mc/s so this further advice is printed to ask European stations in the 50 Mc/s region to look on 52·5 Mc/s for Gs.

G3IUD (Wilmslow) has taken down his 52·5 Mc/s beam, as he has heard nothing on the band. G3IUD is accordingly again on 2m with a 4 element beam. However, if things wake up on 52·5 Mc/s G3IUD will probably have another go on that band during August.

On March 16, W1ELP, W1HDQ, W1SUZ, and W4AYV were all hearing CE8AE, with and without flutter. ZL signals were coming in to W6PUZ and K6PHE (via F2) and on the other end of the path VK4NG worked quite a few Californian stations. CX1AO (Uruguay) enjoyed a good sporadic E evening with LU7MAZ, CE2AX and PY6FI; KH6CCZ heard VK4NG via trans-equatorial scatter. The best 6m aurora of the period was in operation during 2½ hours of March 18 when the ZL/W6 path was again open for a time. This path was also open on many days up to March 26. In early April the path was again open, and there was some traffic between Japan and Australia by the trans-equatorial mode during the first fortnight of April. On April 15, W6BJI, K6EDX and K6NRQ all heard LU signals via F2 at noon.

Four Metres

G5MR (Hythe, Kent) had the very pleasant experience of working North Africa in the person of FA9VN on June 10. This QSO has been confirmed, and certainly appears to have taken the record. FA9VN's QTH is given as Lat. 34° 30′ 30″ N Long 0° 50′ 40″ E and the distance is calculated by G5MR as 1,142 land miles. A calculation of the G5KW/FA3JR distance gives 1,082 miles. The actual address of FA9VN is Ain-Skhouna, Algeria, which is 120 miles south of Oran. He is running 30 watts to p.p. VT501s and has a cascode converter. The aerial is only a fixed half wave dipole, but the QTH is 3000 ft. up FA3JR (Oran) was also raised but after signal reports were exchanged FA3JR's signals went right out. Reports were FA3JR-S8 while G5MR received 589! FA3JR was raised again on June 16 at 20.23 G.M.T. at S7 phone, but faded out completely before reports could be exchanged. FA8BG was also heard strongly on June 10. There was however no QSO; G5MR thinks he was not searching the U.K. frequencies.

G6ZO reports that FA9VN heard German f.m. broadcasting on 70·200 Mc/s and Milan f.m. on 71·700 Mc/s on June 1. FA9VN wants to work Gs and will be regularly on 72·480 Mc/s.

G3IKN reports that DL9GU would like to work G stations on 4m and is QRV every Tuesday and Thursday from 22.00 to 24.00.

General Notes

In conjunction with G3BAK, G3IUD will be carrying out tests with mobile equipment on 10,000 Mc/s and eventually, along with G3FDU, they hope to have three sets of mobile equipment for 70 cm and 3 cm in operation.

We suppose you will already have sent in your material for the August BULLETIN; if not send it in as soon as possible for inclusion in September.

Some of you have not been reporting lately. I shall be glad to hear from all such.

All good wishes.

Heard and Worked on Two

Two Metres

B.R.S. 18572 (Mitcham) May 19-June 17.
Heard: F3LP, G2XV, 3BA, 3DKF, 3ENY, 3FAN, 3GSO, 3IIT, 3IRS, 3JWQ, 3JZG, 3KHA 3KSA, 3LHA, 3LOK, 3MNQ, 4JJ/A, 5CP/M, 5YV, 6XM, 6XX, 6YV, GW8UH.

B.R.S. 19162 (Dewsbury).
Heard: G2XV, 2ANT, 2FNW, 3EEV, 3GSO, 3HBW, 3HXN, 3JMA, 3JXN, 3JZG, 3KZE/P, 3LIM, 4DC, 5DW, 5MA, 6XM, 6JS, 6JY, 8VZ, GB3IGY, PE1PL.

B.R.S. 20133 (Melton Mowbray) May 14-June 14.
Heard: G2BVW, 2CDB, 2CRL, 2FMO, 2HCG, 3APY, 3APY/M, 3BA, 3DJJ, 3DKF, 3ENS, 3EVV, 3FAN, 3FGT, 3FUW, 3GSO, 3HAN, 3HBW, 3HWC, 3HYH, 3IKV, 3IRS, 3JAZ/P, 3JSQ, 3JWQ, 3JWQ/M, 3JWQ/P 3JWU/A, 3JXN, 3JZG, 3JZN, 3KQF, 3KUH, 3LHA, 3LGJ, 3MNQ, 3MPS, 4MK, GB2RS, GB3IGY, GI3GXP, GW3APY/P, PE1PL.

G3FKO/P (Manchester area) June 1-13.
Worked: G2NY, 3HA, 3APY, 3GGR, 3HYH, 3IWJ, 3JWJ, 3JWQ, 3JZN, 3KUH, 3MAX, 3MED, 3MNM/A, 4DK, GI3GXB, GW3GWA, GW3GWA/P.
Heard: G2OI, 3PD, 3AOS/M, 3CCH, 3HAZ, 3IUD, GI3GXP, GW3AOS/M.

G3FKO/M (Longleat Mobile Rally 2m Control Station) June 15.
Worked: G2AHL/M, 2HDR, 3AST, 3CGE, 3FIH, 3IRA/M, 3XC/M, 3KHA, 5BM/M, 5DW, 5OB, GW8UH. *Heard:* G2ADZ, 5MA.

G3GRA (Plymouth) May 19-June.
Worked: G3JGJ, GC2FZC, GW3MFY.

SECOND ANNUAL— RADIO HOBBIES EXHIBITION

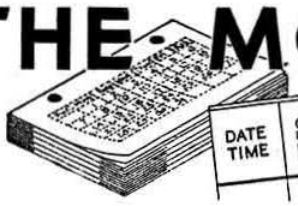
ROYAL HORTICULTURAL SOCIETY'S OLD HALL, VINCENT SQUARE, LONDON, S.W.1

November 26-29, 1958

The Exhibition Committee invites members all over the country to offer for display equipment of every type from gadgets to complete transmitters and receivers. Offers *only* in the first instance should reach R.S.G.B. Headquarters by September 30, 1958. A Silver Plaque will again be presented in connection with the Constructors' Competition. Offers to do stand duty at the Exhibition should be sent direct to G. W. Norris (G3ICI), 134 Meads Lane, Ilford, Essex.

Enquiries regarding stand space should be addressed to the Exhibition Organizer, P. A. Thorogood (G4KD), 35 Gibbs Green, Edgware, Middlesex.

THE MONTH ON THE AIR



DATE TIME	FREQ.	STATION CALLED	CALLED BY	STATION HEARD OR WORKED				IF QSO RESULTED				REMARKS
				R	S	T	KC/S OR DIAL	MY SIGS. R	MY SIGS. S	MY SIGS. T	TIME OF ENDING QSO	

By S. A. HERBERT (G3ATU)*

FOR a long time, it has been obvious that this column—*your* column—has been kept going principally through the efforts of a keen and extremely competent band of B.R.S. members and by a handful of equally capable and co-operative transmitting types. Straight away, it must be made clear that the contribution made by the listeners is invaluable. The Society is lucky to have in its ranks some of the world's best in the listening field and the fact that they are willing to give others the benefit of their skill—through the medium of *M.O.T.A.*—is most gratifying. At the same time, a feature such as this can do nothing but increase in stature and in usefulness if *both* sides of our hobby are prepared to help. The R.S.G.B. includes in its membership some thousands of licensed amateurs. Naturally, not all of them are attracted to the DX facet of Amateur Radio. This particular aspect of the hobby is now so competitive that it takes a very much better than average operator even to hold his own when faced with world-wide competition, very often from stations using higher power, allied with considerable skill and cunning.

However, there must still be several hundred licence-holders spending at least some of their time on the DX bands and we hereby suggest that those among them who read these words may consider weighing in with an occasional spot of DX information. If it does nothing else, it will make those of us who *do* contribute feel a little less lonely!

Having disposed of that little piece, we turn to another lively month's activity. Considering the time of year, the bands are behaving extremely well and will be dealt with as usual, but first let us look at the overseas mail.

From Far and Wide

The remarks above referred, of course, to our home membership. The overseas contingent have always given sterling support to these pages and this month is no exception.

Australia: Eric Trebilcock **(B.E.R.S. 195)** is as keen as ever, even though he is about to pass his 195,195th log entry. That " 195 " is a very special group of figures to him and two of them together represent history in the making, *and* an awful lot of hard work, too. Now, 249C have been heard and 239 of them confirmed. After waiting decades for a UH8 card, he got three of them in one week! Recent QSLs include cards from YL ops ZS1NQ and ZS6AQK, which brings to mind the daily activity on 14 Mc/s c.w. of VK3YL and ZL2JO —two more YL DX types. In Australia, DX on 14 Mc/s is very good and KM6EVK, OR4OR, ZM6AS, FB8BS, 9K2AQ, KP6AL, KB6BJ, ZK1AK, '2AD, ZL5AE, UA1KAE and UA1KAE/6 were heard, as was GM3MFE/MM, who was followed across the Pacific until reaching the Panama Canal. Eric says **7 Mc/s** is really very dead, apart from JZ0DA, KP6AL, VS1HU and HMF21/22/23 who sends Iron Curtain type Press on 7015 kc/s. Quite! B.E.R.S. 195 would like more QTH data, as it may take months for some of the rare ones to get their addresses published.

Muscat and Oman: Peter Rackham (G3IRQ) is now on the air as **VS9O**, operating on 21075, '150 and '339 kc/s, c.w. and phone, with an input of 150 watts. At present, he is the only station active from the Sultanate, but as he will be there for a year he has hopes of making that rare spot much less of a rarity. QSLs must be sent *only* via the R.S.G.B. QSL Manager. **G2MI** has all the facts and will do his part with his usual efficiency.

Thailand: G3HFD (Sheffield) passes news from A1, of **HS1B**, that the latter will handle all HS1 QSLs, which should be sent to him at P.O. Box 1038, Bangkok. Licensed stations are HS1A, '1B, '1C and '1E and himself. HS1B will be there for another two years.

Bahrain: G3AAE (Barnet) reports that Bill Wheeler (ex-ZD3BFC) was flying to Bahrain for a tour of two or three months.

Formosa: Leo Fitzpatrick **(K2MZM)** who was the chief operator of BV1US from March 9, 1956 to December 31, 1957 will gladly confirm QSOs between those dates to anyone sending the necessary data. Leo thanks all his contacts for their patience and co-operation and says that although he personally confirmed over 10,000 QSOs, some cards inevitably go astray. Write him via S.F.C. Leo W. Fitzpatrick, H.Q. Det., Q.T.C., A.P.G., Aberdeen, Maryland, U.S.A.

Falkland Is. Dependencies: Ted Ross (G3LWS) back home after a spell as **VP8CZ** obliges with some up-to-date " gen " on the rather obscure state of affairs prevailing in that far-flung outpost. Firstly, both VP8BI and VP8BK (South Georgia) have had their licenses cancelled—*because* they are Norwegian citizens. Other bad news is that VP8BU was drowned at Port Stanley, only three days before he was due to return to the U.K. VP8AQ has sold his Minimitter to VP8CV, who is mainly on 28 Mc/s phone, while Joe Booth (VP8BN), who holds dual G/CE nationality, is on 7 Mc/s phone only. Joe would welcome the handbook or any articles about the Bendix TA-12B. Write him via Supt., Posts and Tels., G.P.O., Port Stanley, Falkland Is. As for VP8CZ himself, he was active from the South Shetlands and the South Orkneys only. His receiver was poor, to say the least, and when he got on the air after his last " sked " at 01.30, about all he could hear were Ws. Apparently, he was 599—or if reports had been honest 597—in G, UB, UG, ZL etc. Occasional Europeans were heard at odd times, but with the " rubber stamp " technique in operation, the Ws won. Finally, Ted says he is no longer **ZC4FB.** The call may have been re-issued, but if so it is no longer any concern of his. **VP8CC** (G3KTE) is now at Base " W," Graham Land and he is active at regular intervals on the h.f. bands.

Singapore: The Royal Navy's Kranji A.R.C. station, **VS1HU** still works new ones on twenty and ET3PRS, ZS2MI, GC3AAE, IS1, OY, VP5, CT2, VS1BB/VS9, VQ8AJC, VR3A, ZD3, KB6, HR and HE have boosted the score to 174/124C. VS1BB is back from the Maldives, but his DX35 rig is still on the island, ready for use by his relief. VR2AP put in at CR10 and VR1, but receiver trouble meant few QSOs. He is due next at Gate Is. (FU8) and hopes for better luck there. The VS1HU gang hear that VK2AIR *hopes* to operate from Lord Howe Is. shortly and that ZL1ABZ (Kermadecs) is going to be on 14 Mc/s in addition to 3·5, which should please all DX chasers. Des Shepherd **(VS1HQ)**

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

is back in the U.K. and he must have been pleased to hook a GW and an EA to give him his 100C, just before he packed his gear for home.

U.S.A.: John Knight **(W6YY),** in another of his first-hand DX catalogues, specifies activity from CR10AA, back on twenty c.w. Roger (VS1JF) tells that he is due to replace VS1BB on the Maldives. He will be there for six months. VK2AIT (ex-VK9YY) goes to Lord Howe Is. in about two months. (The same chap as per VS1HU, perhaps). VK9BB joins VK9JF on Cocos-Keeling and VK9XM has been licensed on Christmas Is. (ZC3). (The competent authorities have revoked all ZC3 (Christmas Island) licences for security reasons.—Editor.)

West Indies: The A.R.R.L. announces that, consequent upon the recent Caribbean Federation, changes in the DXCC List as of June 1, 1958 give " country status " to the following: Anguilla, Antigua and Barbuda, British Virgin Is., Dominica, Grenada and Dependencies, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and Dependencies (all the above being VP2) and Jamaica and Cayman Is. (VP5) This means ten countries, unless you worked them before June 1, when they counted as a mere four!

Twenty Metre DX

Things remain remarkably lively and for **G6XL** (Leeds), the excitement was hearing a strong VR5AZ (04,00, '015), but as the beam was west and he was only heard once, we fear the worst. PY0NA came up twice for seconds only at RST589 and G6XL is convinced he spent very little time actually on the air. ZK2AB (06.50, '145), VK0KT and 0TC were worked on phone, with UA1KAE (Mirny, 19.30, '042) on c.w.

G3ISV (Middlesbrough) managed VQ8AJC (Chagos, 17.00, '050), with the usual lot " CQ-ing " on top of him, while **G2CIL** (Horsham) used an 807 running at 33 watts and a sloping wire to QSO FF8CI, W7HDQ (Utah), WO/QAZ (Colo.), W0IDI (who is after a GC QSO) and W6MSW. The W6 runs 65 watts and has been worked on *sked* successfully.

G3JAF (Lymington) has it from VE7ZM that ZL3VB will shortly be on 20 c.w. from Chatham Is., while VK2AYY is to operate on 14, 21 and 28 Mc/s c.w. from Lord Howe Is. during July or early August. (That could make three of them on the island!) Art's own efforts on phone have gained him QSOs with VE1ADE (Prince Edward Is.), VP8DE (Falklands), DU6IV, VS9AP, MP4BFC (so Bill *did* make Bahrain), VS1, VU, CR4AD and ZD1EO.

G3FPK (London, E.10) is one of those who would be happy to see more transmitting reports. He now has 113 confirmations and so has DXCC on the way. He remarks that 48 of the 52 countries he worked at 3A2BT have so far obliged, with TF5TP, TI2PZ, VQ3GC and VK0AB still to come. Norman seems to have uncovered a good " racket." He got lots of European listener cards for 3A2BT very quickly. Then, months later, a second lot arrived, all for the same band and time, it being obvious that the second characters had merely read somewhere that OK . . . . or DM . . . . had worked 3A2BT. Future attempts to get unearned cards will get the " W.P.B." treatment! 'FPK added three new ones via c.w. by working ET2TO (QSL to W0WET), KR6AO and VQ4AQ, while he needs only Franz Josef Land and a UJ8 for " game," " set " and " all Us."

G3KGV (Sunderland) who goes up further with VQ3CF, '5FS, UA1KAE, SM8AQT/LA/P (c.w.) and EA9AQ (phone) happily took delivery of a direct air-mail QSL from ZD7SA.

B.R.S. 20104 (South Harrow) missed VS1BB and PY0NA, but found compensation in QSLs from KC4AF, FB8CD (Comoros), GC3AAE, VR3A (Fanning) and HA5AM/ZA, while ZC3AC sent him two! Goff thinks UA0IJ *may* be on Wrangel Is., although this is by no means certain. PY7AFN, PY7BAD and PY7SC seem to be resident on Fernando da Noronha, which should ease the strain somewhat. Finally, the QTH of VK9RR and ZM6AS would be welcomed. **B.R.S. 20317** (Bromley) has added VQ8AJC and PY0NA, to make his score a round 250, but he appeals for the times to listen for HK0, VP1, HV, Norfolk Is., etc. Despite years of trying, he's never even heard them being called but he *did* log CR10AA (14,00, '061), FG7XE, FP8AU (19.40), HS1JN, JT1YL (11.00), KM6EVK (17.50), KW6CE (17.40, RST579), YS3RE (19.00) *and* UA0IJ, who gave his QTH as Barengowsky.

Frequency Predictions for August 1958

PREPARED BY J. DOUGLAS KAY (G3AAE)

BAND	NORTH AMERICA East Coast	NORTH AMERICA West Coast	CENTRAL AMERICA	SOUTH AMERICA	SOUTH AFRICA	NEAR EAST	MIDDLE EAST	FAR EAST	AUSTRALIA	ANT-ARCTICA
M.U.F.	23 Mc/s 1900	19·5 Mc/s 2000	26 Mc/s 1800	28·5 Mc/s 1300	30 Mc/s 1200	27·8 Mc/s 0800	27·5 Mc/s 0800	27·5 Mc/s 0800	27 Mc/s 0900 SP	28·5 Mc/s 1300
28 Mc/s	1900	2000	1800	1200/1400	0900/1800	0800	0800	0800	0900 SP	1200/1800
21 Mc/s	1100/2300	2000	0930/0000	1030/1130 1600/0100	0600/0800 1300/0000	0830/1800	0600/2100	1200/2030	1030/1130 SP 2100/0000 LP	1700/0100
14 Mc/s	0800/1000 2000/0300	0600/0700	2100/0830	2200/0830	1800/0230	1530/0830	1200/0700	1700/2330	0200/1000 LP 1030/1130 SP	2200/0600
7 Mc/s	0200	0800	0000	0400	0000	2000/0430	1800/0200	2000	1900 SP	0400
3·5 Mc/s	0200	0800	0000	0400	0000	2300/0100	0000	2000	1900 SP	0400

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

B.R.S. 20106 (Petts Wood) says ZD9AF seems genuine (*vide* ZS4GK), but he doubts if UA0KSI is on Wrangel. VQ8AJC appears weakly at 15.00, very near the l.f. band edge. FW8AB was heard at 07.20, trying to work a CN8, helped by FO8AG and 3W8FM (15.00) was working an OK1. Norman also logged c.w. from ZS2MI, ZK1AK (08.45), XZ2TH and JZ0HA (15.50) and heard a " CQ " on phone from ZD7SA at 02.45. **A. 1399** (Prestwich) logged HZ1AB, KR6QF (17.00) and VU2RX on s.s.b., while **B.R.S. 21279** (Birmingham) heard ZD7SA on phone—S7 at 21.00 and PY0NA (22.00) and a " funny man " signing ZA1CR. Martin wishes well to A.1416. As to the ten new VPs, he suspects that someone is trying to reach 300C—and how right he is!

B.R.S. 2292 (Hounslow) used c.w. to log YK1AK (20.00), FO8AC (05.45), VP1RL (also at 05,45) and a mysterious EQ1RY (20.30), while on phone he heard a YL, TI2EH. **B.R.S. 21762** (Loughton) heard PY0NA on his first night on the air, plus VP3YG for another rare piece of phone.

DX on Fifteen and Ten

This means fifteen very largely once again, though ten keeps opening and can reward those on at the right time.

G3BHJ (Norwich) used 21 Mc/s phone to work VS9O (Oman), SV0WN (Crete) and 9G1BF, who changed from A3 to A3a with a most marked signal improvement. By now, G3BHJ hopes to be listening from W0FQY, whom he is visiting for a short time. **G6XL** had A3 contacts with VS9O, VK9NT and VK9BW (Rabaul, 12.45, '263), VP2AB (Antigua) and VK0TC (Macquarrie) while he heard VK5BV (Darwin, 22.00, '240). **G3FPK** made it 67 on 21 Mc/s with CR7BN (15.40), KH6AH (10.30), 4S7DT (11.00) and 9K2AQ (Ron, of G3FJU). On some mornings, KH6, VK9, VR2DA, FB8XX and old JT1 have been the only stations audible. DU7SV has been called often around 08.50, but still no luck.

B.R.S. 20104 heard an S9 " CQ " from JT1AA and nobody came straight back! VS9O was around 21337 kc/s and he hears that VQ1SS is, or should be on for a few days at a time, though on low power. The KC6 recently reported on Truk is KC6JC. **B.R.S. 20317** heard VS1BB/VS9, VS9O and YS1MS on 21 (the YS, by the way, has 279 confirmed on 14 Mc/s phone only!) and he logged VQ3SS and FL8AC (18.20, '040) on ten c.w.

On 21 phone, **B.R.S. 20106** mentions ZD9AF (17.30), VP8DL (Port Lockroy), VP8CC (Base W), HS1E (19.50), OR4VN and VR2AZ (07.45), with FK8AT (10.00) on c.w. **B.R.S. 20135** (Newport, I.o.W.) watched the rain pouring down as he listened on 21 Mc/s to ZD1EO, EL1I, VP3HAG and VP8's 'DH, 'DG and 'DI, while **A.1399** lists VK5NE (Darwin), ZS8O (18.00), TI8WTC on A3 and ZK1BS (09.00) on A3a. HI8BE, VS9AP and VE3BQL/SU were on ten. **B.R.S. 21762** happened upon EA0AB, PY0NA, YK1BE (23.00), SV0WB (Rhodes), ZS8I (14.00) on 21 Mc/s and ZD2NNW and ZD3E on ten, while **B.R.S. 2292** logged PJ2ME, KH6 and VK4CF (22.00) on 21 c.w. and CE7AQ, ET2, ET3, VQ3 and VS90 on phone.

Forty Metres and Above

A brief mention this time as space is short.

B.R.S. 20106 heard PJ2ME (03.00) on eighty and W1EKJ was S9 on 75 phone—this on one foot of wire! Norman understands via VS1BB that VU4 activity is possible next February. G8GP had a *sked* on Top Band recently with CN8GU, but Norman failed to hear any sign of the CN8. On eighty, **B.R.S. 20317** heard ZP9AY (3502 kc/s, 00.30), while B.R.S. 2292 logged LX2GH on 7 Mc/s c.w.; PA0LY was calling ET2US on the band at 08.30).

And that is all for this month. Deadline for the August M.O.T.A. is July 18. *Good hunting to you all and don't forget you licensed types—others want to know what goes on* .73.

Tests and Contests

V.H.F. National Field Day, 1958

COUNCIL has accepted recommendations of the V.H.F. and Contests Committees that the national v.h.f. contest on September 6 and 7, 1958, shall take the form of a V.H.F. National Field Day coinciding with the European V.H.F. Contest.

The details are as follows:

When: 17.00 G.M.T. on September 6 to 17.00 G.M.T. on September 7, 1958.

Sections: (*a*) Single band operation: portable and mobile stations.
(*b*) Multi-band operation: portable and mobile stations.

Eligible Operators: All fully paid-up members of the R.S.G.B. resident in G, GC, GD, GI, GM and GW, who may operate as Town or Area Groups, Affiliated Societies or clubs, informal groups or as individuals providing the call-sign of only one operator is used and the entry made in accordance with General Rule 7.

Contacts: May be made on A1, A2 or A3 in the 144, 420 and 1250 Mc/s bands.

Scoring: Points will be scored in accordance with the rules of the European V.H.F. Contest 1958 which will be taking place at the same time. The scoring system is as follows:

Distance covered in QSO	145 Mc/s	435 and 1250 Mc/s
0-100 km.; 0-62 miles	1 point	10 points
100-250 km.; 62-155 miles	2 points	20 points
250-500 km.; 155-311 miles	4 points	40 points
500-700 km.; 311-435 miles	8 points	80 points
Over 700 km.; over 435 miles ...	10 points	100 points

Contest Exchanges: RST (RS) reports followed by the band identification letter (A-144 Mc/s, B-420 Mc/s and C-1250 Mc/s) and the contact number and location (e.g. RST569B007 Birmingham).

Logs: (*a*) Must be tabulated in columns headed (in this order) " Date," " Time " (G.M.T.), " Call-sign of Station Contacted," " Location," " Type of Emission," " My report on his signals and serial number sent," " His report on my signals and serial number received," " Distance," " Points Claimed." Separate sheets, clearly marked, must be used for each band.
(*b*) The cover sheet must be made out in accordance with Rule 5 of the R.S.G.B. General Rules published in March 1958. A copy of the General Rules may be obtained by sending a stamped addressed envelope to R.S.G.B. Headquarters.
(*c*) Logs must be submitted in duplicate if automatic entry in the European V.H.F. Contest 1958 is desired.
(*d*) Entries must be addressed to the Contests Committee, Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1, and must be postmarked not later than **Monday, September 22, 1958.**

Awards: At the discretion of the Council, certificates of merit will be awarded to the leading stations in each section.

Third R.S.G.B. 1250 Mc/s Tests

THE third 1250 Mc/s Tests organized by the R.S.G.B. will take place on September 6-7, 1958; it is hoped that the tests will again attract the support and interest of all u.h.f. workers.

Rules

The event will have few fixed rules, other than the duration, which will be from 17.00 G.M.T. on Saturday, September 6, to 22.00 G.M.T. on Sunday, September 7, 1958, and the provision that all entries must be from fully paid up Corporate members of the R.S.G.B. and accompanied by the declaration set out below. Entries can be accepted only on behalf of an individual station, though no limitation is placed on the number of operators or assistants. Entries from receiving stations will be welcome and will be eligible for the award.

The entries will be required to include details of stations heard or worked (with distances) and general observations on the band. A full description of all equipment used should be included and this information and any other evidence submitted of work carried out on the band will be taken into consideration when judging the event. The Contests Committee reserves the right to abstract information for the purpose of preparing a report on the Tests. The entrant submitting the best entry in the opinion of the judges will be recommended to the Council for the award of the *Arthur Watts Trophy*.

Entries must be addressed to the Contests Committee, Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1, and be postmarked not later than **September 22, 1958.** Entries must contain the following declaration:

I declare that my station was operated strictly in accordance with the rules and spirit of the Tests and I agree that the decision of the Council of the Radio Society of Great Britain shall be final in all cases of dispute.

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

Society News and Proceedings

Walkie Talkie Equipment

A FEW weeks ago the Society drew the attention of the Post Office to the fact that certain radio dealers were advertising for sale to the general public ex-Government walkie-talkie sets at very cheap prices. The advertisements which appeared in various newspapers and periodicals claimed that the sets could be operated with ease by young and old alike and that no technical knowledge was required.

The Society suggested to the G.P.O. that such advertisements are not only misleading but they convey the impression that anyone may buy these sets and use them at will without the necessary qualifications. The G.P.O. were asked whether any action was contemplated in connection with the form of advertising in question.

The following is a copy of a letter dated May 16, 1958 which has been received from the Radio Services Department of the G.P.O.

> " With reference to your letter of May 2, the statement in the accompanying advertisement that no technical knowledge is required in the operation and use of the described ' walkie-talkie ' apparatus is simply a statement of fact; and there is no action therefore which the Post Office could take in that connection. You will be interested to know, however, that the question of the disposal of ex-Government surplus radio equipment is at present under consideration.
>
> " As you know, Section 1 of the Wireless Telegraphy Act, 1949, provides that no person shall establish or use any station or apparatus for wireless telegraphy except under the authority of a licence in that behalf granted by the Postmaster General. Anyone who wished to use ' walkie-talkie ' apparatus would, therefore, have to apply for a licence; and there is no obligation upon radio dealers to inform prospective clients of the licensing provisions of the Wireless Telegraphy Act or of the conditions under which licences are issued in the various services. However, this type of equipment is quite unsuitable for operation in the amateur or private mobile radio services and the Postmaster General could not grant a licence for its use in either of those services. If any person used this or any other type of apparatus without a licence he would of course render himself liable to prosecution."

O.A.R.C. Geneva 1959

A JOINT statement outlining the views of agencies of the United States Government towards the frequency allocation table in preparation for the forthcoming Ordinary Administrative Radio Conference was made recently by the Federal Communications Commission and the Interdepartment Radio Advisory Committee of the Office of Defense Mobilisation. For the Amateur Radio Service the proposed frequency table includes provision for continuance of every present amateur frequency assignment with some changes in u.h.f. bands.

F.C.C. and I.R.A.C. indicate that they have found the Atlantic City allocations table below 30 Mc/s generally satisfactory and propose only minor changes in that portion of the spectrum.

In the United Kingdom an Interdepartmental Steering Committee, headed by Capt. C. F. Booth, C.B.E., an Assistant Engineer-in-Chief of the Post Office, is engaged in preparing the U.K. brief for the Geneva Conference.

The views of the R.S.G.B. in regard to frequency allocations were submitted to the G.P.O. in November 1957 and a meeting between representatives of the Society and members of the Frequency Sub-Committee of the Interdepartmental Steering Committee took place at Society Headquarters a few days ago.

Headquarters Office Hours

HEADQUARTERS is open from 9.15 a.m. to 5.15 p.m. from Mondays to Fridays except public holidays.

Morse Tests and Radio Amateurs' Examination

THE G.P.O. is again arranging to conduct technical examinations and Morse tests for the Amateur (Sound) Licence in the autumn, provided sufficient applications are forthcoming.

The technical examination will take place during the afternoon of Saturday, October 4, 1958, at the following centres:

Armour House, St. Martin's-le-Grand, London, E.C.1.

Radio Surveyor's Office, Ministry of Transport and Civil Aviation, 2 Bute Place, Cardiff.

Radio Surveyor's Office, Customs House, Dock Place, Leith, Edinburgh 6.

Applications to sit the examination, accompanied by a remittance for the entrance fee of 25s., must reach the Wireless Telegraphy Section, Radio Services Dept., Union House, St. Martin's-le-Grand, London, E.C.1, ***not later than September 6, 1958.***

Morse Tests will be held at the Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester during the first week in September 1958, provided there are sufficient candidates. Application forms may be obtained from the Radio Branch, Radio Services Dept., Post Office Headquarters Building, St. Martin's-le-Grand, London, E.C.1. Completed application forms, to which the entrance fee of 10s. must be affixed in stamps, must be posted to the Wireless Telegraphy Section, Radio Services Dept., Union House, St. Martin's-le-Grand, London, E.C.1, ***to arrive not later than August 20, 1958.***

Courses of Instruction for the Radio Amateurs' Examination

COURSES of instruction for the Radio Amateurs' Examination and for those who wish to study radio have been arranged at the undermentioned centres:

Northwood Evening Institute, Potter Street, Northwood Hills, Middlesex.

Two courses will be held next session, one assuming no knowledge of radio and covering the whole R.A.E. syllabus, and a more advanced course for students with knowledge of basic theory. Enrolments will take place between 6 and 8 p.m. on September 15, 16 and 17. Classes will commence on September 23. The instructor will be G. P. Anderson, A.M.I.E.E. (G2QY).

Brentford Evening Institute. The following courses will be held during the coming session, starting in the week commencing September 22:

(i) R.A.E. Course for students wishing to take the examination in May 1959.

(ii) Radio Servicing (including TV).

The classes will be held between 7 and 9 p.m. Further particulars may be obtained from the Education Office, Town Hall, Chiswick, London, W.4.

The Editor will be pleased to give publicity to courses of instruction at other centres provided details reach R.S.G.B. Headquarters not later than July 22, 1958.

Result of May 1958 Radio Amateurs' Examination

THE total entry for the City and Guilds of London Institute Radio Amateurs' Examination, held on May 9, 1958 was 716, of whom 518 passed (72·4 per cent) and 198 failed (27·6 per cent). The results are an improvement on last year but the number of failures is still high. The examining body is making an analysis of the papers with a view to showing the relative results obtained by candidates who have undergone a course of study and those who have not.

August Issue

OWING to the absence of the Editorial staff at the Region 1 Conference in Bad Godesberg, the August issue of the R.S.G.B. BULLETIN may be published a few days later than usual. The closing date for copy for the August issue will be July 22.

High Wycombe D/F Event

THE High Wycombe qualifying event took place on June 1 in almost continuous rain, culminating in a thunderstorm in the later stages. Despite these conditions, which somewhat reduced the number of competitors, nine out of the ten starters successfully located the transmitter in a small tent in a wood near Great Missenden, and ten miles from the starting point.

First to arrive was E. L. Mollart (B.R.S. 10977) of Oxford in the very creditable time of 1 hour, followed fifteen minutes later by H. W. Drury (B.R.S. 2035) of Romford. At 3.33 p.m. A. Miles (B.R.S. 21208) of High Wycombe arrived to achieve his first success, and 12 minutes later J. J. Grant (B.R.S. 6395) (Rugby) came in, followed closely by four other

A. Miles (B.R.S. 21208) and party at the start of the High Wycombe D/F Event on June 1, 1958

competitors. Particular credit is due to N. B. Simmonds (Slade Radio Society) who cycled all the way from Birmingham to take part, and successfully reached the transmitter at 4.19.

After tea at the Little Abbey Hotel, Great Missenden, Mr. and Mrs. Norman Turner joined the damp but cheerful party and presented the High Wycombe Challenge Trophy to Mr. Mollart and prizes, also kindly donated by G4NT, to the first three successful competitors. A special award was made to Mr. Simmonds in recognition of his strenuous efforts.

Index to Volume 33

THE Index to Volume 33 will be enclosed in the August issue of the BULLETIN.

Regional Representatives

MR. L. W. Lewis (G8ML), 117 Fairview Road, Cheltenham, Glos., and Mr. M. P. Nicholson (G2MN) of Ranworth, South Leigh Road, Warblington, Havant, Hants, have been duly nominated and elected as Representative for Regions 6 and 17 respectively.

Region 6 covers the counties of Buckinghamshire (outside London Region), Gloucestershire (excluding Bristol) and Oxfordshire.

Region 17 covers the counties of Berkshire (outside London Region), Hampshire (including the Isle of Wight), Wiltshire and the Channel Islands.

Four Metre Band to Stay

JUST before this issue closed for press the Post Office advised the Society that after consulting the appropriate department it had been decided to allow United Kingdom amateurs to continue to use the band 70·2 to 70·4 Mc/s beyond the end of 1958. The facility was originally granted in connection with the I.G.Y.

The restriction placed on the use of the band by stations located within 50 miles radius of Jodrell Bank Observatory must still stand, although the Post Office has agreed to look into the question of reducing the radius if low power is used.

The continued use by amateurs of the band 70·2 to 70·4 Mc/s will be reviewed on a year to year basis.

R.S.G.B. Certificates' Manager—New Address

MR. G. E. VERRILL (G3IEC), who is the R.S.G.B. Honorary Certificates' Manager, has moved to 10 Sea Horse Street, Gosport, Hants, England, to which address all claims for certificates should be sent.

H. WHITAKER G3SJ

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Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on May 19, 1958, at 6 p.m.

Present: The President (Mr. L. E. Newnham in the Chair), Messrs. W. H. Allen, H. A. Bartlett, N. Caws, C. H. L. Edwards, D. A. Findlay, W. J. Green, F. Hicks-Arnold, W. R. Metcalfe, A. O. Milne, W. A. Scarr, A. C. Williams, E. W. Yeomanson (Members of the Council), John Clarricoats (General Secretary) and John A. Rouse (Deputy General Secretary).

Apologies for Absence

Apologies for absence were submitted on behalf of Messrs. J. H. Hum and E. G. Ingram.

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

* * *

Finance

Resolved (i) to receive and adopt the Cash Account for April 1958 as prepared and submitted by the Secretary; (ii) to receive the Financial Statement for the 10 months ended April 30, 1958, as prepared and submitted by the Honorary Treasurer.

Reports of Committees

Resolved (i) to receive as Reports the Minutes of Meetings of the Finance and Staff, Publications and Contests Committees; (ii) to accept recommendations of the Finance and Staff Committee in respect to an extension of the Staff Pensions Scheme; to consider at the November 1958 meeting a proposal in respect to the establishment of a Technical Reference Library at Headquarters; (iii) to accept recommendations of the Publications Committee in respect to the preparation of a new edition of *A Guide to Amateur Radio* and a publicity leaflet; not to accept a recommendation of the Committee that the Society should publish an *Equipment Data Book*; (iv) to accept recommendations of the Contests Committee in respect to the B.E.R.U. Contest.

Membership

Resolved (i) to elect 100 Corporate Members and 21 Associates; (ii) to grant Corporate membership to three Associates.

The Secretary reported that 116 of the 690 members whose subscription became due on February 1, 1958, became three months overdue on April 30, 1958, and that 21 of the members concerned had written to resign.

Applications for Affiliation

Resolved to grant affiliation to the Barnet and District Radio Club; Preston Radio Society (previously affiliated); Purley and District Radio Club (previously affiliated as Sanderstead and Purley Amateur Radio Society); R.A.F. (Yatesbury) Amateur Radio Club (previously affiliated); South Bay Amateur Radio Society (California, U.S.A.).

O.R.Ms.

Resolved to authorize the Representatives for Regions 12 and 13 to hold O.R.Ms. in Aberdeen and Edinburgh respectively on Saturday, October 25 and Sunday, October 26, 1958.

News Bulletin Service

Resolved (i) to appoint Messrs. A. D. Naylor (G3GHI) and G. M. C. Stone (G3FZL) as additional operators of the South of England V.H.F. News Service; (ii) to appoint Messrs. C. H. L. Edwards (G8TL) and E. W. Yeomanson (G3IIR) as additional operators of the South of England 3·6/7·1 Mc/s News Service; (iii) to appoint Mr. A. C. Dunn (G2ACD) as an additional operator of the North of England 3·6/7·1 Mc/s News Service.

R.A.E.N. and Police

It was reported that the Amateur (Sound) Licence had been amended to permit amateurs to co-operate with the police.

Attention was drawn to the fact that in the various Press reports of the R.A.E.N.-Police arrangements no reference was made to the fact that the Network is an R.S.G.B. activity.

I.A.R.U. Region I Conference, Bad Godesburg

Resolved to nominate the General Secretary as the R.S.G.B. representative to serve on the I.A.R.U. Region I delegation to the Ordinary Administrative Radio Conference due to open in Geneva on August 17, 1959.

It was agreed that in the event of the General Secretary being appointed at the forthcoming Region I Conference in Bad Godesburg to serve on the I.A.R.U. Delegation to the O.A.R.C. Geneva, he would not be expected to remain at the Conference permanently.

Mr. Milne, in his capacity as Hon. Secretary, Region I Division, explained that I.A.R.U. Region I Division, Fund 3, should be able adequately to cope with the expenses of the appointed delegates.

O.A.R.C. Geneva, 1959

The Secretary reported that he had again written to the G.P.O. to enquire when the Society would be given an opportunity of discussing its frequency proposals with the appropriate Committee. (A meeting has now taken place.—Ed.)

Bristol Group Resolution

The following resolution was submitted from the Bristol Group:

"This meeting deplores the publication, in '*Current Comment*' of the April 1958 issue of the BULLETIN, the suggestion that Top Band should be a c.w.-only band, and that local 'phone nets which normally work in this band should move to the 2m band. The meeting further considers that such suggestions (which in this case seem to be the personal opinion of the writer), should only appear in '*Current Comment*' by authority of the Council, and that personal opinions should be expressed in the form of letters to the Editor."

During the discussion it was pointed out that the author of the *Comment* had included a sentence in context to make it clear that the views expressed therein were personal and not the views of the Council. It was agreed to consider at the June meeting the general question of BULLETIN editorials.

Nottingham O.R.M. Resolution

The following resolution was submitted from the Nottingham O.R.M.:

"In view of the fact that the Zonal Representative for Zone B is not due to retire until December 31, 1959, he be requested to submit to the Council sufficient and good reason for his inability to attend meetings, or to resign to make way for a more conscientious member."

It was reported, during the discussion on the resolution, that the Zone B Representative had attended only five out of 24 possible meetings of the Council in the last two years.

The Secretary was instructed to bring the terms of the resolution to the notice of Mr. Mitchell.

Consideration was given to various other matters discussed at the Nottingham O.R.M. held on April 20, 1958.

Southampton Group Resolution—Revoking of Licences

The following resolution was submitted from the Southampton R.S.G.B. Group:

"This Group views with concern the Regulations recently submitted by Her Majesty's Postmaster General concerning the new arrangement for renewal of revoked licences.

"In the view of this Group these regulations are unnecessarily stringent in their requirements since it does not take into consideration those members who are unable to renew their licences promptly every year owing to sickness or temporary absence overseas. Further, no provision is made for a licensee who, for example, may be serving in Her Majesty's Forces overseas and holds a local Amateur Radio call-sign.

"The proposal of this Group is that the penalties involved should not be invoked until a period of at least three years has elapsed since the Licence was revoked and it presses the Society to bring this proposal to the attention of Her Majesty's Postmaster General."

The Secretary was instructed to inform the Southampton T.R. that the Council has reason to believe that the G.P.O. will give special consideration to amateurs who are unable to renew their licences promptly owing to sickness or temporary absence overseas.

Unlicensed Operation

The Secretary reported that he had written to the G.P.O. about the sale of ex-Government transmitters and "Walkie-Talkie" sets. In reply the G.P.O. had stated that the question of the disposal of such equipment was under consideration. The G.P.O. had also drawn attention to the clauses in the Wireless Telegraphy Act, 1949 which deal with the operation of transmitting equipment.

After discussing other points which had been raised by members of the Council it was agreed that the question of unlicensed operation should be considered by the G.P.O. Liaison Committee at its next meeting with a view to raising with the G.P.O. the matter of tracing unlicensed stations.

The Secretary was instructed to thank Mr. F. C. Judd (G2BCX) and his colleagues on behalf of the Council for the assistance they gave to the G.P.O. in connection with two recent cases of unlicensed operation in the East London area.

Birmingham O.R.M.

Consideration was given to matters discussed at the Birmingham O.R.M. held on May 11, 1958.

Amateur Licences

It was reported that, for the first time, the number of licences in force had exceeded 8,000. The figure as at May 12, 1958, was 8,077 which number included 535 mobile and 58 television licences. The relevant dates when the first licences were issued in the G3K--, G3L--, and G3M-- series were given as follows:

G3KAA issued October 7, 1954

G3LAA issued May 31, 1956

G3MAA issued October 1, 1957

The meeting terminated at 9.40 p.m.

Mobile Column

BY JOHN A. ROUSE (G2AHL/M) *

BRILLIANT weather on June 15, 1958, was one factor which helped to make Bristol Group's first mobile rally at Longleat House, near Warminster in Wiltshire, a success. Careful planning and excellent arrangements generally put the seal of success on the event for the crowd of more than 300 people who attended. Those who did so much to see that things went smoothly must have felt well satisfied at the end of the day.

A fine mobile rig, and a magnificently turned out Ford Consul Mk II, won the *concours d'elegance* for G3ATL/M who also received a certificate of merit for travelling the greatest distance on the day of the rally (172 miles each way). Other certificates went to G3KFT/M (for the longest contact with control on Top Band), G3IRA/M (for the longest contact with control on 2 metres), and G5PP/M who just managed to exceed G3WW/M's score in the Top Band Field Strength Contest.

Many visitors probably thought the raffle should have been called a swindle—Bristol's T.R. (G2FYT) managed to win three of the main prizes!

The control stations were G3CHW/A on Top Band and G3FKO/P on 2 metres, who was using a most interesting form of double circle aerial fed with 70 ohm co-ax.

An excellent factual report on the rally was broadcast by the B.B.C. in the *Today* programme the following morning.

Despite bad weather about 50 mobiles attended the Harlow and District Radio Society's Mobile Rally at Magdalen Laver on June 22. In addition to a Treasure Hunt and Draw, there were demonstrations of commercial mobile equipment, Amateur Television and hi-fi.

Out and About

G2CD/M (Seven Kings) who recently spent a holiday in the Scottish Highlands, took his mobile equipment along hoping to have some QSOs. In two weeks, however, only two contacts were made—one on Top Band and one on 80 metres. The reasons for these poor results seem to be two-fold. Activity on Top Band appears to be low in Scotland owing to interference from navigational aids, while 80 metres, used for so many inter-GM contacts, suffers badly from the effects of the mountain ranges. The noise level is, of course, high in industrial areas while in the country, due to mist and moist conditions generally, discharge on high tension cables makes mobile operation hard work. Nevertheless, G2CD/M's signals were heard at good ranges.

G3LHA/M (Coventry) reports that G2AK/M, G2ATK/M, G3APY/M, G3AOS/M, G5LJ/M, G5CP/M, G5ML/M and G6YU/M, have all been active recently. His own equipment, for 2 metres only, comprises a double superhet and a transmitter, the line-up of which is Z77 (crystal oscillator on 24 Mc/s), 12AV7 (first half tripling to 72 Mc/s, second half doubling to 144 Mc/s), and a QQV03/10 in the p.a. running 12 watts input. The modulator employs a 12AX7 speech amplifier and a QQV03/10 in class AB1. The 12AV7 gives considerably more drive than a 12AT7 or 12AU7 but is very difficult to obtain; however, a 12AT7 can be substituted in an emergency.

The receiver employs a 6BQ7A as a grounded grid r.f. amplifier and mixer, 6J6 (one half self-excited oscillator on 44 Mc/s, second half tripling to 133 Mc/s), Z77 second mixer (on 10·7 Mc/s) and 6AK5 crystal controlled second oscillator, followed by two 465 kc/s i.f. stages and the usual detector and noise limiter. The complete transmitter and receiver are built on a single chassis measuring 13 in. × 7 in. × 5 in.

Power is derived from an RCA AR88 vibrator pack operating from a 6 volt battery, which should be considerable encouragement to those not having 12 volt systems. Results, using a dipole on the vehicle roof and about 9 ft. above ground, have been excellent, many fixed stations being worked whilst on the move at ranges over 35-40 miles.

British mobile operators will be pleased to learn that Netherlands amateurs have now been granted mobile facilities.

Carry Your Licence!

A few weeks ago a member operating near Cheltenham was challenged by the police. As he did not have his radio licence with him he was very nearly taken into custody. Luckily, production of his R.A.E.N. card convinced the police of his *bona fides*.

However, this and other recent experiences in which members have been asked to produce their licences suggest that the time is opportune to stress once again that it is advisable *always* to carry your Amateur (Sound Mobile) Licence (or main station licence if operating portable).

Mobile Material

Most mobile equipment is built to withstand the difficult conditions under which it is expected to operate. Nevertheless, faults do occur and the wise mobileer generally carries a good basic tool kit for the radio as well as for the car. A small soldering iron is always an asset and G8TL has been testing a new one, the Brownleco low voltage pencil iron for 6 or 12 volt use which weighs only 1½ ounces. Various size copper bits can be fitted. Although the iron consumes only 18 watts, G8TL reports that it works very satisfactorily and reaches a high temperature. The Brownleco, price 19/6, is made by Browning's Electric Co. Ltd., Boleyn Castle, Green Street, Upton Park, London, E.13.

One of the items which produced a great deal of interest at the Longleat Rally was G3ATL's mobile whip designed to fit on the rear of a car in a hole the same size as that for a Lucas reversing lamp. The basic mount consists of a ball joint (locked by an Allen-headed bolt and captive nut) to which a cadmium plated coil spring is attached. Loading coils for each band can be screwed into the end plate of the spring. A standard top whip section screws into the top of the loading coil. G3ATL has decided to make all the parts available commercially, the basic mount and spring assembly costing 65/-.

Another firm entering the amateur mobile market is the Minimitter Co. Ltd., already well known to mobile operators for the Minimitter converter. The company's first mobile transmitter is designed for operation on 40, 80 and 160 metres. The r.f. line-up comprises a 12AT7 (v.f.o./c.o./buffer) driving a pair of 6AQ5s in parallel in a pi-network circuit, modulated by another pair in class AB2. The speech amplifier is a 12AX7 and the input is for a crystal microphone.

The complete transmitter measures only 8 in. by 7 in. by 5 in. high and requires a power supply giving 250 to 300 volts at 150 mA (max.) and 12 volts at 2 amps. This company is also producing a companion aerial consisting of a short whip with a capacity hat for tuning and encapsculated loading coils for the various bands. Fittings will be available for bumper and rear boot mounting and for the rear of station wagons.

Vibration is one of the problems to be faced with all equipment, but perhaps most of all with the cores of i.f. transformers and similar coils. Rubber bands and various waxes commonly employed are not always satisfactory in mobile operation but special compounds are now available. A typical example is Silicone Core Retaining Compound M.S. 2241, details of which are available from Rocol Ltd., Ibex House, Minories, London, E.C.3, who market a range of locking compounds. M.S. 2241 is satisfactory over a wide temperature range (minus 58° F. to 392° F.).

Items for inclusion in the next *Mobile Column* should reach R.S.G.B. Headquarters not later than August 18.

* *Assistant Editor.*

R.A.E.N. Notes and News

By E. ARNOLD MATTHEWS (G3FZW)*

THE recently published report on the Lewisham railway accident emphasizes that even the finest communications system will break down under extreme pressure. That this should happen in an area so well supplied with communications as London is not surprising when it is remembered that telephone exchanges are designed to handle, at most, one-fifth of the calls needed to simultaneously engage all lines connected to them. Commenting on the report, the **London** C.C., G3IIR, said, "Had regulations permitted, London R.A.E.N. could, with difficulty, have given effective assistance, but any tasks would have been much lighter were our numbers greater." Anyone in two minds about registering as a member of R.A.E.N. will do well to study the report bearing in mind that the Network exists to give help in just such circumstances as arose at Lewisham, where hospitals could not make essential outgoing calls because their lines were flooded with incoming calls from all over the country.

R.A.E.N. Membership Cards

In an emergency the Police may require R.A.E.N. members to produce their membership cards. Carry yours with you—*always*.

Around the Groups

Reports indicate that co-operation with police is no one-sided affair and much practical help is being given to R.A.E.N. groups. An example from **Yorkshire** illustrates this. In **Hull** the group has had a superb control room in Police H.Q. placed at its disposal and members are being given a course of six instructional lectures and the local radio society has been found a meeting room by the police. A recent visit to Scarborough club by G2ACD resulted in a useful batch of recruits being enrolled in R.A.E.N. Col. Dunn also visited **York** to re-activate the group in co-operation with York A.R.S. In large counties it may be found that the C.C. has several police forces to deal with. **Essex**, for instance, has four, each of which has been contacted by C.C., G8TL.

During a recent QSO with G3KEP, the **Bingley** A.C., it was learned that the group is engaged in modifying a WS18 for 160m. These sets are now obtainable very cheaply and modified they should make an excellent substitute for WS68, which it will be remembered were given extensive tests by Essex group some years ago and found to be very useful equipment for low power portable work.

The **Birmingham** C.C., G3CNV, has built a mobile control room in a caravan. Fully equipped and carrying its own generating set it should make for operational efficiency and is an idea worth copying. B.R.C.S. welcomed the information that the **Stirlingshire** group is now active with three mobiles. C.C. GM4QV is anticipating more recruits, and asks anyone interested in joining to contact him.

Recent highly successful activities in Northern Ireland have led to a crop of enrolments from **Belfast**. During a recent visit to **Cardiff**, the Essex C.C. G8TL addressed the local radio society and it is hoped that support for R.A.E.N. will result. This will be welcomed by A.C. GW3ASW who requires more operators for a scheme requested by Glamorgan B.R.C.S. In **Buckinghamshire**, Bletchley St.J.A.B. are interested in R.A.E.N. and the C.C., G3HIU, whose address is given below, asks anyone interested in enrolling in R.A.E.N. to contact him. A report from G3EEL states that the **Peterborough** group, which has contact with St.J.A.B., has three mobiles. Owing to the resignation of G3JBU (the Northampton A.C.) G3EEL's area of operation has been extended to cover the whole county. It is hoped that a new group may be formed in **Berkshire**. Will prospective members please contact G3FZW?

In Suffolk both **Ipswich** and **Felixstowe** groups have sent reports showing great activity. The former plan an initial exercise with the local B.R.C.S., while the latter has enrolled many new members and is completing mobile equipment.

Net Schedules

Hull: Wednesdays, 19.30 B.S.T., 1970 kc/s or nearest.

Norfolk: Every night, 22.00 B.S.T., 1980 kc/s or nearest. Special slow Morse for listener members every Wednesday.

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Personnel

Amendments to list of officers published in April 1958 BULLETIN are as follows:

Appointments

County Controllers. North Yorkshire and Co. Durham: T. Griffin (G3GUV), 22 Albert Terrace, Middlesbrough. Buckinghamshire: F. H. Dewick (G3HIU), 47 Gloucester Rd., Wolverton, Bucks. (Tel.: Wolverton 3270). Worcestershire: R. Lawrence (G3KFY), Old Orchard, King's End, Powick, Worcester.

Area Controllers: R. Burwell (G4LH), 46 Grafton St., Beverley Rd., Hull, E. Yorks. E. W. Bettles (G3KXE), 5 Hainault Rd., Chadwell Heath, Romford, Essex. R. C. Hills (G3HRH), 80 Longcroft Lane, Welwyn Garden City, Herts. (for London, North). E. H. Page (G3HKV). Hill View, Drimpton, Beaminster, (for South Somerset), D. Metcalf (G3GHQ) 80 Kings Road, Southsea, Hants. (Portsmouth and District).

Correction. The address of the Cannock A.C. should read: G. F. Hayward (G3MDF), 74 Dartmouth Av., Cannock, Staffs.

The call-sign of the County Controller for Northern Ireland, G. Henry, is GI3BHX not GI3BHK.

Resignations

Northampton: B. Hayes (G3JBU). Romford: B. W. LeGrys (G3GOT). Beverley, Yorks: R. Mayman (G2ABR). Lichfield, Staffs: J. Beamand (G3DZT).

London Members' Luncheon Club

ARLAND USSHER (ZS6Z), a past president of the South African Radio League, Jimmy Douglas (ZS5QR) of Pietermaritzburg, Don Piccirillo (ZD2DCP) of Lagos, Geoff Miles (VK6MM) and Jan Collis, a shortwave listener from Sweden, were among the 25 amateurs present at the June meeting of the London Members' Luncheon Club. Each of the five visitors spoke briefly about Amateur Radio conditions in their respective countries.

Members of the Club were sorry to learn of the illness of Mrs. Vanstone, wife of the Chairman. Flowers were sent from those present. The Club is due to meet again on Friday, July 18 at the Bedford Corner Hotel, Tottenham Court Road. A cordial invitation is extended to visitors from the provinces and abroad.

The late Stanley Ward, VP8BU/VP8BT

MR. S. L. Hill (G8KS) has been authorized by the parents of the late Mr. Stanley Ward, who lost his life tragically by drowning on April 1, 1958, at Port Stanley, to act on their behalf and handle all the accumulated QSL cards to date addressed to VP8BU/8BT. Meanwhile Mr. and Mrs. Ward are endeavouring to locate their son's station log book.

Mr. Hill asks members who worked VP8BU or VP8BT not to write to him for the time being for confirmation of their QSOs. Another announcement will be made later.

* *1 Shortbutts Lane, Litchworth, Staffs.*

New Members

THE following have been elected to membership.

Corporate Members, Home (Licensed)

G2KF †J. A. Partridge, "Havencroft," Edenbridge, Kent.
G2BNT H. Jordan, 1 Birch Close, Tonacliffe, Whitworth near Rochdale, Lancs.
G2BUR †E. T. Edleston, 64 Laburnum Road, Blackburn, Lancs.
G3FW †G. W. Riseley, Hillcrest, Dingley, Market Harborough, Leics.
G3JW †E. G. Bright, c/o 12 College Road, Exeter, Devon.
G3FGD C/Sgt. W. J. Mordue, Signal Troop, H.Q. 3 Commando Bdge, Malta.
G3HCB J. Greaves, 52 London Road, Cheltenham, Glos.
G3HOH †F. J. Longman, 4 Dale Street, Mansfield, Notts.
G3IBR †D. E. Law, 19 Queens Road, Littleport, Cambs.
G3LKO D. W. Fisher, 153 Bridge Road, Slade Green, Erith, Kent.
G3LZB J. E. Hassall, 35 Coppice Road, Solihull, Warwicks.
G3AMH †H. Green, 1 Darley Cliff Cottages, Worsborough Dale near Barnsley, Yorks.
G3MCT Sgt. E. L. Medway, 8 Military Road, Hilsea, Portsmouth, Hants.
G3MCX W. J. Kennedy, 22 Croham Park Avenue S. Croydon, Surrey.
G3MEK N. Gaunt, 351 Grimshaw Lane, Middleton Junction, Manchester
G3MHD A. E. W. Williams, 68 Doods Road, Reigate, Surrey.
G3MIL F. J. M. Marr-Johnson, Boxley House, Near Maidstone, Kent.
G3MJT A. J. Parkes, 24 Ardgowan Road, Catford, London, S.E.6.
G3MLT R. J. Killick, Brock Cottage, Willbrow Road, Esher, Surrey.
G3MMW G. W. Ilbury, Kedros Flat, 90 Wells Road, Malvern, Worcs.
G3MNB *H. J. Benjamin, 23 Norwich Road, Forest Gate, London, E.7.
G3MND C. B. Wells, 56 Central Avenue, Beverley, East Yorks.
G3MNK E. D. Turpin, 7 Brook Gardens, S. Chingford, London, E.4.
G3MNQ G. E. Goodwin, Lynton, Bunny Hill, Costock, near Loughborough, Leics.
G3MNT †G. A. Farrall, 94 Cheadle Old Road, Edgeley Park, Stockport, Cheshire.
G3MNY G. W. Tyrrell, 70 Middlefield, Ormsgill, Barrow-in-Furness, Lancs.
G3MPS D. Pack, 26 Lansdowne Road, Aldershot, Hants.
G5BQ †S. J. Granfield, 47 Warren Road, Cambridge.
G6AW †W. E. F. Jennings, O.B.E., Leascroft, The Drive, Chestfield, Whitstable, Kent.
GI3HMN †C. E. Davies, 29 Lucerne Parade, Stranmillis, Belfast.
GW3KYA B. R. Davies, 8 Woodbine Villas, Blackwood, Mon.
GW3MPP G. C. Price, "Garreg-Wen," 36 Park Crescent, Abergavenny, Mon.

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G2YJ L. G. Boomer, 11 Tritton Avenue, Beddington, Croydon, Surrey.
G2DCF †J. Walker, 40 Devon Street, Beswick, Manchester 12.
G2FLY G. Edwards, 17 Harrison Road, Erdington, Birmingham.
G2AFD †J. Byrne, Caxton Cottage, Wells Road, Malvern, Worcs.
G3XZ †A. Staples, 36 Musbury Crescent, Rawtenstall, Rossendale, Lancs.
G3BBF †W. D. Jones, 82 Queensway, Buckland Estate, Newton Abbot, Devon.
G3BEC †B. J. Clark, 107 Eastland Road, Yeovil, Som.
G3GBH †J. H. Jones, Flat 2, 18 Vernon Road, Bridlington, Yorks.
G3GTW D. Kirk, 74 Clough Road, Rotherham, Yorks.
G3HSG F. Peirson, 8 Dickson Road, R.A.F. Watton, Thetford, Norfolk.
G3IPG †G. H. Phipps, 2 Ryde House, Stevenage, Herts.
G3IXZ R. T. Bowden, Penninis, Outwood Common Road, Billericay, Essex.
G3JVC J. C. Martin, 23 Aldensley Road, Hammersmith, London, W.6.
G3LNN J. E. Symes, 20 Plantsbrook Road, Walmley, Sutton Coldfield, Warwicks.
G3LZQ J. Dunnington, 31 Subway Street, Hessle Road, Hull, Yorks.
G3MAL R. L. Hodgson, 24 Farfield Grove, Buttershaw, Bradford 6, Yorks.
G3MAY H. F. Stenhouse, 28 Pearl Road, Walthamstow, London, E.17.
G3MBK L/Tel. (S) D. W. Underdown, P/JX 889792, Communications Mess, H.M.S. *Ark Royal* c/o F.M.O. Malta.
G3MEC J. S. E. Pearce, 34 Lacey Crescent, Parkstone, Poole, Dorset.
G3MFF R. S. Ragde, 98 Maldon Road, Great Baddow, Chelmsford, Essex.
G3MFN P. M. Williams, 22 Blenheim Close, Didcot, Berks.
G3MFW H. G. Woodhouse, 14 Carnsmerry Crescent, St. Austell, Cornwall.
G3MHT E. J. Landon, 339 Brampton Road, Bexleyheath, Kent.
G3MIO W. N. Lidgate, 13 The Crescent, Haversham, Wolverton, Bucks.
G3MJI Sgt. R. G. Ford, Signals Section, R.A.F. Station, Hornchurch, Essex.
G3MKC R. A. Hale, Black Mikes, Dursden Lane, Pewsey, Wilts.
G3MKR B. Haywood, "Penarth Cottage," 15 Tunnicliffe Street, Macclesfield, Ches.
G3MKZ D. W. Freeman, 1 Fairfield Close, Isham, Kettering, Northants.
G3MLM †Sgt. D. Parker, 1st Training Regt., Sgts. Mess, Royal Signals, Catterick Camp, Yorks.
G3MLS D. Nappin, 20 Balmoral Road, South Harrow, Mdx.
G3MLX J. Bourne, 184 Albert Avenue, Hull, Yorks.
G3MMQ †J. A. Hedges, 35 Ferrymead Avenue, Greenford, Middx.
G3MNF G. H. Salter, 74 Moss Lane, Litherlands, Liverpool 21.
G3MNO D. L. Lisney, 17 Pickett Croft, Stanmore, Middx.
G3MPJ K. A. Bennett, 2 North Close, R.A.F. Medmenham, Marlow, Bucks.
G3MPL J. H. Robertshaw, 56 Tilling Crescent, Micklefield, High Wycombe, Bucks.
G3MSP Sgt. H. J. B. Western, Sgts. Mess, R.A.F. Watton, Thetford, Norfolk.
G3MTB †G. W. B. Parish, 2A Pasture Road, Barton-on-Humber, Lincs.
G3MTC *R. Jones, 466 Marine Road East, Bare, Morecambe, Lancs.
G3MTF †J. D. Adams, 42 Dunbar Avenue, Norbury, London, S.W.16.
G3MTM T. W. Pawley, 81 Avondale Road, South Croydon, Surrey.
G3MTR †B. S. Wolfe, Officers' Mess, R.A.F. Undholme, Nr. Doncaster, Yorks.
G3MUL/T F. C. Lathwood, Valhalle, 40 Grange Crescent, Lincoln.
G5PK †A. J. Peck, 31 Reginald Road, Forest Gate, London, E.7.
G8BR †B. Rayner, 157 Hamstel Road, Southend-on-Sea, Essex.
G8GA †G. Austin, 16 Woodland Avenue, Goole, Yorks.
GI2FHN †E. R. Sandys, 27 Fairfield Park, Bangor, Co. Down.
GM3DIQ †W. C. Bradford, 6 Langside Park, Kilbarchan, Renfrew.
GM3EQY †D. A. E. Samson, 35 Parkgrove Drive, Barnton, Edinburgh 4.
GM3MJG R. S. Munro, 8 Clune Terrace, Newtonmore, Invernesshire.
GW2FVZ †D. C. Morris, Cilfach, South Street, Caerwys, Flints.
GW3MMU P. M. Fulton, 102 Lewis Street, Aberbargoed, Bargoed, Glam.
GW3FJI E. L. Jones, 8 Merllyn Road, Rhyl, Flints.

Corporate Members, Overseas (Licensed)

CN8JX Glenn H. Luse, 3906th Operations Squadron, A.P.O. 117, New York, N.Y., U.S.A.
EA3GI Jorge Janer Mestres, Ciudad de Balaguer 35, Barcelana, Spain.
K2MIU William A. Walker, Jr, 6848 Chandler Avenue, Pennsauken 5, New Jersey, U.S.A.
K2OVN J. Brandau, 1659 East 46th Street, Brooklyn 34, New York, U.S.A.
K4DKE A. D. Brooks, P.O. Box 388, Havelock, N.C., U.S.A.
K5JEA K. W. Kruger, 4328 N.W.43 Street, Oklahoma City, Olkahoma, U.S.A.
K9DCD J. Robert Roush, 5902 N.67th Street, Milwaukee 18, Wisconsin, U.S.A.
MP4BCK G. W. Hainsworth, British Residency, P.O. Box No. 3, Bahrein, Persian Gulf.
SM3AKW Karl G Mohlin, Hultom, Sweden.
SM4CTF C. Gunnar Jonsson, Lovstagatan 5, Frovi, Sweden.
VE2AUD D. R. McFall, 4544 Old Orchard Avenue, Montreal, Quebec, Canada.
VE2YQ P. K. MacDougall, Box 263, Brownsburg, P.Q., Canada.
VE3CKP †K. J. Porter, 75 Milford Haven Drive, Scarborough, Ontario, Canada.
VE3EMF E. J. Brogden, Box 51, Sarnia, Ontario, Canada.
VE6CX G. C. Hamilton, Box 214, Fort Saskatchewan, Alberta, Canada.
VP8BJ G. N. Biggs, 5 Dean Street, Port Stanley, Falkland Is.
VQ4GQ S. N. Crabtree, c/o Forces Broadcasting Stn., B.F.P.O.10.
VQ4HA J. Biron, Cable & Wireless Ltd., P.O. Box 777, Nairobi, Kenya.
VS1JF R. Brown, c/o F. Johnstone (VS1FJ), 52/6 Upavon Road, R.A.F. Changi, Singapore 17.
VS5AT A. F. Tipple, c/o Brunei Shell Petroleum, Seria, Brunei State, Borneo.
W2AMS H. J. Treger, 2045 Jersey Avenue, Westfield, New Jersey, U.S.A.
W2AYU W. V. Turner, 8 Glendale Drive, Glens Falls, N.Y., U.S.A.
W2BXC J. Russell, Jr., 1195 Eastern Avenue, Schenectady 8, N.Y., U.S.A.
W2DPP A. S. Lukach, 35 East 84 Street, New York, U.S.A.
W3BGP C. H. Rudge, 1113 Bell Avenue, Yeadon, Pa, U.S.A.
W4BRC M. Williams, P.O. Box 1294, Melbourne, Florida, U.S.A.
W4DQH C. W. Bass, 5491 Park Avenue, Memphis, Tennessee, U.S.A.
W4UFQ Dale S. Harridge, P.O. Box 332, Madison, Georgia, U.S.A.
W5UV R. Langhoff, 3837 Lexington Avenue, Port Arthur, Texas, U.S.A.
W5WJQ Evert B. Halbach, Route 1, Box L 692, Thibodaux, Louisiana, U.S.A.
W6JBP Harold E. Lundstedt, 849 West Second Avenue, Escondido, Calif., U.S.A.
W6UKE Roger F. Jackson, 7236 Lanai Street, Longbeach 8, Calif., U.S.A.
W7JWE Commander Earl W. Lockwood, 461 2nd Avenue, South Kirkland, Wash., U.S.A.
W9BDQ Delos E. Wetherell, 9034 West Orchard Street, West Allis 14, Wis., U.S.A.
W9GTJ J. Janczak, 112 West Burnett Street, Beaver Dam, Wis., U.S.A.
W9YNB Norman O. Merz, 914 LaSalle Street, Racine, Wash., U.S.A.
ZB1NB †C. A. Harnwell, 52 Victoria Avenue, Sliema, Malta.
ZB1VJ V. J. Debono, 25 St. Margaret Street, Sliema, Malta.
ZS5DU Noel H. Thomas, P.O. Box 143, Dundee, Natal, South Africa.

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K4JBQ W. A. McCanless, Jr., Halifax Cotton Mills, Inc., South Boston, Virginia, U.S.A.
K4QWG G. D. McConnell, P.O. Box 254, Titusville, Floridia, U.S.A.
K4SUK Gary R. Waldsmith, 917 NE 1st Street Pompano Beach, Florida, U.S.A.
K6MUD Richard E. Skinner, 21052 Rios Street, Woodland Hills, Calif., U.S.A.
K8DEY J. R. McConville, 122 Ralph Street, Toledo 9, Ohio, U.S.A.
K9KDI Gene W. Sochor, 2948 Maple Avenue Berwyn, Ill., U.S.A.

VE3BHS R. T. S. Nash, 100 Matthews Street, Port Arthur, Ont., Canada.
VE4XU F. V. Heiland, 331 Morley Avenue, Winnipeg 13, Manitoba, Canada.
VE5BQ J. R. M. Smith, 2137 Ewart Avenue So, Saskatoon, Saskatchewan, Canada.
VE5DG A. B. Nagy, 1421 Retallack Street, Regina Sask., Canada.
VE5RX R. A. McNeill, P.O. Box 472, Yorkton, Sask., Canada.
VE7APR W. L. Tansky, R.R.1., Chemainus, B.C., Canada.
VK9CK M. H. Ewen, c/o O.T.C.(A)., P.O. Box 56, Port Moresby, Papua.
VQ2JP J. J. R. Peart, H130, Mufulira, Northern Rhodesia.
VS1FW/G3MRC B. J. Poole, R. N. Wireless Station Kranji, Singapore 23.
W3RZL C. R. Brown, 5738 Larchwood Avenue, Philadelphia 43, Pa., U.S.A.
W5BIH T. W. Andrews, P.O. Box 541, Hobbs, New Mexico, U.S.A.
W5IAH C. M. Sandidge, Harper Road, Kerrville, Texas, U.S.A.
W6QS F. A. Gwynn, 887 E. Meadow Drive, Palo Alto, Calif., U.S.A.
W7ZOH D. W. Liebsch, Scobey, Montana, U.S.A.
W9TLL J. D. Gollahon, 1742 N. Whitchel, Decatur, Ill., U.S.A.
W6IWA Henry Canvel, 2486 Moreno Drive, Los Angeles 39, Calif., U.S.A.
ZD7SC A. J. Davis, c/o Cable & Wireless Ltd., " The Briars " St. Helena, South Atlantic.
ZS6AKI L. S. Cole, 28 Fifth Street, Lower Houghton, Johannesburg, South Africa.

Corporate Members, Home (British Receiving Stations)

21854 A. J. Taylor, 420 Wellington Road N, Heaton Chapel, Stockport, Ches.
21855 A. J. Copsey, 95 Victoria Road S, Southsea, Hants.
21856 K. H. Ivatt, 47 Halstead Gardens, Winchmore Hill, London, N.21.
21857 L. Kemp, Anglezarke, Raleigh Road, Barnstaple, Devon.
21858 T. Williams, 9 The Grove, Meliden, Prestatyn, Flints.
21859 A. Bovington, 27 Kent Road, Gravesend, Kent.
21860 W. Devereux, 37 Huddleston Road, Grimsby, Lincs.
21861 S. N. Andrews, 8 Forest Grove, Stockton Lane, York.
21862 G. A. Snutch, 39 Kingston Avenue, Wigston Fields, Leicester.
21863 J. Hewitt, 36 Balholm Drive, Belfast, N. Ireland.
21864 D. F. Pierce, A.M.I.E.E., 147 South Croxted Road, West Dulwich, London, S.E.21.
21865 O. M. Corsbie, 29 Clifton Hill, Exeter, Devon.
21866 G. Berry, 33 Fore Street, Hayle, Cornwall.
21867 G. Hughes, Rhos Garage, Brynteg, Anglesey, Wales.
21868 S. Durrant, 41 Somerset Road, Blue Hall, Norton, Stockton-on-Tees, Co. Durham.
21869 P. Storey, 76 Cemetery Road, Doncaster, Yorks.
21870 K. H. McDonald, Upcott Barton, Broadwoodwidger, Lifton, Devon.
21871 M. H. B. Lucas, Greenfields, Kearby, Wetherby, Yorks.
21872 S. M. Henry, 18 Mountsandel Road, Coleraine, Co. Derry, N. Ireland.
21873 N. B. Simmonds, 5 Bowling Green Road, Stourbridge, Worcs.
21874 E. N. Cheadle, Fir Tree End, Wise Lane, Mill Hill, London, N.W.7.
21875 *P/MX 947034 D. R. Williams, H.M. S/M " Ambush," c/o G.P.O. London.
21876 *D. Young, 13 Laverickhall Street, Glasgow, N, Scotland.
21877 A. Langfield, 17 Highfield Villas, Langold, Worksop, Notts.
21878 H. C. Peacock, 140 Kidmore End Road, Emmer Green, Reading, Berks.
21879 P. A. Leyel, The Anchorage, Riverside, Twickenham, Middx.
21880 F. J. Young, 119 Stanford Road, Norbury, London, S.W.16.
21881 C. R. French, West Rise, Bromham Road, Biddenham, Bedford 6.
21882 A. Brooker-Carey, The Decca Navigator Transmitting Station, Staney Hill, Lerwick, Shetland.
21883 D. N. Hall, 27 Ravenscroft Park, Barnet, Herts.
21884 C. T. Davies, 19 Broadmead, Penllwyn, Pontllanfraith, Mon., S. Wales.
21885 Rev. S. J. Smith, 49 Newbigging, Musselburgh, Midlothian, Scotland.
21886 A. Brown, 105 Stonyhurst Street, Glasgow N.2.
21887 W. G. Dobson, 135 Creswick Lane, Grenoside, Nr. Sheffield, Yorks.
21888 H. L. Wiggins, 63 William Street, New Marston, Oxford.
21889 C. J. White, 122 Hill Lane, Southampton, Hants.
21890 A. W. T. Bagnall, 21 Seaview Road, Peacehaven, Newhaven, Sussex.
21891 O. Heggs, 8 Kingsley Avenue, Stanneylands, Wilmslow, Ches.
21892 R. S. Pritchard, 20 Avon Road, Tolladine, Worcester.
21893 F. S. Crease, 30 Gledwood Drive, Hayes, Middx.
21894 E. James, 42 Shrewton Walk, Swindon, Wilts.
21895 R. Henshall, 4 Trickey Warren, Churchstanton, Nr. Taunton, Som.
21896 N. F. Janes, 22 Downs Road, Dunstable, Beds.
21897 G. C. Newman, 29 Glenwood Drive, Minster on Sea, Sheerness, Kent.
21898 H. Morton, 51 Sweetcroft Lane, Hillingdon, Middx.
21899 J. D. Wheatley, Ridgeway, Islington, St. Germans, Kings Lynn, Norfolk.
21900 R. F. Bolton, Ohmvilla, Newcastle Street, Kilkeel, Co. Down, N. Ireland.
21901 F. T. Brown, 403 Queensway, Rochdale, Lancs.
21902 G. F. George, 163 Ward End, Park Road, Ward End, Birmingham 8, Warwicks.
21903 A. M. Scott, 59 Green Lane, Newby, Scarborough, Yorks.
21904 W. Bailin, 301 Edgware Road, Paddington, London, W.2.
21905 S. B. Norris, 3 Bower Close, Collier Row, Romford, Essex.
21906 D. T. Oldham, 26 Cambridge Road, Macclesfield, Ches.
21907 †K. S. Lunt, 42 Bawtry Road, Whetstone, London, N.20.
3665 †D. G. Garrard, 17 Hill House Road, Ipswich, Suffolk.
6402 C. W. B. Lucas, Durbeyfield, West Bay, Bridport, Dorset.
17157 †W. E. Farmer, Post Office, Fleckney, Leics.
20592 †R. V. Cornelius, 7 Edwards Road, Hythe, Southampton, Hants.

Corporate Members, Overseas (British Empire Receiving Stations)

979 Ian Mayo-Smith, c/o Ministry of Finance, Establishment Division, Kaduna, Nigeria.
980 G. M. Middleton, c/o P.O. Box 300, Bathurst, Gambia.
981 G. A. Greville, Accounts Section, Commonwealth Dept. of Works, Port Moresby, Papua.
982 I. J. G. Benoy, 6 George Street, Rosettenville, Johannesburg, South Africa.
983 P. Dixon, P.O. Box 626, Broken Hill, Northern Rhodesia.
984 E. J. Charman, 494 Bissett Street, Broken Hill, Northern Rhodesia.
985 D. A. Anderson, 494 Bissett Street, Broken Hill, Northern Rhodesia.
986 N. D. Nicol, 105 Burton Court, Pretoria Street, Hillbrow, Johannesburg, South Africa.

Corporate Members, Overseas (Foreign Receiving Stations)

292 S. W. Rasmussen, 3 Curzon Street, Slough, Bucks.
293 Stanley J. Penc, 1524 Mt. View Avenue, Utica 4, New York, U.S.A.

Associates

1624 A. B. J. Drewson, 2 Albert Place, Mumbles, Swansea, S. Wales.
1625 P. R. Woodward, 192 Fishponds Road, Eastville Park, Bristol 5.
1626 K. Taylor, 65 Manchester Street, Heywood, Lancs.
1627 P. J. H. Whyte, 13 Toller Road, Quorn, Nr. Loughborough, Leics.
1628 G. I. Knight, 2 Loanhead Terrace, Aberdeen, Scotland.
1629 R. E. Parkes, Great Oaks, Green Lane, Blackwater, Camberley, Surrey
1630 M. D. Watson, 142 The Broadway, W Ealing, London, W.13.
1631 R. J. Fowles, 32 Legh Road, Sale Moor, Ches.
1632 R. W. Sheppard, 94 Durham Road, Feltham, Mddx.
1633 M. J. H. Hole, 35 Florence Court, Kenninghall Road London, E.5.
1634 B. Foster, 32-4 Rendezvous Street, Folkestone, Kent.
1635 E. E. Pears, 115 Fulwell Road, Sunderland, Co. Durham.
1636 J. L. Pritchard, 36 Central Avenue, Sale, Ches.
1637 R. Blakey, 27 King's Lane, Englefield Green, Egham, Surrey.
1638 R. H. Reeves, 5 Brook Avenue, Timperley, Altrincham, Ches.
1639 J. D. Page, 28 Castletown Road, W. Kensington, London, W.14.
1640 B. J. Mahony, 1 Eglinton, Badby Road West, Daventry, Northants.
1641 J. J. G. Clayton, Marconi's Wireless Telegraph Co. Ltd., Aero Div., Chelmsford, Essex.
1642 P. G. K. Cabban, Cloverlea, Brington Road, Flore, Northants.
1643 E. V. Taylor, 131 Derbyshire Road South, Sale, Ches.
1644 W. E. Leddington, 23 Wyesham Avenue, Monmouth.
1645 A. S. Keir, 112 Perth Road, Scone, Perthshire.
1646 M. J. M. Saltmarsh, 54 Manford Way, Grange Hill, Chigwell, Essex.
1647 A. P. Carpenter, 46 Central Road, Worcester Park, Surrey.
1648 J. A. Fawcett, Invergelder, Algarth, Pocklington, Yorks.
1649 A. F. Stafford, The Roundlets, Cockshutt Lane, Malbourne, Derbys.
1650 M. Wills, 36 Victoria Road, Newport, I.O.W.
1651 P. T. Owens, 24 Eden Avenue, Culcheth, Nr. Warrington, Lancs.
1652 G. R. Watts, 46 Links Road, Weymouth, Dorset.
1653 I. W. Sampson, 4 Park Avenue, Uttoxeter, Staffs.
1654 G. A. J. Powell, 37 Elm Park, Filton, Bristol.
1655 P. O. Kellard, 62 Central Hill, Upper Norwood, London, S.E.19.
1656 R. J. Oram, 4 Hardy Avenue, Ashton Gate, Bristol 3.
1657 J. L. Marshall, Northowram Vicarage, Halifax, Yorks.
1658 A. R. Pingstone, 35 Braemar Avenue, Northville, Bristol 7.
1659 A. C. Wadsworth, 2 Edith Road, Prittlewell, Southend on Sea, Essex.
1660 V. L. M. Fernando, 41 Holland Park, London, W.11.
1661 T. L. Aldred, 66 Cock Road, Kingswood, Bristol.
1662 A. Ansell, " The Good Intent " Public House, Bath Road, Cliftonville, Margate, Kent.
1663 R. H. Jarvis, Flacks Green, Terling, Nr. Chelmsford, Essex.
1664 R. J. Pullen, Braybrooke, Terling, Chelmsford, Essex.

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

CHANGES OF ADDRESS SHOULD BE NOTIFIED TO HEADQUARTERS IMMEDIATELY

Regional and Club News

Blackpool and Fylde Amateur Radio Society.—There was a good attendance on May 23 when Mr. W. D. Calvert, of Mullard Ltd. lectured on "The Manufacture of Modern Radio Valves," illustrated with films. *Hon. Secretary:* H. G. Newland (G5ND), 161 Penrose Avenue, Marton, Blackpool.

Bristol.—At the June meeting G2FYT, G2HDR, G3CHW, G3COP, G3FBA, G3FKO, G3GON and B.R.S.21806 demonstrated and described items of equipment which they had constructed. A report on the group's first Mobile Rally at Longleat organized by G2FYT, G3CHW, G3FKO and G3JMY, appears in *Mobile Column*. Matters of special interest to B.R.S. and Associate members are to be discussed on July 18. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol 7.

Cornish Radio and Television Club.—At the June meeting, the club's president, Ron Penrose, lectured on "Licence Regulations and Conditions." Visitors present included G2AOP from Surrey, G3HSE from New Cross, London, and the Honorary Secretary of the Clifton Radio Society. At the August meeting in Falmouth R. Cocks (G3BHC) will give an introduction to s.s.b. *Hon. Secretary:* J. Brown (G3LPB), Marlborough Farm, Falmouth.

Finsbury Park and District.—Details of the group's next meeting on July 22 at 7.30 p.m. may be obtained from the *A.R.*, A. J. Mourton (G8QU), telephone CANonbury 2970.

Grafton Radio Society.—The society's annual Field Day on Hampstead Heath was again a great success. G3AFT/P was in operation on 10, 15 and 20 metres, and G2CJN/P on 40, 80 and 160 metres. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

Gravesend Amateur Radio Society.—The society took part in N.F.D. from Woodhill Farm, Meopham, under the direction of the *Chairman*, A. Watson (G3DCV). Meetings are held on Thursdays at 7.30 p.m. at The Old Sun, Crete Hall Road, Northfleet. *Hon. Secretary:* L. C. Bodycombe, 21 Grieves Road, Northfleet.

Macclesfield and District Radio Society.—At the first meeting of this new society, held on June 13, 1958, at the Liberal Club, Queen Victoria Street, Macclesfield, Mr. Eric T. Webster (G3JQ) was elected chairman. Future meetings are to be held fortnightly. Local amateurs interested in Amateur Radio are cordially invited to write to the *Hon. Secretary and Treasurer* B. Haywood (G3MKR) "Penarth Cottage," 15 Tunnicliffe Street, Macclesfield for further information.

North Kent Radio Society.—The society will be operating GB3ENT as part of the Erith Borough Council's Annual Show at the Recreation Ground on August 4. It is expected that the station will work on all bands from 10 to 160 metres, phone and c.w. A special QSL card will be issued bearing greetings from the Mayor and Corporation. In addition, there will be a small display of typical home constructed amateur equipment. Members of the society will be pleased to meet old friends and new at the Show and on the air. *Hon. Secretary:* D. W. Wooderson (G3HKX), 39 Woolwich Road, Bexleyheath, Kent.

Mike Marlow (G3IAF) recently married Miss M. A. Watson. On the right of the picture are A. W. Warner (G3FZC), A. R. for Guildford and Woking, and H. J. Lawn (G3HLY).

Plymouth Radio Club.—At the A.G.M. the following officers were elected: *President*—H. Jones (G5ZT); *Vice-President*—E. Diggle (G3LSD); *Chairman*—C. Teale (G3JYB); *Hon. Secretary:* H. Dean (G3KDK), Chaddlewood House, Plympton, Plymouth; *Hon. Treasurer*—E. Fallon. G3HPC won the *G5ZT Constructional Trophy* with a miniature oscilloscope, the runner-up being R. Smith who has produced a professional-looking 2 valve t.r.f. short-wave receiver and power pack from odds and ends. Meetings are held on Tuesdays at the Virginia House Settlement, Barbican, Plymouth.

Purley and District Amateur Radio Club.—The following officers were elected at the A.G.M.: *Chairman*—F. Jones; *Hon. Treasurer*—R. Knight (G3DPW); *Hon. Secretary*—E. R. Honeywood (G3GKF); *Committee Members*—J. N. Buckland (G3JSQ) and R. Narramore.

Romford and District Amateur Radio Society.—Whilst the monthly junk sale is still being held on the first Tuesday in each month, the summer programme has been amended to provide for four mobile evenings during July and August. The society meets at R.A.F.A. House, 18 Carlton Road, Romford, on Tuesdays at 8.15 p.m. Visitors and prospective members are always welcome. *Hon. Secretary:* L. S. Owen (G3MDP), 53 Applegarth Drive, Newbury Park, Ilford, Essex.

Slade Radio Society.—At the meeting on July 18, G3GVN/M will give a talk on "The Installation of Mobile Radio Equipment." A visit to Birmingham City Police Radio Room is planned for August 15. *Hon. Secretary:* C. N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.

South Shields and District Amateur Radio Club.—During June, members visited the B.B.C. Transmitting Station at Stagshaw, Northumberland. The Transmitting Competition was won by G3LKZ, the runner-up being G8AO. B.R.S. 20185 won the Receiving Contest, with N. Reed as runner-up. The Constructional Competition was won by G2BCY with a power pack, g.d.o. and wavemeter. At the meeting on July 30, at Trinity House Social Centre, Laygate, G3LLI is to give a talk on his experiences since getting his licence.

Tees-Side Amateur Radio Club.—At the A.G.M. the following were elected: *Chairman*—J. B. Harding (G3JYH); *Hon Treasurer*—A. E. Moon (G3KBM); *Hon. Secretary*—A. L. Taylor (G3JMO), 12 Endsleigh Drive, Middlesbrough. The club meets on alternate Fridays throughout the year at Settlement House, Newport Road, Middlesbrough.

Thames Valley Amateur Radio Transmitters' Society.—As part of the society's programme to mark the occasion of its Silver Jubilee, a successful river trip from Windsor to Marlow and back took place on June 15. At Windsor, the President (Leslie Cooper, G5LC) welcomed 91 members and friends aboard the launch *Sonning*. Among those on the trip were Stanley Vanstone, G2AYC (President, Sutton and Cheam Radio Society), Fred Lambeth, G2AIW (Region 7 Representative), "Digger" Hancock, G3JNH (Kingston Radio Society) and Horace Cullen (G5KH).

Torbay Amateur Radio Society.—At the society's June meeting at the Y.M.C.A., Torquay, D. Webber (G3LHJ) gave a talk on "A Portable Trans-receiver," illustrated with a demonstration. *Hon. Secretary:* G. Western (G3LFL), 118 Salisbury Avenue, Barton, Torquay.

DERBY MOBILE RALLY

Markeaton Park, Derby

(On the Derby ring road between Kingsway and Broadway)

Sunday, August 17, 1958

Facilities for boating, miniature golf, tennis. Gardens and car park (admission free). Exhibition. Raffle. Junk Sale. Refreshments available.

RALLY STATIONS

G3ERD/P on 1·8 Mc/s G3LTL on 3·5 Mc/s

G3EEO/A on 144 Mc/s

Organized by the Derby and District Amateur Radio Society

Forthcoming Events

DETAILS FOR INCLUSION IN THIS FEATURE SHOULD REACH THE APPROPRIATE REGIONAL REPRESENTATIVES NOT LATER THAN THE 18th OF THE MONTH PRECEDING PUBLICATION. T.R.s AND CLUB SECRETARIES ARE REMINDED THAT THE INFORMATION SUBMITTED MUST INCLUDE THE DATE, TIME, VENUE OF MEETING, NAME OF LECTURER OR DETAILS OF ANY OTHER SPECIAL EVENT BEING ARRANGED.

REGION 1

Blackpool (B. & F.A.R.S.).—July 16, 7.30 p.m., Gadsby Street, Nelson Road. ("Receivers," R. H. Hammans, G2IG).

Bury (B.R.S.).—August 12, 8 p.m., George Hotel, Kay Gardens. ("Gimmicks for the Ham Shack" by J. Crux, G3JAG).

Stockport (S.R.S.).—July 16, 8 p.m., Blossoms Hotel, Buxton Road. ("Receiver Alignment" by A. Smith, G3AYT).

Wirral (W.A.R.S.).—July 18, 4 Hamilton Square, Birkenhead. ("V.H.F. Apparatus" by H. Schroeder).

REGION 2

South Shields (S.S. & D.A.R.C.).—July 30, 7.30 p.m., Trinity House Social Centre, Laygate, South Shields. ("My experiences since being licensed," M. Chesser, G3LLI).

REGION 3

Birmingham (Slade).—July 18, 7.45 p.m. ("Installation of Mobile Equipment" by G3GVN/M); August 15 (Visit to Birmingham City Police Radio Room), Church House, High Street, Erdington.

Coventry.—July 18, 7.30 p.m., Vine St. Schools, Coventry. (Formal Meeting).

Stourbridge & District (A.R.S.).—July 18, 8 p.m., White Horse, Amblecote. (Informal Discussion). August 12, 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge. (Talk and Film).

REGION 4

Derby (D. & D.A.R.S.).—July 23 ("For the Listener" by B. J. C. Brown); July 30, (Open Evening); August 6 (Surplus Gear Auction Sale); August 13 ("Ultra Linear Modulation" by W. H. Jones (G3JXC), 7.30 p.m., Room 4, 119 Green Lane, Derby; July 27, D.F. Contest, 1·8 Mc/s Band for President's Trophy; August 17, Mobile Rally, Markeaton Park, Derby.

Ilkeston (I & D.A.R.S.).—July 17 ("Reactivation of Cathode Ray Tubes" by F. Meigh); July 24 (Lecture and Demonstration on Antennas) 7.30 p.m., Room 5, College of Further Education, Field Road, Ilkeston.

REGION 7

Acton, Brentford & Chiswick.—August 19, 7.30 p.m., A.E.U. Rooms, 66 High Rd., Chiswick. ("Mobile Operation" by G2CAJ).

Barnet & District.—June 24, 7.30 p.m., No. 1374 Squadron, Air Training Corps, Gloucester Rd., New Barnet. (Junk Sale and talk on Amateur Radio by J. Douglas Kay, G3AAE).

East Molesey (T.V.A.R.T.S.).—August 6, Carnarvon Castle Hotel, Hampton Court. (Talk by F. Hicks-Arnold, G6MB).

Enfield.—July 20 ("R.A.E.N." by C. H. L. Edwards, G8TL), August 17 (Tape Lecture), 3 p.m., George Spicer School, Enfield.

Harrow (R.S.H.).—August 8, 8.15 p.m., Science Laboratory, Roxeth Manor County Secondary Modern School, Eastcote Lane, South Harrow. ("Brains Trust.")

Holloway (G.R.S.).—Mondays & Wednesdays (RAE & Morse), Fridays (Club) 7 p.m., Montem School (ex Isledon School), Hornsey Road, N.7.

Norwood & South London.—July 19, Windermere House, Westow St., Crystal Palace. (International Geophysical Year: G. M. C. Stone, G3FZL and C. E. Newton, G2FKZ).

Slough.—August 4, (Discussion Group); September 1 (Discussion Group), 7.45 p.m., Plough Hotel, Wexham Street, Wexham.

REGION 9

Bath.—July 21, 7.30 p.m. ("From Carborundum to Quartz," Chairman, G2ZR), 12 James Street West. (No meeting in August.)

Bristol.—July 18, 7.15 p.m. ("An Introduction to V.H.F." by C. N. Chapman, G2HDR, and "B.R.S. Forum"; a discussion on matters of interest to the Short Wave Listener). Carwardine's Restaurant, Baldwin Street.

REGION 10

Port Talbot.—August 5 (General Discussion); August 19, 7.30 p.m., 15 Holland Street, Port Talbot. R.A.E. Instruction.

REGION 13

Falkirk.—Summer Recess. Next meeting August 29.

Glasgow. — Summer Recess. Next meeting August 29.

REGION 14

Aberdeen (A.A.R.S.).—August 1 ("Ohm's Law—Practical Applications," L. Hardie, GM2FHH) August 8 (Visit to Coast Radio Station at Stonehaven); August 15 (Mullard Films "Principles of Ultrasonics" and "Special Quality Valves"); August 22 (Building Competition followed by "Hints and Kinks"); August 29 ("Mathematics and the R.A.E.", G. T. Donaldson, GM3FKS), 7.30 p.m., 6 Blenheim Lane.

DATES FOR YOUR DIARY

July 21-26.—I.A.R.U. Region 1 Conference, Bad Godesberg, Germany.
August 26-September 6.—National Radio Show, Earls Court, London.
August 31.—G6UT's Annual Ham Party.
September 14.—Woburn Abbey Mobile Rally.
September 21.—Bridlington O.R.M.
September 21.—Lincoln Mobile Rally.
October 10.—Old Timers' Dinner, The Horseshoe Hotel, Tottenham Court Road, London, W.C.1.
October 25.—Aberdeen O.R.M.
October 26.—Edinburgh O.R.M.
November 26-29.—Radio Hobbies Exhibition, Horticultural Society Old Hall, London.
December 12.—Annual General Meeting.

Regional Representatives

THE following is a list of R.S.G.B. regional representatives and the names of their respective regions:

Region 1.—North Western. B. O'Brien (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.
Region 2.—North Eastern. J. R. Petty (G4JW), 580 Redmires Road, Sheffield 10, Yorkshire.
Region 3.—West Midlands. W. A. Higgins (G8GF), 28 Kingsley Road, Kingswinford, nr. Brierley Hill, Staffs.
Region 4.—East Midland. E. S. G. K. Vance, M.B. (G8SA), 43 Blackwell Road, Huthwaite, Sutton-in-Ashfield, Notts.
Region 5.—Eastern. T. A. T. Davies (G2ALL), Meadow Side, Comberton, Cambridge.
Region 6.—South Central. L. W. Lewis, (G8ML), 117 Fairview Road, Cheltenham, Gloucestershire.
Region 7.—London. F. G. Lambeth (G2AIW), 21 Bridge Way, Whitton, Twickenham, Middlesex.
Region 8.—South Eastern. E. R. Dolman (G2DCG), 20 Canterbury Road, Margate, Kent.
Region 9.—South Western. W. J. Green (G3FBA), 82 Bloomfield Avenue, Bath, Somerset.
Region 10.—South Wales. C. Parsons (GW8NP), 90 Maesycoed Road, Heath, Cardiff, Glam.
Region 11.—North Wales. F. G. Southworth (GW2CCU), Samlesbury, Bagillt Road, Holywell, Flintshire.
Region 12.—East Scotland. A. G. Anderson (GM3BCL), "Helford," Pitfodels, Aberdeen.
Region 13.—South-East Scotland. G. P. Millar (GM3UM), 8 Plewlands Gardens, Edinburgh 10.
Region 14.—West Scotland. D. W. R. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4.
Region 15.—Northern Ireland. J. William Douglas (GI3IWD), 54 Kingsway Park, Cherryvalley, Belfast, Northern Ireland.
Region 16.—East Anglia. H. H. Lowe (G2HPF), "Akabo," Main Road, Boreham, Chelmsford, Essex.
Region 17.—Southern. M. P. Nicholson (G2MN), Ranworth, South Leigh Road, Warblington, Havant, Hants.

Do drop in at
THE RADIO SHOW
AUG. 27 · SEPT. 6
and meet your friends on the R.S.G.B. Stand No. 306 in the Gallery

Contests Diary

1958

September 6-7	-	V.H.F. National Field Day[1]
September 6-7	-	European V.H.F. Contest
September 6-7	-	1250 Mc/s Tests
September 7	-	D/F National Final (organised by Slade Radio Society)
September 14		Low Power Field Day
September 28	-	R.A.E.N. Rally
October 4-5	-	Low Power Contest
October 4-5	-	VK/ZL DX Contest (Phone Section)
October 11-12	-	VK-ZL DX Contest (C.W. Section)
November 8-9	-	Second 1·8 Mc/s Contest
November 15-16	-	Second 70 Mc/s Contest
November 22-23	-	21-28 Mc/s Telephony Contest

[1]Details in this issue.

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.

Off-Loading the Frequencies

DEAR SIR,—Despite much talk on the simplification of s.s.b. transmitter circuits, the fact remains that s.s.b. operation is still a tough proposition when seen in light of the theoretical standards set by the R.A.E. The construction and alignment of such equipment requires a great deal more skill, time and expense than the average a.m. gear. Moreover, when the average newly licensed amateur sets up for the first time he still has to acquire operational and practical skills which the standards for the licence do not require. The idea of the licence is to allow the holder to " self train " himself both in electrotechnical and operational techniques. Just as the average " G3M " is expected to be initially slow at Morse and faltering with his 'phone technique, so too should the same average " G3M " be expected to be rudimentary in his first constructional efforts. Throwing in s.s.b. to confuse the issue would be most unfair. It is far better that the beginner should teeth himself on simple a.c.w. and a.m./f.m. equipment whilst finding his feet in the hobby.

I nevertheless admit the great efficiency and space saving attributes of the system. Sooner or later, all those interested in station efficiency and sound contacts will be forced to the conclusion that s.s.b. offers more than any other telephonic mode of communication on the amateur bands. No, let the inherent superiority of A3a prove itself to each person as time progresses rather than ram its intricacies down originally unwilling or undeveloped throats. Already there has been a remarkable quantity of conversions to the mode, and for this reason I deplore the clannishness of the exponents of it. Why s.s.b. is unable to live at comparative peace and co-operatively with the other systems I fail to see. Although I disagree entirely with any move officially or unofficially to enforce s.s.b., the DX chat on s.s.b. that goes on outside the primarily DX columns of both the BULLETIN and the *Short Wave Magazine* should be compelled to combine with the rest. It is there that s.s.b. will score its greatest success, by displaying its own merits on a competitive basis that inclines heavily in its own favour.

Yours faithfully,

St. Catharine's College, Cambridge. IAN DAVIES (G3KZR, ex ZB1ZR).

DEAR SIR,—Apropos " Off-Loading the Frequencies" (discussed in *Current Comment*, April):

If all those amateurs whose a.m. transmissions occupy excessive channel space due to overmodulation, audio distortion and bad adjustment are forced to change over to s.s.b. operation, surely they will have a much more potent and effective weapon with which to do their damage!

I feel that a better approach towards finding more " kilocyclic elbow room " would be to have included as terms of the Amateur Radio station licence regulations after the following style:

(1) Every amateur a.m. telephony station shall be equipped with an effective overmodulation indicator (see 1958 *A.R.R.L. Handbook*, p. 302 for an example of a simple overmodulation indicator).

(2) Every amateur telephony transmitter shall be equipped with a filter to reduce audio frequencies above five kilocycles (see 1958 *A.R.R.L. Handbook*, p. 264).

The second regulation could be framed so that the minimum filtering required by law would be that provided by a prototype filter in the output of the audio amplifying stages.

Let us witness a general improvement in conventional a.m. transmissions before advocating a mass exodus to the wilds of s.s.b.

Yours faithfully,

Stretford, Manchester. JOHN R. BLACKMAN (G3MKS).

DEAR SIR,—In spite of the implication that it did not represent the " official " view, the first " *Current Comment* " in the April issue of the Society's journal must have raised very grave doubts in the hearts of many members and should not have been printed, at least, as a leading article.

At a time when several forces are trying to oust U.K. amateurs from Top Band, to allow the article, written by a member of Council, to be published as an editorial, was not at all politic and could be construed by those outside the Society who read it, as an abandonment by the Society of its Top Band policy. It is only a few years since we had a slice cut from one end of the band.

We, who are users of the band, are most concerned by the suggestion that it should be made " c.w. only." Surely that could be said of any band. To talk of redundant communication being shifted to more suitable parts of the spectrum is a most selfish attitude, as at least 95 per cent of all amateur communication, could, without much imagination, be termed redundant, and would leave a very few so-called specialists in sole possession of the band in question. A case of " Get off the bus—I want two seats." Top Band is no more crowded than any other band; and why not shift all the rubbish off the 'phone end of 3·5 Mc/s.?

To say that 14 Mc/s is inappropriate for cross town work is ridiculous, as there have been many occasions recently when the band has been utterly devoid of any DX signals.

No Sir—we should fight for what we believe we should have—'phone and c.w. on *all* bands—both shared and exclusive—and let us not forget that Top Band is the nursery of many newly licensed U.K. amateurs, and in spite of the final sentence under review, we maintain that it is very much easier and cheaper to get started on Top Band than on Two.

Yours faithfully,

J. W. RUSSELL (G2ZR). C. P. GAY (G3MFR).
S. G. MARSH (G2CZU). A. G. BLACKMORE (G3FKO).
A. G. EMBLETON (G3BNF).

Bath, Somerset.

Advertising over the Air

DEAR SIR,—Mr. Robinson (G5UP) is to be thanked for raising the vexed and vital topic of advertising over the air. However, at the risk of being proscribed as an " upstart " by some of the O.T.s (or, likelier, some of the not-so-O.T.s!), I venture to dispute Mr. Robinson's interpretation of the licence conditions.

Admittedly Clause 16 of the licence forbids the use of the station for advertisement purposes, but, unfortunately, it fails to reveal any definition of the term. Surely advertising, in the most normally accepted sense, implies an inducement to buy. While transmissions to the effect that " Schultz's Sets are Smashing—send s.a.e. for price list " might raise an official eyebrow, I cannot believe that favourable comment on a particular piece of commercial equipment *in use by the station concerned* would result in a bleak communication postmarked London, E.C.1. Indeed, I submit that such comment is a matter of a personal nature in which the Licensee or the person with whom he is in communication has been directly concerned and as such is permitted by Clause 1 (b) (i) of the Amateur (Sound) Licence.

I agree with G5UP that there is no place for the cheap forms of *advertising* to which some stations may wander perilously close, but I cannot understand the somewhat narrow view frequently advanced by a number of the purists to whom the merest whisper of a Trade Name on the air is an event apparently immeasurable in terms of human horror.

Yours faithfully,

G. C. MOORE (G3MCY).

Officers' Mess, R.A.F. Tangmere, Chichester, Sussex.

Unlicensed Operation

DEAR SIR,—Although unable to co-operate in person because of domestic commitments may I be allowed in this matter to strengthen the hands of the South Woodford trio, G2BCX, G6HU and G3HWG, by giving a sobering extract from the Berne List (the " Mariner's Callbook ").

This shows that since May 1, 1953, no less than 42 coast stations in the U.K. and on the near Continent are operating on

31 different frequencies between 1799 and 1955 kc/s. If these maritime channels are respected as they should be, a total of only 16 unoccupied frequencies are available for amateurs to settle on and these are only " clear " when no Link call (ship's radiophone linked to the inland telephone services) is in progress and when normal traffic is not being passed by the coast stations on either side of the chosen amateur channel. As pirates are also not immune from coastal station QRM, their intrusion in Top Band (or any amateur band) can only be on one of these precious frequencies and at the expense of the authorised amateur occupants.

Yours faithfully,

Southbourne, Bournemouth, Hants. N. P. SPOONER (G2NS).

European Band Plan

DEAR SIR,—I have the impression that a number of U.K. amateurs think that the European Band Plan (first put forward by the R.S.G.B.) applies solely to us in the U.K. In point of fact the Plan, which is of a voluntary nature, has been accepted by nearly all amateurs in Europe. Until recently the only country to flout the Plan was Spain but, unfortunately, there is now another country where far more amateurs are daily using telephony in the telegraphy section of the 7 Mc/s band (i.e., below 7050 kc/s), and that country is the United Kingdom.

There are two possible explanations: (1) the decision of the G.P.O. to allow newly licensed amateurs to use phone immediately, which has led to congestion in the phone section; (2) few stations are equipped with efficient means of frequency measurement (it is, I believe, still compulsory to possess a wavemeter).

A few offenders against the Plan—which is after all a Gentleman's agreement—say they will continue to use telephony where they wish. To such people I would point out that we could all adopt the same attitude but if we did so the bands would very soon become a veritable shambles. Operating conditions were bad enough before the Band Plan was introduced; they would be far worse now with hundreds of new stations on the air.

Yours faithfully,

Prestatyn, N. Wales. J. PHILIP EVANS (GW8WJ).

RTTY

DEAR SIR,—May I support the sentiments of VE7KX's letter in the May BULLETIN? This is an aspect of Amateur Radio which for some reason appears to have been completely ignored this side of the Atlantic. Perhaps this is because of the difficulty of obtaining much information on Amateur Teletype and the apparent scarcity of equipment. There must be, within the Society, some who have the knowledge and perhaps know of suitable sources for obtaining equipment which could be pressed into amateur service. Would it not be a good idea if the Society tried to encourage some RTTY activity in this country? Perhaps a small group of enthusiasts could be formed, who could help each other in the way suggested in VE7KX's letter. Great encouragement has been given to the phone men to use s.s.b. Why not give similar encouragement to the c.w. man to get really up to date?

Yours faithfully,

Oulton Broad, Lowestoft. ARTHUR C. GEE (G2UK).

It's the Aerial that Counts

DEAR SIR,—I should like to support the views expressed by W1OHA in his letter published in your April 1958 issue. It is my experience that kilowatts only make for trouble—it is the good aerial system that makes DX possible.

May I suggest to all the high power operators who are interested in working long distance stations that they should study aerial theory, paying particular attention to what has been written about aerial height, the number of half-waves required for a particular band, vertical and horizontal polar diagrams. Having done that I recommend them to reduce their power to 75 watts—then compare their electricity consumption after a month with that of the month before!

At the present time I am using vertical dipoles for 21 and 28 Mc/s placed under the roof, and with an input of 40 watts to an 807, contacts have been made recently with 42 of the United States in all ten districts, as well as with VE5, 7, PJ2, VK2 etc.

With best wishes for the future of R.S.G.B.

Yours faithfully,

Brussels, Belgium. F. BAEYENS (ON4EG).

DEAR SIR,—Having read that excellent letter on the subject of QRO from Mr. W. L. Hill (ex-G5WI) in the February issue I can no longer restrain my " verbosity." . . . I would like to make two points.

I have never taken part in a contest here for the very reason that my time is wasted in competition with the kilowatts-plus in this part of the world; and I know that many other amateurs do not for the same reason.

Secondly, the original concept of the amateur in this field was experimentation not confabulation; and with increasing knowledge of efficiency in radiation the tendency should be towards reduced power.

In the past three years I have worked only three stations (on h.f.) with inputs of less than 35 watts. It is time, I fancy, that our aims were subject to review.

Every wish to the Society for continued success.—S. B. SPENCER (VE7AMD).

Small Polls

DEAR SIR,—I was very pleased to see letters from G3AAZ (January) and G3BID (April) published, as similiar things have been said at many meetings. These members are to be applauded for their live interest, but I cannot see that their ideas will in any way affect the issue.

G3AAZ may see through a " lurid " election address, but most wouldn't; even so, there are millions of people in this country who have chosen on election addresses, but have they seen or could they see the promises implemented?

To take a case in point: say a candidate was to " get in " on a favour for contests—what could he do with an adverse body of Council, or, supposing information was to hand that our occupancy of a shared band was somewhat in jeopardy, would he, or could he, encourage our members to clutter up the band even more by running more contests?

Could, or should, any Council member sit at a meeting with previously conceived irrevocable ideas?—what is the value of debate?

The great value of the present Councils—despite being ponderous—is in their size; many more ideas emerge which ensures the greater possibilities of the wisdom of the final decision.

G3AAZ has got something and G3BID agrees: it would be a forward step if candidates were nominated six months before their election, on the understanding that they would be available, as far as is practicable, to attend meetings by invitation. This would have snap, not so much zonally, as nationally, but provided (seeing the Society has not such funds) there is agreement between the candidates and the meeting organizers as regards expenses. This assumes that not all nominees have funds, though they must, obviously, have time. It is known that probably only about 10 per cent of the membership attends meetings, but the idea is worthy of Council's consideration.

Has anyone thought why our meetings are so poorly attended? I leave this with the reader.

With other societies, such as model engineering, photography etc., nothing would be seen by members, nothing discussed and members would be unknown to each other, unless they met. Our members meet and discuss on the air and are, unfortunately, thus satiated—they're more interested in their hobby than their Society; they don't know how selfishly foolish they are.

Yours faithfully.

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

PSE Don't QSL

DEAR SIR,—I am receiving S.W.L. and QSL cards direct in increasing numbers. It would perhaps save some of your readers both money and grief if I could, through your columns, point out that in no circumstances does G3CMJ send QSL cards (not having had any printed) and that the receipt of QSL and S.W.L. cards is of no interest to me.

Yours truly,

Salisbury, Wilts. REGINALD A. TITT (G3CMJ).

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TVI Problems

DEAR SIR,—I read with interest about the TVI problem of G3FPQ—it seemed to be a résumé of my own experience!

My transmitter, basically the first G5RV exciter driving the G5RV 813 p.a., originally operated at Malvern, on all bands 3·5 to 30 Mc/s, and caused no interference to either my own or other TV sets. No aerial filter was necessary but an aerial coupling unit was used to match into a 138 ft. per leg " V " beam fed with 600 ohm line. On moving to Mill Hill it was obvious that the harmonic radiation needed reducing and that a sensitive harmonic indicator—not just a crystal diode—was essential to indicate the relative strengths of Band I and my harmonic signals.

The p.a. screening box was improved by ensuring adequate bonding of the screens (see " *TVI can be Cured*," BULLETIN, April 1954) and insulated couplers and shafts were fitted to controls to prevent coupling out of the box along these spindles. As a considerable amount of harmonic energy was leaking out on the 813 heater leads, a screened double filter was inserted using 1000 pF ceramic feed-through condensers. Screened plugs, sockets and leads were used for all interconnections. The clamper valve was fitted with its own separate screening can. The original condensers specified by G5RV were not very effective at 50 Mc/s, e.g., a 0·001 μF condenser having a lead length of 1 in. resonates at approximately 25/30 Mc/s. Attention to these points produced a worthwhile improvement but the harmonic radiation was still too high.

More in desperation than through logical reasoning the exciter was next operated on. Bypass condensers were either replaced or paralleled by postage stamp mica types of 470 pF having very short leads. The drive to each of the wideband coupled stages was reduced to the minimum necessary whilst maintaining sufficient drive (12-15 mA) to the 813 p.a. In some cases the values of the grid leaks were raised. These alterations, together with improvements in the screening similar to the p.a. made the biggest contribution; the 42 Mc/s harmonic was reduced very considerably and low pass filters previously ineffective started to work. At no time, however, have I been able to obtain more than about 30db of attenuation either with my own filters or with two well-known commercial filters. My own filters gave over 60db attenuation when tested with a Signal Generator and valve voltmeter into a resistive dummy load.

A two-element Yagi aerial fed by co-axial cable and balanced by an " EMI Balun " or " Pawsey Stub " is used both on the 21 Mc/s and the 28 Mc/s bands (see " *Aerial Reflections*," BULLETIN, December 1955). In the case of the 21 Mc/s Yagi 45 ohm cable is used to match the estimated 40 ohm radiator. The balun, which consists of a quarter wavelength of similar cable, can be adjusted to length with a g.d.o. as described by G6CJ but note that since the fork is mainly airspaced the physical and electrical lengths will be nearly the same. Now a quarter wavelength at 21 Mc/s is obviously a half wavelength at 42 Mc/s thus the feeder is effectively shorted at 42 Mc/s and very little second harmonic energy is fed into the radiator. My second harmonic, when operating in the 21 Mc/s band, is now about 20db down on the Channel 1 sound and vision carriers at a distance of 2 ft. from the transmitter and approximately 60db down at 30 ft. as measured on a 4 ft. vertical aerial. One small crystal set close to the transmitter, however, causes a wipe-out on vision.

Sad to say, the TV set which started all this and which is some 100 ft. away suffered interference as before until a simple home-made high pass filter (three condensers and two coils) was installed which cleared the trouble and now so far as I know, the G.P.O., my neighbours, and myself complete with two TV sets, are happy when I operate on 21 and 28 Mc/s.

At present the field strength of the third harmonic of my 14 Mc/s signal is above the level of the B.B.C. Channel 1 signal. In my opinion this is due (*a*) to the fact that the exciter stage which was tripling to 21 Mc/s is now doubling to 14 Mc/s and is overdriving the following stage and (*b*) that the aerial in use is a ground plane with no balun or other means of suppressing the third harmonic at the radiator.

The moral seems clear—if you don't generate harmonics you can't radiate them which in turn suggests a transmitter with its driving stages on the same frequency as the p.a. (G5OX regularly uses a 72 Mc/s v.f.o. to drive his 144 Mc/s transmitter) or perhaps a series of twin triodes used as class A push push doublers, or even mixing techniques as used in s.s.b. transmission.

Mill Hill, London, N.W.7. Yours faithfully. C. COLLINS, A.M.BRIT.I.R.E. (G8SC).

DEAR SIR,—I read with sympathy G3FPQ's letter about TVI (in the May BULLETIN), as his experience seems to be similar to mine on 14 and 21 Mc/s. Low pass filters often have little or no effect in cases where interference is due to harmonics and not to blocking by fundamental overload, 14 Mc/s i.f.s, etc.

I believe the cause is due to the " rusty bolt effect "—generation of harmonics by non-linear elements. In my opinion, this is a frequently overlooked source of TVI and can be serious even with low power installations. It was first brought to my attention by G2IG in his article *Diagnosis of TVI* (BULLETIN, June 1956) and, in his words, " sheer dogged searching or inspired deduction are needed to find it and attempt a cure."

Sometimes I can run 150 watts on 14 Mc/s without a shade of interference; at others, perhaps later the same day, 10 watts will remove the picture. On occasion I have been able to find the offending " rusty bolt." Once I noticed two galvanized wires supporting some roses in the garden. I separated the wires and the interference went. Another time the harmonic indicator showed a big reading beside a spare wire mattress in a room near the aerial. Moving the mattress improved matters.

However, I have found no permanent cure. I suspect the chief offender to be the mains wiring, which is very old, in poor condition and gives large erratic harmonic readings. Fortunately, it is not my house—I am only in digs! Perhaps the TV aerials near G3FPQ are old and corroded.

The rusty bolt effect will not explain interference from a 28 Mc/s transmitter in the Channel 1 TV area unless the set responds to 56 Mc/s. I presume G3FPQ and the G.P.O. engineers have tried high pass filters and I can only suggest an open circuit quarter wave coax stub at 28 Mc/s across the TV aerial socket. I found this effective with one old straight set which was quite unaffected by a high pass filter.

Finally, if all else fails, I suggest to G3FPQ that he should (1) move nearer the Crystal Palace; or (2) move to another area, e.g., Holme Moss, where the harmonics of 14 Mc/s and above fall outside the TV band; or (3) go mobile!

Yours faithfully,

Maidenhead, Berkshire. A. H. B. BOWER (G3COJ).

Government Surplus Transmitters

DEAR SIR,—Recent inquiries were made by me with regard to the purchasing of various types of Government surplus transmitters and transmitter/receivers. One of my queries concerned the necessity of a licence to use the sets for transmitting, and the following were the replies I received:

Dealer A.—" You are supposed to have a licence but as the operating frequencies are so remote from those used by Commercial stations *no* licence to transmit is necessary."

Dealer B.—" A G.P.O. licence is required." He was honest enough to say " we have been warned by the G.P.O. to point out this requirement."

Dealer C.—" No licence for transmitting is necessary, providing you don't cause interference to other services."

Dealer D.—Replied that he knew nothing about licences but said he would fix me up with a transmitter/receiver.

It should be noted that three of the dealers are advertisers in the R.S.G.B. BULLETIN and other well known amateur and professional radio journals.

Other reports, from reliable sources, have also been received concerning quotations by dealers to customers when inquiries regarding a transmitting licence have been made, particularly by younger persons. Invariably they are told that *no licence is necessary*.

It would appear, therefore, that some immediate action is required both by the G.P.O. and the various radio periodicals, by announcements to the effect that a G.P.O. licence must be held if these Government surplus transmitters and tranceivers are used for transmitting and that a penalty of a fine or imprisonment can be the consequences for having no licence.

Yours faithfully,

South Woodford, London, E.18. F. C. JUDD (G2BCX).

(A statement dealing with the sale of Walkie-Talkie Equipment appears under " Society News."—EDITOR).

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1C5	12/6	6AG5	6/6	6H6GTG	3/-	7A7	12/6	12SG7	8/6	77	8/-	DF96	10/-	ECF80	13/6	EZ80	9/6	OA10	12/6	SP4(7)	15/-	UY41	8/6
1D6	10/6	6AK5	8/-	6H6GTM	3/6	7B7	8/6	12SH7	8/6	78	8/6	DH63	10/-	ECF82	13/6	EZ81	9/-	OA70	5/-	SP41	3/6	UY85	10/6
1H5GT	11/-	6AL5	6/6	6J5G	5/-	7C5	8/-	12SJ7	8/6	80	9/-	DH76	7/6	ECH35	9/6	FW4/800		OA71	5/-	SP42	12/6	V1507	5/-
1L4	6/6	6AM6	7/6	6J5GTG	5/6	7C6	8/-	12SK7	8/6	83V	12/6	DH77	8/6	ECH42	11/-		10 -	OB2	17 6	SP61	3/6	VLS492A	£3
1LD5	5/-	6AQ5	8/6	6J5GTM	6/-	7H7	8/-	12SQ7	8/6	85A2	15/-	DK91	8/-	ECH81	9/-	GZ30	10/6	OC72	30/-	SU61	10/6	VMP4G	15/-
1LN5	5/-	6AT6	8/6	6J6	5/6	7Q7	9/-	12SR7	8/6	150B2	15/-	DK92	10/6	ECL80	14/-	GZ32	12/6	P61	3/6	TP22	15/-	VP2(7)	12/6
1N5GT	11/-	6AU6	10/6	6J7G	6/-	7S7	10/6	12Y4	10/6	807	7/6	DK96	10/-	ECL82	12/6	GZ34	14/-	PABC80	15/-	U16	12/-	VP4(7)	15/-
1R5	8/-	6B4G	6/6	6J7GT	10/6	7V7	8/6	14R7	10/6	956	3/-	DL3	15/-	EF36	6/-	H30	5/-	PC84	9/-	U18/20	10/-	VP13C	7/-
1S5	8/-	6B7	10/6	6K7G	5/-	7Y4	8/-	14S7	17/-	1203	7/-	DL33	9/6	EF37A	8/-	H63	12/6	PC85	12/6	U22	8/-	VP41	7/6
1TA	6/6	6B8G	4/6	6K7GT	6/-	8D2	3/6	19AQ5	11/-	4033L	12/6	DL66	15/-	EF39	6/-	HABC80	13/6	PC86	9/-	U25	15/6	VR105/30	
1U5	10/-	6B8GTM	5/-	6K8G	8/-	8D3	7/6	19H1	10/-	5763	12/6	DL92	7/6	EF40	15/-	HK90	10/-	PCF82	12/6	U31	10/-		9/-
2A7	10/6	6BA6	7/6	6K8GT/G		9D2	4/-	20D1	16/-	7193	5/-	DL94	9/-	EF41	9/6	HL23	10/6	PCL82	12/6	U43	10/6	VR150/30	
2C26	4/-	6BE6	7/6		11/-	10C1	15/-	25L6GT	10/-	7475	7/6	DL96	10/-	EF42	12/6	HL41	12/6	PCL83	14/-	U45	10/6		9/-
2D13C	7/6	6BJ6	7/6	6L6G	9/6	10F1	19/6	25Y5	10/6	9002	5/6	DL810	10/6	EF50(A)	7/-	HL133DD		PEN40DD		U50	8/-	VT61A	5/-
2X2	4/6	6BR7	11/6	6L18	13/-	10F9	11/6	25Y5G	10/-	9003	5/6	DM70	8/6	EF50(E)	5/-		12/6		25/-	U52	8/6	VT501	5/-
3A4	7/-	6BW6	9/6	6N7	8/-	10F18	12/6	25Z4G	10/-	9006	6/-	EA50	2/-	EF54	5/-	HVR2	20/-	PEN45	19/6	U76	7/6	W76	7/6
3A5	12/6	6BW7	8/-	6Q7G	10/-	10LD3	8/6	25Z5	10/6	AC6PEN	7/6	EA76	9/6	EF73	10/6	HVR2A	6/-	PEN46	7/6	U78	7/-	W81M	6/-
3B7	12/6	6BX6	8/-	6Q7GT	11/-	10P13	17/6	25Z6G	10/-	AC/HL/		EABC80	9/-	EF80	8/-	KF35	8/6	PL82	10/-	U251	15/-	X61	12/6
3D6	5/-	6C4	7/-	6R7G	10/-	11E3	15/-	28D7	7/-	DDD	15/-	EAC91	7/6	EF85	8/-	KL35	8/6	PL83	11/6	UABC80		X63	10 -
3Q4	7/6	6C5	6/6	6SA7GT	8/6	12A6	6/6	30	7/6	AC/P4	8/-	EAF42	10/6	EF86	17/6	KT2	5/-	PM2B	12/6		10/6	X65	12/6
3Q5GT	9/6	6C6	6/6	6SC7	10/6	12AH7	8/-	30C1	9/-	AL60	10/-	EB34	2/6	EF89	10/-	KT33C	10/-	PM12	6/6	UAF42	10/6	X66	12/6
3S4	7/6	6C8	12/6	6SG7GT	8/-	12AH8	10/6	30F5	8/-	AP4	7/6	EB41	8/6	EF91	7/6	KT44	15/-	PM12M	6/6	UB41	12/7	XD (1·5)	6/6
3V4	9/-	6C9	12/6	6SH7	8/-	12AT6	10/6	30FL1	10/-	ATP4	5/-	EB91	6/6	EF92	5/6	KT63	7/-	PY80	9/-	UBC41	8/6	XFW10	6/6
5U4G	8/6	6C10	12/6	6SJ7	8/-	12AT7	8/-	30L1	9/-	AZ31	10/-	EBC33	7/6	EL32	5/6	KTW61	8/-	PY81	9/-	UBF80	9/6	XFY12	6/6
5V4G	12/6	6CH6	12/6	6SK7GT	8/-	12AU7	7/6	30P12	13/6	BL63	7/6	EBC41	10/-	EL41	11/-	KTW62	8/-	PY82	9/-	UBF89	10/6	XH (1·5)	6/6
5X4G	12/6	6D6	6/6	6SL7GT	8/-	12AX7	9/-	30PL1	12/6	CK506	6/6	EBF80	10/-	EL42	11/6	KTW63	8/-	PY83	9/6	UCC85	10/6	XSG (1·5)	
5Y3G	8/-	6E5	12/6	6SN7GT	7/6	12BA6	9/-	31	7/6	CK523	6/6	EBF89	9/6	EL81	15/-	KTZ41	8/-	QP21	7/-	UCH42	11/-		6/6
5Y3GT	8/6	6F6G	7/-	6S87	8/-	12BE6	10/-	33A/158M		CV63	10/6	EC52	5/6	EL84	10/6	KTZ63	10/6	QP25	15/-	UCH81	11/6	Y63	7/6
5Y4	12/6	6F6GTM	8/-	6U4GT	14/-	12E1	30/-		30/-	CV85	12/6	EC54	6/-	EL91	5/-	L63	6/-	QS95/10	10/6	UCL82	15/6	Z63	10/6
5Z3	12/6	6F8	12/6	6U5G	7/6	12J5GT	4/6	35/51	12/6	CV271	10/6	EC70	12/6	EM34	10/-	LZ319	9/-	QS150/15		UF41	9/-	Z66	20/-
5Z4G	10/6	6F12	7/6	6U7G	8/6	12J7GT	10/6	35A5	11/-	CV428	30/-	ECC31	15/-	EM80	10/6	MH4	7/-		10/6	UF80	10/6	Z77	7/6
5Z4GT	12/6	6F13	12/6	6V6G	7/-	12K7GT	7/6	35L6GT	9/6	D1	3/-	ECC32	10/6	EN31	34/9	MHL4	7/6	QVO4/7	15/-	UF85	10/6	Z719	8/-
6A8	10/-	6F17	12/6	6V6GTG	8/-	12K8GT	14/-	35W4	8/6	D42	10/6	ECC33	8/6	EY51(Large		MHLD6	12/6	R2	10/-	UF89	10/6	Z729	17/6
6AB7	8/-	6F32	10/6	6X4	7/-	12Q7GT	7/6	35Z3	10/6	D63	5/-	ECC35	8/6		12/6	ML4	12/6	R12	12/6	UL41	10/6		
								35Z4GT	7/6	D77	6/6	ECC81	8/-	EY51(Small									
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