NOVEMBER, 1963

RSGB BULLETIN

VOL. 39, No. 5

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

Volume 39 No. 5

November 1963

3/- Monthly

R.S.G.B. BULLETIN

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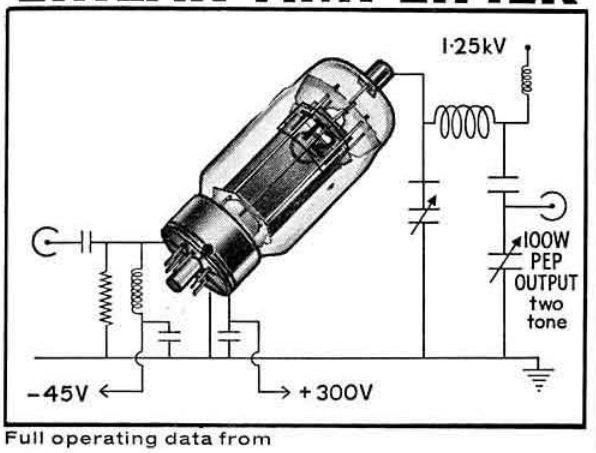

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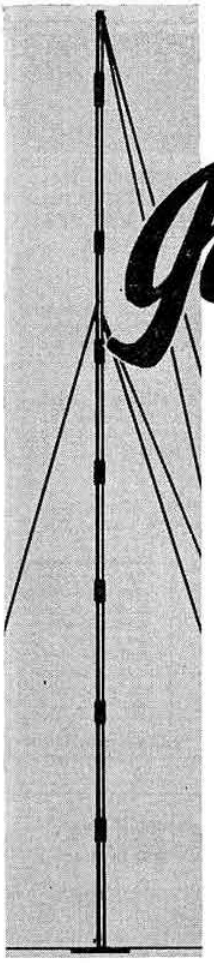

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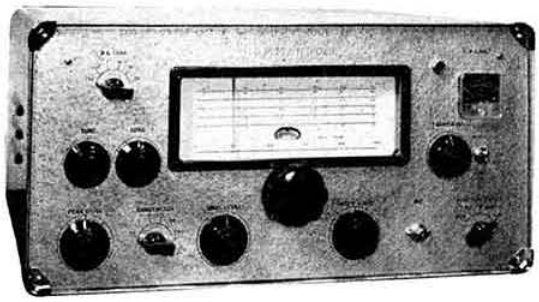

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Current Comment

discusses topics of the day

New Headquarters — Facing the Facts

JUST over two years ago, Major-General E. S. Cole, G2EC, then president of the Society, launched an appeal for funds to help to provide the Society with a new Headquarters. After an initially good response, donations have dwindled to what can only be described as a faltering trickle.

At the same time, the need for a new Headquarters has become a matter of great urgency. The lease on the present offices ran out in June—five months ago. Despite a continuous, time consuming and increasingly heartbreaking search, there is at this time no immediate prospect of the Society finding a new home. Fortunately, notice has not yet been given to quit the present cramped and inadequate offices on the fifth floor of New Ruskin House.

Many potentially suitable properties have been investigated in the last two years. Of these, a great proportion has proved unsuitable for the Society's purpose but there have been quite a number which seemed eminently suitable. In every case, however, snags have arisen to dash the hopes of those faced with finding the new offices: planning permission not obtainable for use of the building as offices, planning permission for use as offices due to run out in a few years; even, in one case, the ground landlord refused to consider an *amateur* organization such as the Society as suitable although architects, accountants and similar *professions* were acceptable.

The relative failure of the Headquarters Fund appeal is possibly due to our failure to describe exactly what type of Headquarters we have in mind. Suggestions have, in fact, ranged from a place in the country, with space for members' lounges, bar and restaurant, lecture halls, council and committee rooms, Headquarters station, administrative offices, car parks and aerial farms. Attractive though such a vision of the new Headquarters is, there seems little to justify such an establishment. The cost of upkeep would be far beyond the means of the Society with the subscription rate at its present level. And most of the facilities could only be used by a small fraction of the total membership.

What, then, do we *need* for a Headquarters office? Accommodation for the staff engaged in running the Society's day-to-day affairs and in the production of the BULLETIN and other publications, at least one reasonably large meeting room for the Council and Committees. In addition we require a reception room where members, prospective members and visitors can be interviewed in congenial surroundings instead, as is so often the case at present, in a room where two or more people are hard at work, or, even worse, in a store or despatch room or in a corridor. There must also be space available for the storage of the considerable stock of publications for the radio amateur now handled by the Society. It would also be good if there were space for a technical library.

These then seem to be the minimum requirements, which look like requiring an area of about 3000 square feet, a little over twice as much as that available in the present offices. With modern decorations and layout there is no reason at all why a suite of offices offering this accommodation should not make a Headquarters to be proud of, a Headquarters members would be pleased to visit and a Headquarters members would be glad to contribute towards.

The question of where Headquarters is to be located is one which has been argued over constantly since the idea of establishing a Headquarters worthy of the Society was first mooted nearly 20 years ago. From time to time, excellent cases have been made out for getting away from London to the heart of the country, possibly within easy reach of one of the motorways. We have strong inclinations towards a central point perhaps somewhere in the South Midlands, in the Stratford-on-Avon, Leamington Spa, Banbury and Oxford area. The idea of living only a few minutes from Headquarters is an appealing one. The life of commuters in the Greater London area is not to be envied.

On practical grounds, however, the case for remaining in London seems to be the most valid. London, whatever those of us born and brought up outside the Home Counties may feel, is the easiest place to get to: lines of communication all converge on London, an important consideration for a national organization with people frequently visiting. London, and its environs, also contains a high proportion of potential voluntary workers for the Society willing to serve on Committees and do other work. No doubt Committee men and other volunteers could be found elsewhere in the country but to find sufficient within reach of one another

(*Continued on page 298*)

A Modern Control System

Voice Control, Full Break-in and Differential Keying—but No Relays

By P. G. MARTIN, G3PDM*

FOR some time the writer endeavoured to develop an effective break-in system without using relays or negative power supplies, but as circuits which obtain bias voltages from rectified r.f. energy proved to have several shortcomings, the objection to negative supplies was eventually withdrawn. However, as relays are considered much less reliable than their electronic counterparts, and keying relays produce a disturbing amount of noise even when mounted on rubber, the objection to relays remained.

Requirements

To radiate a clean c.w. signal, free from chirps and clicks, differential keying, in which the v.f.o. is switched on before the p.a. and off after the p.a., is essential in any break-in system. Having deliberately avoided the use of electromagnetic devices, the operating time of a relay armature could

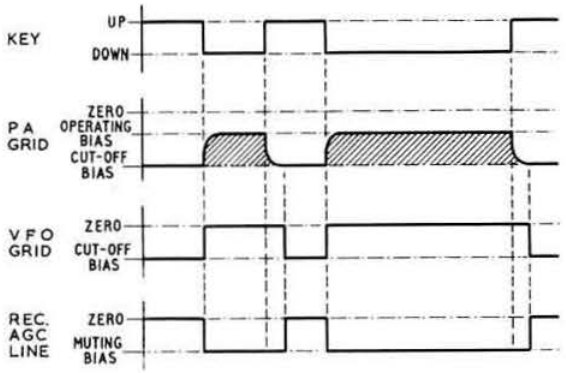


Fig. 1. Ideal keying waveforms at four points in a transmitter and receiver during transmission of the Morse character "A."

not be used to obtain a differential effect, and so an electronic substitute had to be found.

The waveforms of the voltages required at various points in a transmitter and receiver during keying are shown in Fig. 1. When the key makes contact, the v.f.o. must produce a signal immediately, and the receiver must also be muted to the side-tone level instantaneously. The p.a. must be switched on with a certain degree of exponential softening, to produce a signal free from key clicks. These "key-down" processes are quite easily obtained electronically.

When the key circuit is broken, the p.a. must switch off, also exponentially, but it is important that the return of the v.f.o. and receiver to the *receive* condition be delayed until the p.a. is completely cut off. Should this not be so (i.e., the v.f.o. is switched off while the p.a. is still conducting), the click of the sharply keyed v.f.o. will be carried through to the aerial, and the p.a. will be left in the undriven state for a short while—hardly a satisfactory arrangement!

* 1 Western Hill, Durham City.

Circuits have appeared in the past which possess some of the necessary facilities, but have usually required three well-regulated supplies of various voltages, and are not suitable for vox operation unless a zero impedance electronic switch can be devised. Apart from this, no complete circuits of effective break-in systems have been found in British or American amateur radio publications.

Fundamental Flip-Flop Circuit

The circuit adopted at G3PDM employs two double valves in flip-flop circuits, and will be shown in Fig. 3. Before describing details of the complete system, however, an outline of the action and properties of a simple flip-flop circuit may be helpful.

A twin-triode unit is shown in Fig. 2. If V1 is cut off, due to V_g being considerably less than V_k, only V2 will conduct, as the potential divider R_{a1}, R and R_g leaves V_{g2} above its cut-off point. When V_{g1} is gradually increased, a point will be reached where V1 begins to conduct, and the anode current I_{a1} will produce a greater voltage drop across R_{a1}. V_{g2}, and hence I_{a2}, will thus both decrease. As I_{a2} decreases, the common cathode voltage V_k follows, which makes the grid voltage of V1 more positive with respect to its cathode, leading to a further increase in I_{a1}. This action round the loop V1, R, V2, R_k continues until V2 is cut off and V1 conducts. Capacitor C is included to ensure that changeover takes place as quickly as possible. The changeover process is, of course, reversible.

If control grid muting is used in the receiver (by application of bias to the a.g.c. line), and grid block keying is used on the controlled transmitter stages, negative bias voltages will be available across the anode resistors of the flip-flop valves, provided the h.t. positive line is earthed, and the h.t. negative line is at approximately −300 volts. Unfortunately, because of the standing current through the resistor network R_{a1}, R, R_g, the anode voltage of V1 will never reach zero, and consequently that point is not suitable for control.

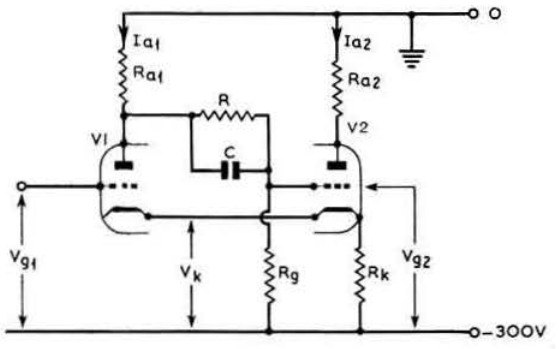


Fig. 2. The fundamental flip-flop circuit. The valve can be any double triode of reasonably high gain.

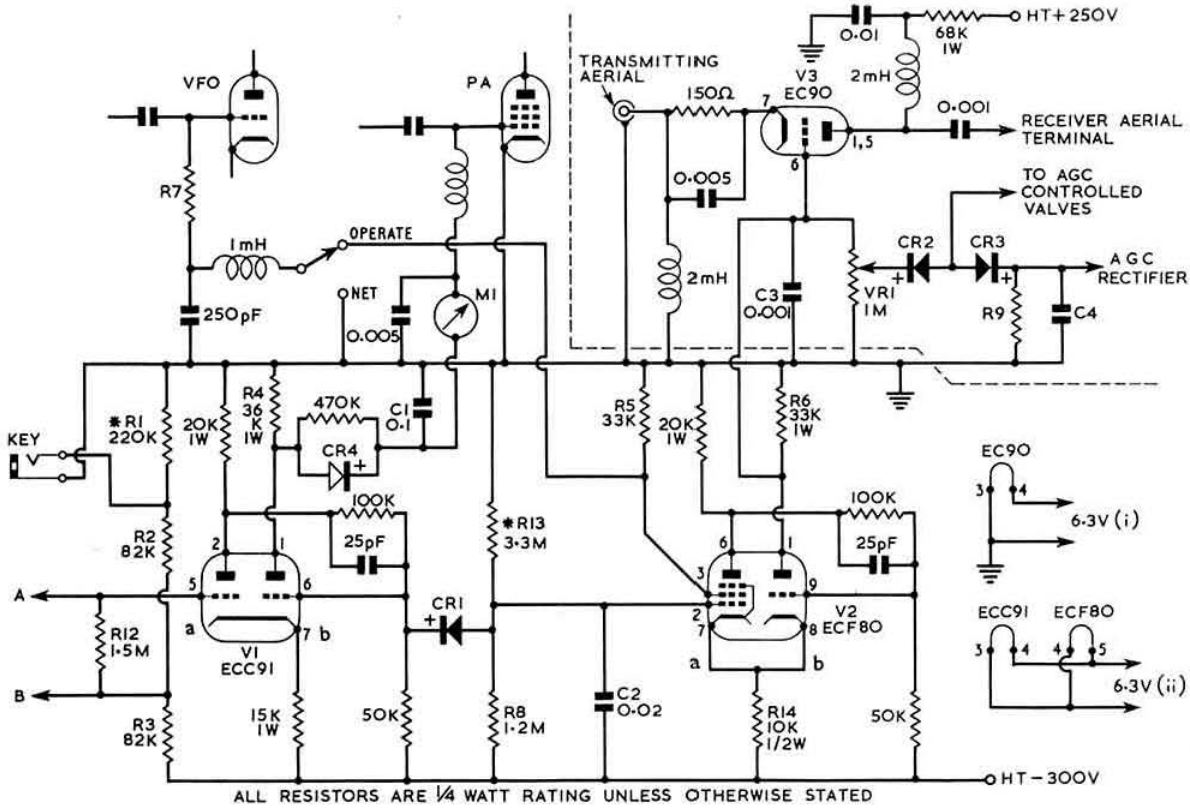


Fig. 3. Circuit of the complete c.w. break-in unit. CR1, CR2 and CR3 can be any diodes with a p.i.v. rating of 150 volts or more. M1 is the normal grid current meter for the p.a. in use. The components marked with asterisks, R1 and R13, are given representative values only (see text). R7 is the normal v.f.o. grid resistor which can be slightly reduced in value to allow for R5, if considered necessary. C4 and R9 are the a.g.c. decay-time components fitted in the receiver. Points A and B are connected to A and B on Fig. 4 for voice control operation.

High gain triode-pentodes can, however, be used in flip-flop circuits, the screen grid of the pentode section then acting as the control electrode in a similar manner to the anode of the triode section. It should perhaps be mentioned here that ECL80 valves were tried in the circuit, but were completely unsuited to this application, because of the low mutual conductance of both triode and pentode sections.

Practical Unit

The circuit of a unit which provides full break-in c.w. facilities is shown in Fig. 3. The first flip-flop, V1, is an ECC91 double triode, controlling only the transmitter p.a. by grid block keying. The second flip-flop, V2, is an ECF80 triode-pentode, the screen grid of the pentode section controlling the v.f.o. The receiver muting circuit is connected to the anode of the triode section.

When the key makes contact, R1 is short-circuited and the divider R2, R3 allows V1a to conduct. V1b is thus cut off, and R4 acts as the normal grid resistor of the transmitter p.a. The grid voltage of V2a is greater than that of V1b, so diode CR1 conducts, and V2a follows V1b instantaneously. R5 then acts as part of the v.f.o. grid resistor, and as V2b is conducting, there will be about 200 volts negative across R6 to mute the receiver. When the key is raised, V1a is cut off by the introduction of R1 into the divider, and so V1b conducts, causing current to flow through R4 which places a cut-off bias of about −150 volts on the p.a. grid. CR1, now non-conducting, prevents V2 from returning to the RECEIVE state until C2 has discharged sufficiently through R8 to trigger V2. When V2a reaches the conductive state, about 65 volts negative is developed across R5 and applied to the grid of the v.f.o. V2b is also cut off, so there is no bias across R6 to affect the receiver performance. The time constant of C2 and R8 is so arranged that the second flip-flop does not return to the RECEIVE condition until full cut-off bias is applied to the p.a.

C1 and R4 determine the rise and decay times of the p.a. control voltages, and thus the degree of softening of the radiated c.w. note. With the values given for C1 and R4, about 0·01 second elapses while the p.a. bias rises to 95 per cent of its full value when the key circuit is broken.

Fig. 3 also shows the connection of the control unit to a transmitter v.f.o. and p.a., and a circuit for the full control of a receiver. The muting bias from R6 is applied to VR1 and C3 (a value sufficiently large to decouple the grid of the T/R switch, but small enough to avoid delay in receiver muting). On key-down, full bias is applied to the grounded-grid EC90 (V3) transmit/receive switch to protect the re-

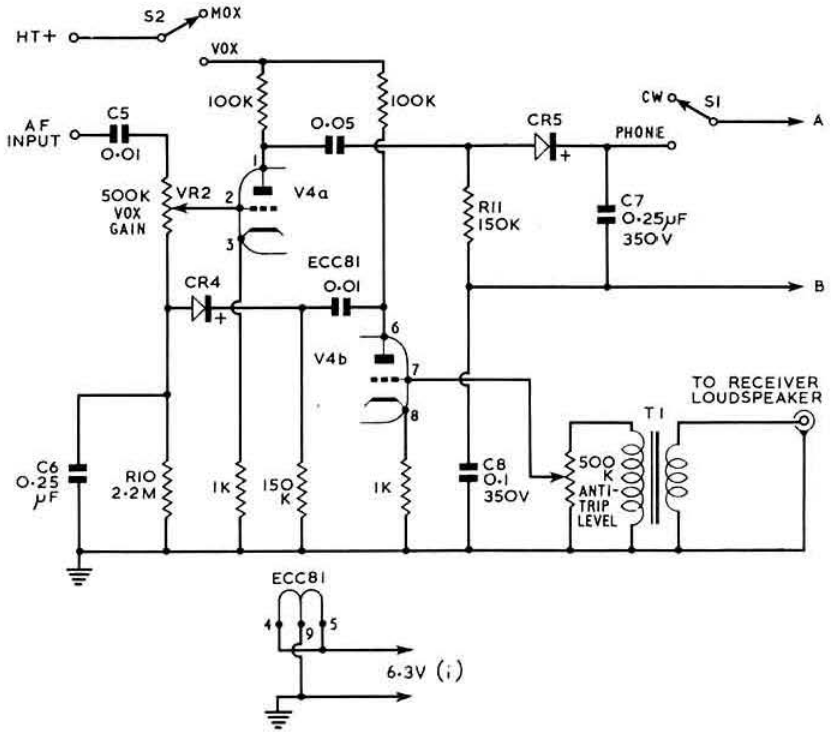


Fig. 4. Additional circuit to provide voice control and anti-trip facilities. CR4 and CR5 should be rated at 150 p.i.v. or more. T1 is a small output transformer. H.t. voltage can be obtained from the same source as that for the modulator preamplifier.

ceiver during transmission periods, and a fraction of this bias, determined by the setting of VR1, is fed to the a.g.c. line through CR2. Diodes CR2 and CR3 prevent the internal a.g.c. system of the receiver and the external muting voltages from interacting so that, for instance, the time constant components of the a.g.c. circuit (C4 and R9) do not cause a delay in the receiver recovery when break-in is in use. This receiver control sub-unit, just one of many possible designs, should be mounted either inside the receiver cabinet, or close to its aerial terminal. If the T/R switch is fitted inside the receiver, more gain will be available particularly when the 2 mH r.f. choke in the anode circuit of the EC90 is replaced by the first-tuned circuit in the receiver. This will also help to avoid dead spots which are sometimes troublesome. The switch shown in Fig. 3 may be used with transmitters up to 100 watts input.

Voice Control

Development of the break-in system had just reached completion when it was realized that it would have several advantages over conventional circuits in vox operation. To adapt the unit for voice control, the circuit of Fig. 4 should be connected to the points *A* and *B* of the main section in Fig. 3. This addition provides vox and anti-trip facilities with only one extra valve, V4. Note the absence of a control valve, a neon tube, a relay valve and a relay, all present in many of the usual circuits. The neon, normally fitted to provide a clean, sharp changeover, can be safely eliminated, because a flip-flop switching circuit, unlike a relay, has no half-on/half-off state, and clean switching is ensured.

The vox and anti-trip amplifiers (Fig. 4) are part of a conventional voice control circuit shown in the RSGB *Amateur Radio Handbook*, and are quite straightforward in action. Audio voltages are fed to C5 from the transmitter modulator. A suitable point for extracting this audio voltage is after three triode speech amplifiers, or one pentode and a triode. Anti-trip voltages from the receiver loudspeaker terminals are then stepped up by T1, amplified by V4b, and rectified by diode CR4 to provide a negative voltage at one end of VR2, thus counteracting acoustical coupling between the loudspeaker and the microphone. C6 and R10 form an anti-trip delay network. Audio signals, amplified by V4a, appear across R11, are rectified by CR5, and develop a positive d.c. voltage across C7 and R12 (Fig. 3,) which triggers the flip-flop circuits, should it exceed about 10 volts. C7 (0·25μF) and R12 (1·5 Megohms) determine the vox delay. Although R12 is shown as a fixed resistor, it could be made a potentiometer of about 3 Megohms for variable delay. C8 is necessary to block the d.c. path through R11, CR5, R12 and R3. S2 provides a choice between vox and manual changeover on phone. A second section of S2 would be necessary either to disable the negative supply, or to short the key jack, on manual operated phone. S1 is a section of the main PHONE/C.W. switch. If the vox facility is to be used in an a.m. transmitter, it would be advisable to disable the modulator power valves in the RECEIVE condition, when the modulation transformer secondary would be unloaded. The

(*Continued on page 290*)

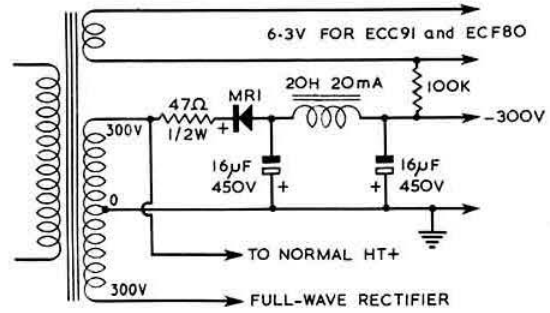
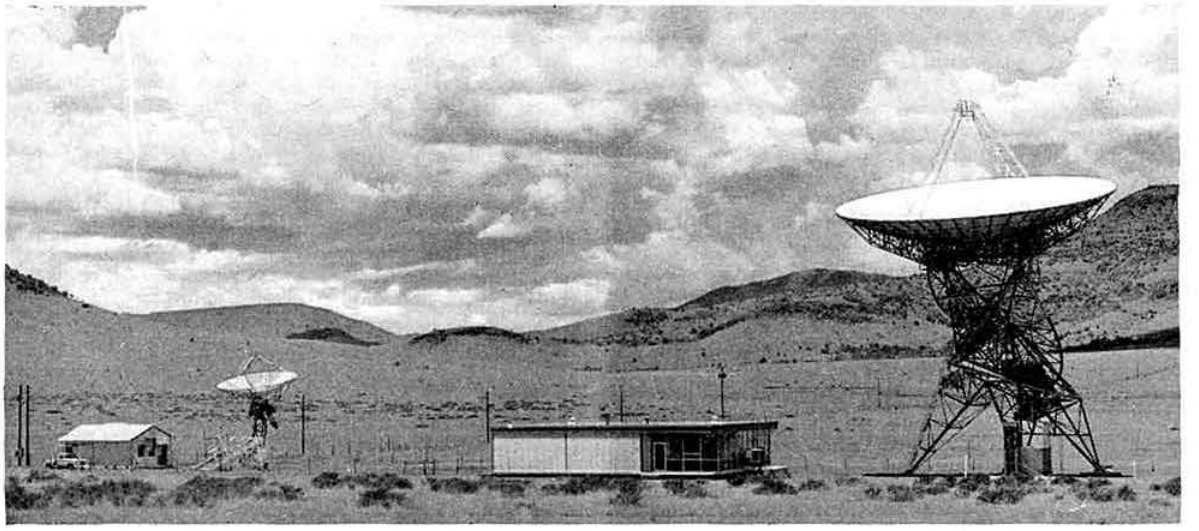


Fig. 5. Circuit to obtain the required negative supply from an existing power supply. A separate heater winding is necessary for the two switching valves as the cathodes are about 200 volts negative with respect to earth. MR1 should be rated at 1000V p.i.v.



The Harvard Radio Astronomy Station in West Texas. McDonald Observatory is on the horizon left of the large aerial.

Solar Radio Bursts

By M. P. HUGHES, VE2AUB/W5, G3KBH, ex-VE7ADM*

AT about 15.25 G.M.T. on December 16, 1960, a W4 was in contact with a Portuguese station on 29 Mc/s. Five minutes later there was a sudden onset of fading and the background noise level went up by a factor of about 1000; the contact was over.

This contact was monitored in a remote valley in West Texas where sensitive radio equipment, operated by Harvard radio astronomers, was being checked for proper operation as part of the morning routine. The equipment records solar radio radiation over a wide range of frequencies and it was noted that there was a strong burst in progress at the time. The circumstances leading to the end of the QSO were the result of a flare of importance 2 that erupted on the Sun at 15.20 G.M.T. X-radiation produced on the Sun at the same time as this flare penetrated to within 90 km. of Earth's surface and ionized the *D* region of the ionosphere strongly enough to absorb 29 Mc/s radio signals. Such an occurrence is known as a " Sudden Ionospheric Disturbance " (abbreviated SID). The increase in noise level mentioned above took place as the frequency of maximum intensity of the radio noise burst associated with the flare reached 29 Mc/s.

The Harvard Radio Astronomy Station was first put in operation in August, 1956. The station is located in a valley eight miles north of the town of Fort Davis in the Davis Mountains of West Texas. The valley is about one mile high and is surrounded by mountains some 1500 ft. higher which screen out most man-made radio interference. The site was chosen because of the very low level of terrestrial radio signals prevalent there. Above 40 Mc/s only a few radio telephone and weak television signals are found, but at lower frequencies signals often skip into the valley from the ionosphere. TV and f.m. signals sometimes skip in from sporadic-*E* clouds and from ionized trails left by meteors as they enter the Earth's atmosphere (Fig. 1).

The station was established to record the spectrum of radio noise bursts originating on the Sun. Such bursts were discovered in February, 1942 when some British radars, operating in the range 55 to 80 Mc/s, suffered severe interference. As the radiation came from the direction of the Sun, which had a large sunspot on its face, it was concluded that the radiation originated on the Sun and was associated with the sunspot activity. In June and July, 1942 radar receivers with parabolic aerials were used in New Jersey, U.S.A., to measure the intensity of solar radiation at 3000 and 10,000 Mc/s. Later, in 1943, Grote Reber (W9GFZ), using his home-made 31 ft. parabolic aerial, recorded strong radiation from the Sun at 160 Mc/s.

After the war several groups of scientists began studying solar radiation, and in 1949 J. P. Wild and his colleagues in Australia constructed a receiver to monitor the spectrum of the intense bursts. The receiver swept across the range 70 to 120 Mc/s three times per second and its output was displayed on a cathode ray tube that was continuously photographed. Other receivers have since been added and the observing range now extends from 5 to 240 Mc/s. The pictures produced by this equipment showed the detailed structure of the bursts for the first time.

Equipment

The equipment at Fort Davis is basically the same as that used by the Australians. Originally there were three receivers covering the range 100 to 580 Mc/s. In 1959 two more

* *Radio Astronomy Station of Harvard College Observatory, Fort Davis, Texas.*

receivers were added to extend the range down to 25 Mc/s and in 1960 another was put in operation in the range 2000 to 4000 Mc/s. All the receivers were made by Airborne Instruments Laboratory, Long Island, N.Y.

The three original receivers cover the ranges 100-180, 180-320 and 320-580 Mc/s and they all use 416B co-axial triodes as grounded grid r.f. amplifiers and have noise figures of 6, 7 and 8db respectively. The two lower frequency receivers covering the ranges 25-50 and 50-100 Mc/s use 417A triodes in cascode circuits and have noise figures of about 3db. These five receivers are all tuned by motor-driven variable capacitors and have to be aligned carefully to maintain good noise figures over their full ranges.

The 2000-4000 Mc/s receiver has no r.f. amplification and uses what has become known as a " zero i.f." system. Incoming signals are mixed with the output of a travelling wave tube (TWT) local oscillator which sweeps across the range 2000-4000 Mc/s. The output of the mixer is passed through an amplifier with a passband of 0·1 to 5 Mc/s. Since there is no preselection the bandwidth of the receiver is 10 Mc/s except that the 200 kc/s of the incoming signal centred on the TWT frequency (plus most of the TWT noise output) is rejected. A noise figure of about 10db is obtained.

The display unit for these receivers is a bank of six cathode ray tubes mounted vertically above one another. The output from the detector of each receiver is amplified and applied to the cathode of one of these cathode ray tubes and modulates the intensity of the electron beam. As each receiver sweeps across its range the spot of its associated cathode ray tube is swept vertically across the face of the tube. A signal for this purpose is derived from a discriminator which has the receiver's local oscillator as its input (in the case of the 2000-4000 Mc/s receiver the sweep voltage is obtained from the TWT sweep circuit). The receiver outputs are blanked on the return sweeps where it is not possible to maintain alignment. This display is photographed on 70 mm. film which moves horizontally at a constant speed. Therefore distance across the film represents frequency, distance along the film corresponds to time, and the image brightness is a function of the burst intensity. Some results obtained using this arrangement are shown in Fig. 1.

Time marks are automatically photographed on the film every minute and every hour, crystal frequency calibrations are injected into each receiver every 20 minutes, and at the end of each day a noise source is coupled to each receiver in turn to calibrate it with respect to intensity.

The aerial system for the two lowest frequency receivers (25-50 and 50-100 Mc/s) consists of two bow-tie dipoles* mounted above a reflecting screen and directed along the meridian. These two aerials have broad beams along the celestial equator and so the Sun can be monitored for the greater part of the day. Aerials for the four high frequency receivers are mounted at the focus of a 28 ft. equatorially-mounted parabolic dish which tracks the Sun across the sky each day. The primary feeds consist of dipoles for the 100-180 and 180-320 Mc/s receivers and horns for the 320-580 and 2000-4000 Mc/s receivers.

The four main types of solar radio bursts are illustrated in Fig. 2.

Noise Storm (Type I) illustrated in Fig. 2(a) is characterized by large numbers of short-lived bursts of short frequency range superimposed upon an enhanced background. Such storms of bursts are associated with the meridian passage of sunspots and often last for days.

* A bow-tie dipole is a broad-band aerial so called because of its shape.

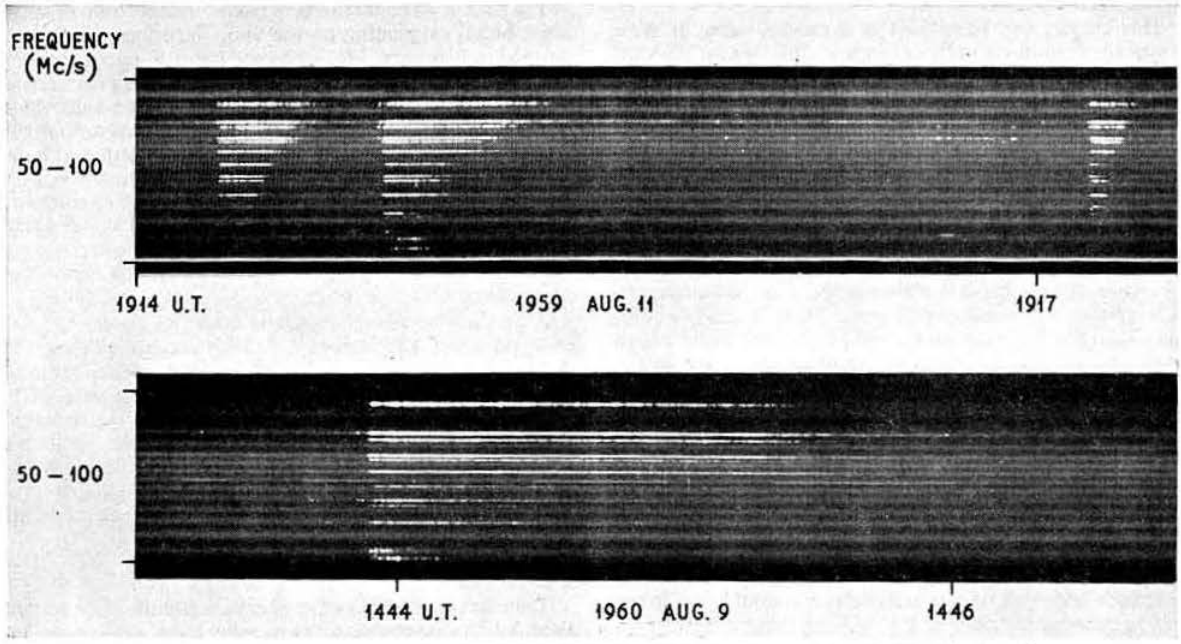


Fig. 1. Television and f.m. signals reflected from ionized trails left by meteors entering the Earth's atmosphere.

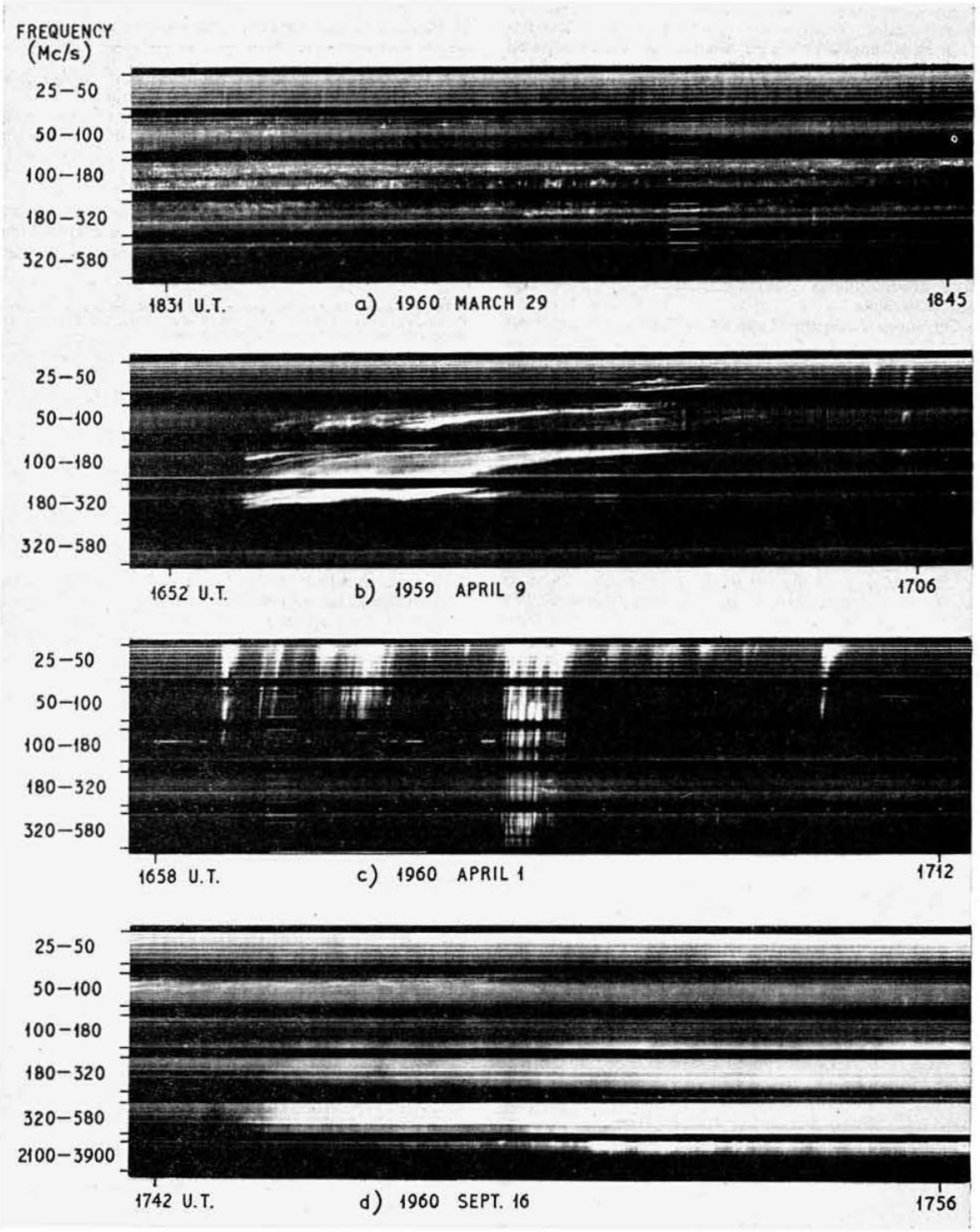


Fig. 2. The four main types of solar radio bursts: (a) Noise storm; (b) Slow-drift burst; (c) Fast-drift bursts; (d) Continuum.

Slow-Drift Bursts (Type II) generally last about 10 minutes, show harmonic structure and drift from high to low frequencies at about 0·3 Mc/s per second. They are associated with large flares and are usually very intense (Fig. 2(b)). About 30 type II bursts were recorded per year near sunspot maximum at Fort Davis. Terrestrial magnetic disturbances often occur a day or so after slow-drift bursts.

Fast-Drift Bursts (Type III, Fig. 2(c)) last for about 10 or 20 seconds and drift from high to low frequencies very rapidly (at about 60 Mc/s per second at 100 Mc/s). Occasionally they show harmonic structure. During the last sunspot maximum some 20,000 type III bursts were recorded per year at Fort Davis. They sometimes appear singly, but more frequently in groups containing from two to more than 100 individual bursts. They are associated with both large and small flares.

Continuum Radiation (Type IV). The smooth enhancement shown in Fig. 2(d) is known as continuum radiation or a type IV burst. During the last sunspot maximum about 20 type IV bursts were recorded per year at Fort Davis and they were always associated with large optical flares. At the time of these bursts the Sun ejects very high velocity particles which often arrive at the Earth within about an hour of the start of the optical flare. These particles cause the aurorae and ionospheric absorption of radio signals in the polar regions.

In the general view of the Fort Davis station with McDonald Observatory of the University of Texas five miles away on the horizon, the solar receivers are housed in the small laboratory on the left of the photograph. The new laboratory and 85 ft. aerial on the right of the picture will be used to study cosmic radio radiation other than that from the Sun. Two receivers will be used, one at 950 Mc/s and the other at 5000 Mc/s. Observations with the solar equipment and 28 ft. aerial will probably be continued through the sunspot minimum to maintain continuity of the records.

A Modern Control System (Continued from page 286)

grid leak resistors of a small modulator could probably be taken to the same control point as the transmitter v.f.o.

The control unit requires a negative supply of about −300 volts at 18 mA, and the circuit of Fig. 5 shows how this can be easily obtained from the main exciter h.t. supply unit.

Setting-up

A few components may require some adjustment for correct operation of the switching valves. The values of R1 and R13 are quite critical, but 10 per cent tolerance resistors were used elsewhere in the circuit with complete success. The voltage at the grid of V1a must be close to that which triggers V1 (vox operation would not otherwise be satisfactory), and the voltage at the grid of V2a must be close to the average key-up and key-down voltages at the grids of V1b.

TABLE I

Voltages measured at various points of the control unit during operation. All readings were made with a voltmeter of resistance 200,000 ohms, and were measured with respect to earth or chassis.

Point	Key-up	Key-down
V1b anode	−155 volts	Normal operating bias
V1b grid	−220 volts	−250 volts
V2a screen	−60 volts	zero volts
V2b anode	zero volts	−200 volts
V2 cathode	−208 volts	−227 volts

When setting up, a 250K ohms potentiometer should be used in place of R1, and R13 replaced by a 5 Megohm potentiometer. R13 should first be adjusted for correct c.w. operation of the second valve with R1 at maximum value. R1 may then be adjusted until the whole circuit is just held in the RECEIVE state. When perfect operation is achieved, fixed high-stability resistors of the correct values should be substituted for the potentiometers.

Table 1 shows some voltages measured at important points of the circuit during operation. If the voltage across R5 does not fall to zero on key down, R14 should be increased in value slightly.

Conclusion

The unit was incorporated in a miniature a.m./c.w. transmitter, and no trouble was experienced in making the system work. vox was included in this transmitter simply to experience the joys of relay-less voice control, but the system outlined would be more suitable for an s.s.b./c.w. station.

All experiments were carried out on transmitters running only 10-20 watts, but the results are also applicable to higher power transmitters. At some stage it would become necessary to key the v.f.o. and final buffer and to protect the p.a. valve with a clamp circuit.

Enquiries Regarding Bulletin Articles

Members who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

The Miniphase V.F.O.

By R. F. STEVENS, G2BVN *

THE Miniphase V7M variable frequency oscillator was primarily designed as the r.f. driver unit for the Miniphase SB7M s.s.b. transmitter which incorporates a generator of the fundamental frequency phasing type. The output circuit of the V7M for this application has high impedance and a high C/L ratio, whilst an alternative model has a low C/L ratio and is designed to be used as the driver unit for a power valve such as a TT21 or 6146.

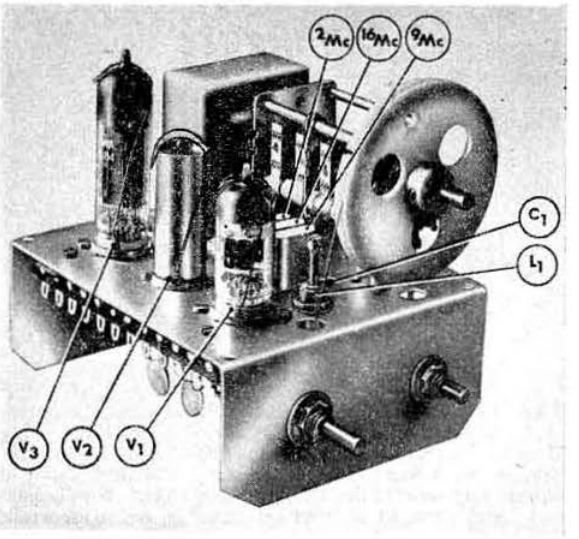
The first stage valve in the V7M is a 12AT7 and this double triode is used as a v.f.o. and crystal oscillator. The Clapp v.f.o. operates in the range 5·0 to 5·5 Mc/s irrespective of the final output frequency, whilst the crystal oscillator uses three crystals having frequencies of (a) 2 Mc/s, (b) 16 Mc/s and (c) 9 Mc/s. These units are used when the final output frequencies are (a) 7 Mc/s, (b) 21 Mc/s and (c) 3·5, 14 and 28 Mc/s respectively. The use of ceramic components and a double bearing tuning capacitor of high quality, together with temperature compensation, ensures that frequency drift is kept to a minimum. The output from the mixer is capacity coupled to the final valve which is a 6BQ5/EL84, the anode circuit requiring an external variable capacity of between 5 pF and 20 pF. This stage operates as a straight through amplifier except on 28 Mc/s on which band it is employed as a doubler.

An unusual feature of the V7M is that it incorporates a separate mains transformer to supply the heater of the oscillator valve and this should be left on even when the remainder of the transmitting equipment is switched off. The unit requires supply voltages of 6·3 volts, 300 volts and 150 volts, the latter from a regulated source for the 12AT7. Connections are brought to a tag strip at the side of the chassis and provision is made for an external potentiometer as a drive control and also for keying in the cathode circuit of the mixer valve.

A conventional exciter unit employing a low frequency oscillator followed by a series of frequency multipliers has

(*Continued on page 298*)

* Chairman, Technical Committee.



The Miniphase v.f.o. which is physically interchangeable with the Geloso unit of similar appearance.

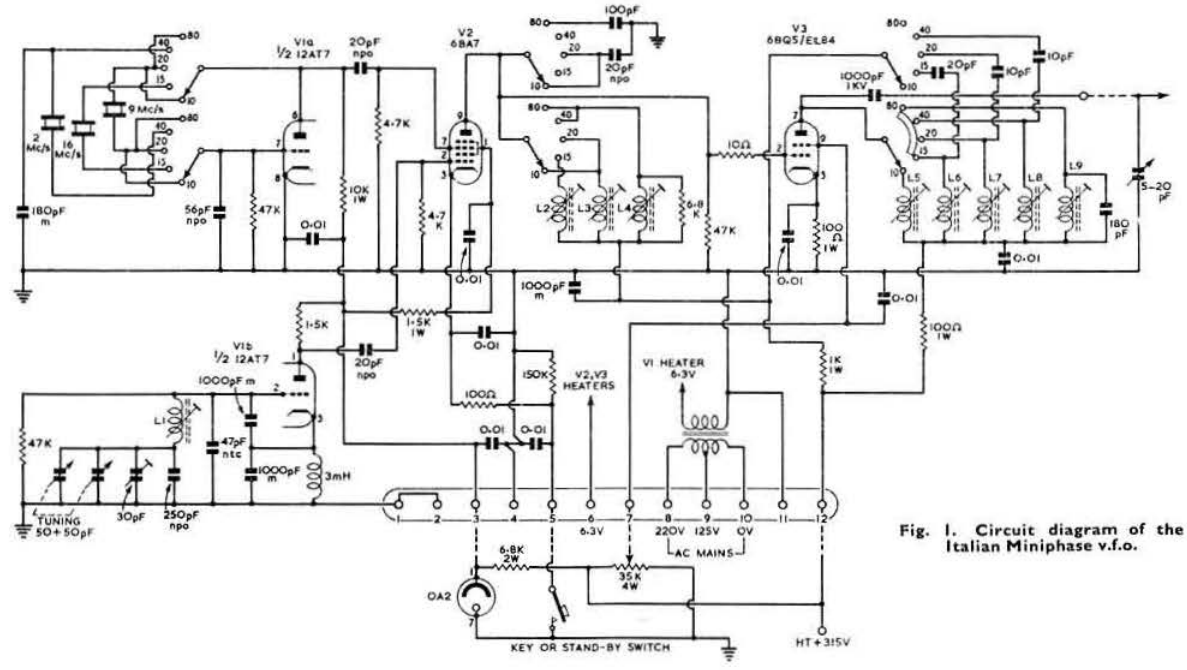
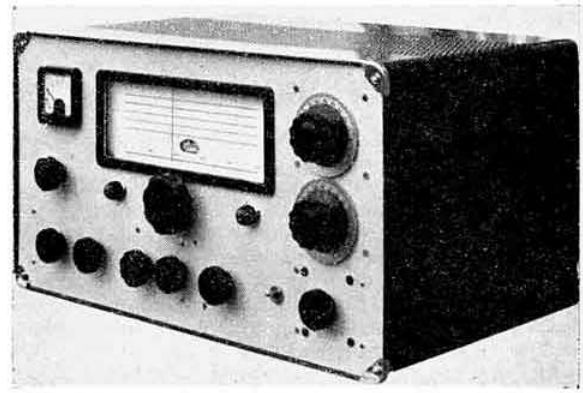


Fig. 1. Circuit diagram of the Italian Miniphase v.f.o.

C

Highlights of the RSGB International Radio Communications Exhibition



The Princess transmitter, shown on the Society's stand at the RSGB Radio Communications Exhibition, is a compact self-contained transmitter for a.m./c.w. operation on all bands from 3·5 to 28 Mc/s. Special features include a built-in power supply, mixer-type master oscillator of high stability, provision for full break-in operation and conversion to single sideband at a later date if desired. The Princess will be described by G3JJG in the Bulletin early in 1964.

WHEN the Society's International Radio Communications Exhibition was opened by Mr. F. C. McLean, C.B.E., Director of Engineering of the BBC, on Wednesday, October 30, it was clear that the scene was set for another outstanding event of this Golden Jubilee Year. New designs and ideas seem to abound on amateur and commercial stands alike; wider use of transistors was one clearly discernible trend.

On the main RSGB stand there was a most interesting display of vintage wireless equipment tracing the development of radio from the earliest days. Modern home-built equipment displayed included G2BP's transistorized electronic bug-key for speeds up to 30 w.p.m., two of G3HBW's transistorized communications receivers, a number of transistorized devices by B.R.S.20533, an s.s.b. transmitter by G3HRO, an s.s.b. transceiver by G6JP and a prototype of the new Princess transmitter developed for the RSGB by G3JJG. Full constructional information on this outstanding design will be published in the BULLETIN early in 1964.

Facing the Society's stand was the largest of those occupied by K.W. Electronics who introduced the KW707 receiver, a de luxe version of the KW77, employing a mechanical filter for s.s.b. reception and a half-lattice crystal filter (200 c/s at 6db) for c.w. The K.W. Vespa is described as an s.s.b./c.w. transmitter without frills—it covers three bands (20m and 80m and one other of the purchaser's choice). Complete with a.c. power supply, the Vespa is housed in a cabinet the same size as that used for the KW77. It has a p.e.p. input of 90 watts and costs £85. Another addition to the K.W. range was the 2m Vanguard, physically the same as the h.f.-bands Vanguard and employing the same speech amplifier, modulator and power supply. The KW2000 s.s.b. transceiver, announced some time ago, was on show for the first time. This unit covers all bands from 1·8 to 28 Mc/s and costs £165.

On the K.W. Communications stand a complete Collins station comprising the 32S3 transmitter, 30L1 linear amplifier and 75S3 receiver was prominently displayed. Other items on show were McCoy h.f. crystal filters, Kokusai mechanical filters, Airdux air-spaced coils of various diameters and the new CDR TR44 rotator which is similar to the AR22 but has a more robust braking system and a silent direction indicator.

Webbs Radio introduced the new Eddystone EA12, a double conversion 13 valve communications receiver with a crystal controlled front-end. All amateur bands from 10 to 160m are covered in nine ranges (four for 10m). The first (tunable) i.f. is 1·1-1·7 Mc/s and the second i.f. 100 kc/s. Selectivity is continuously variable and is provided by a crystal filter and T-notch filter. Separate detectors are provided for a.m. and for c.w./s.s.b. A low pass filter in the audio stages can also be used as a tuned filter for c.w. The receiver, which has a built-in S meter and a 5 in. internal loudspeaker, costs £185.

Another new receiver on Webbs' stand was the transistorized Eddystone EC10 covering 550 kc/s to 30 Mc/s in five ranges and costing £48. Like all Eddystone receivers, the EC10 uses a geared tuning drive.

Electroniques of Felixstowe exhibited a new 1·6 Mc/s full lattice bandpass crystal filter with a shape factor of 1·5 and a bandwidth of 3 kc/s. On show for the first time were "Codar-Qoils," a range of air wound coils of various sizes and inductances. Other exhibits included a two-speed slow motion drive and dial, new types of r.f. chokes and a wide variety of "Stabqoils."

Green and Davis showed several items of new equipment: a Mark IV version of their 144 Mc/s converter using three 6CW4, s.s.b. adaptors for 2m and 160m, and the US Sonar four band transceiver. The Green and Davis linear amplifier, another addition to the range, employs an RCA 7094 beam tetrode giving an output stated to exceed 250 watts p.e.p. and covering all bands from 10-80m. The unit has a built-in aerial changeover relay and uses silicon rectifiers. This firm was also exhibiting transistorized converters and pre-amplifiers for 144 and 420 Mc/s.

Daystrom showed for the first time the new Heathkit general coverage communications receiver Model RG1 which is similar to the Model RA-1 amateur bands receiver and a wide range of other Heathkits for amateur radio and high fidelity audio enthusiasts.

A new 2m turnstile and a 10-element Yagi for the same band were interesting exhibits on the J-Beam Aerials stand in addition to a wide range of other types for domestic and commercial use.

Withers Electronics showed a new 420 Mc/s converter using an A.2521 grounded grid r.f. stage in a trough line, followed by a 6DS4 mixer and a cascode i.f. amplifier with a substantially flat response over a range of 4 Mc/s. Other new equipment on this firm's stand was a Top Band mobile transmitter in a cabinet the same size as the TW2 transmitter, and the TW2-120 rig capable of 150 watts input on c.w. or 120 watts on phone to the QQV06-40A in the p.a. using Lecher lines.

* * *

A comprehensive report on the whole exhibition will be published in the December issue of the BULLETIN.

Single Sideband

By G. R. B. THORNLEY, G2DAF*

IN *Single Sideband* last month, the block diagram of a basic single crystal frequency synthesizer was shown in Fig. 2 on page 231. At first glance this would appear to be a simple and straightforward arrangement. However, the practical difficulty is to ensure that each stage passes only the required sub-harmonic or harmonic of the 100 kc/s crystal oscillator and greatly attenuates all other unwanted output frequencies. This would entail a considerable number of high Q resonant circuits and, if the synthesizer output was required to take the place of the usual v.f.o., a number of these circuits would have to be tunable over a range of possibly 500 kc/s.

While this is not an insuperable problem, it does add a considerable amount of complication that most amateur constructors would wish to avoid. An alternative approach, offering some simplification in regard to tuned circuits and enabling the constructor to use a conventional v.f.o. circuit, is the method adopted for experimental work by the writer. This will now be described in further detail.

An Experimental Single Crystal Frequency Synthesizer

The basic principle is shown in the block diagram of Fig. 1,

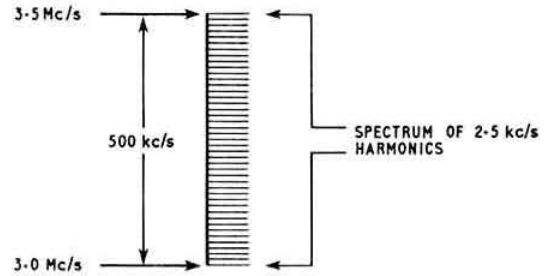


Fig. 2. Functional diagram showing spectrum of 2·5 kc/s harmonics at the anode circuit of the harmonic amplifier V3b. The spectrum of 500 kc/s will in fact embrace a total of 200 harmonics—a smaller number is shown for the sake of clarity.

balanced converter V5 the other input of which is the 500 kc/s signal passing through the selective filter. As the output circuits of this converter are tuned to the *sum* frequency and the output circuits of the first converter are tuned to the *difference* frequency, any drift of the v.f.o. will cancel out and the stability of the final output frequency will be that of the 100 kc/s crystal oscillator. Should the v.f.o. output frequency drift more than the bandwidth of the filter, it will heterodyne the next adjacent 2·5 kc/s harmonic and the final output from the synthesizer will jump 2·5 kc/s. There is,

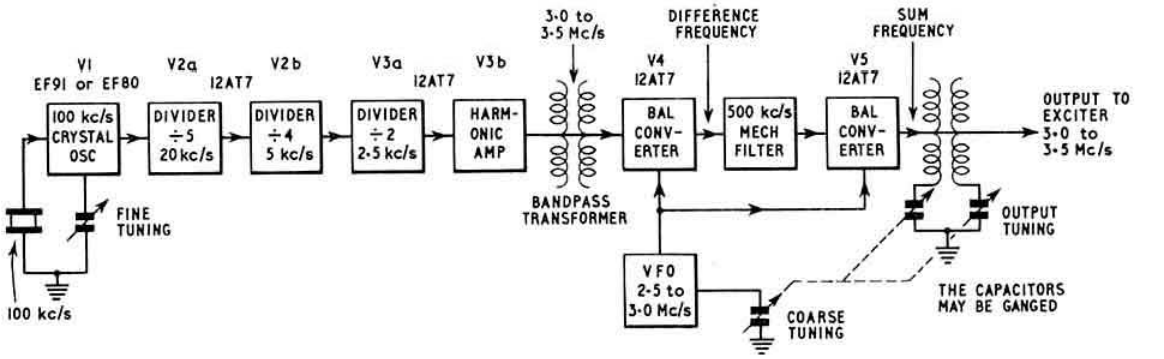


Fig. 1. Functional block diagram showing the basic method of operation of a single crystal frequency synthesizer giving continuous output over the range 3-3·5 Mc/s.

the stable reference being the 100 kc/s quartz crystal bar. Output from this oscillator is divided down in three stages to produce a 2·5 kc/s output that is locked to the 100 kc/s crystal. The 2·5 kc/s signal is then fed into an harmonic amplifier V3b, the anode load of which consists of a double tuned bandpass circuit resonant over the range 3·0 to 3·5 Mc/s. This in turn feeds into the input grids of a balanced converter V4.

It will be appreciated that the r.f. output at the anode of the harmonic amplifier is a spectrum of r.f. signals at 2·5 kc/s intervals centred over a range of 500 kc/s from 3·0 to 3·5 Mc/s. This is shown in diagrammatical form in Fig. 2. If the existing v.f.o. circuit is modified to tune 2·5 to 3·0 Mc/s and fed into the converter, it will beat at every 2·5 kc/s over its tuning range with one of the spectrum of 2·5 kc/s harmonics to produce a difference frequency of exactly 500 kc/s that will be passed by the selective 500 kc/s filter. This filter is required to pass the wanted signal and effectively suppress the unwanted outputs in the channels 2·5 kc/s away, either side of the passband centre.

The v.f.o. output is simultaneously fed into the second

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however, no practical difficulty in building a v.f.o. whose total drift (even switching on from cold) is less than the required filter bandwidth and in practice the final output frequency will remain stable.

The v.f.o. is merely used to beat the required harmonic down to approximately 500 kc/s so that it may be passed through the sharp bandpass filter to reject all the other harmonics either side of it. The same v.f.o. then beats the 500 kc/s back again to the original frequency for passing to the exciter. It can be seen that as the v.f.o. tuning control is rotated over its range, each 2·5 kc/s harmonic in turn will drop out of the filter passband and the next harmonic in turn will enter it. The signal output from the anode of V5 will therefore step from one 2·5 kc/s channel to the next. The v.f.o. tuning can then be considered as a COARSE TUNING control. As it is normal practice to accurately net on to a s.s.b. communication channel, this would not be acceptable and some means must be devised to enable the output frequency, still locked to the crystal, to be tunable over a range that will fill in the gaps, thus giving a continuously tunable output signal.

It is well known that the output frequency of a crystal oscillator can be " pulled " by additional circuit capacity

in shunt with the crystal; in fact the 100 kc/s crystal calibrator provided in many modern amateur band receivers is fitted with a trimmer capacitor to enable the calibrator output to be accurately set to zero-beat MSF or a similar reference signal. Provided therefore that the blocking oscillator divider stages will remain in lock over the required 100 kc/s oscillator excursion, the spectrum of 2·5 kc/s signals at the anode of the harmonic generator V3b can be made to vary in frequency while still locked back and controlled by the stable crystal oscillator.

Divider Function

The limitation to this line of approach is the ability of the divider chain to remain in lock, remembering that the reference source is no longer fixed on exactly 100·0 kc/s. As the degree of " hold " of a blocking oscillator divider is inversely proportional to the dividing ratio, the requirement (100 kc/s down to 2·5 kc/s) is split into three separate dividing stages so that the greatest ratio used in any one stage is not greater than five.

For initial experimental trials the output from the anode circuit of the harmonic amplifier was coupled into the station receiver via a pick-up loop and a length of co-axial cable. The receiver was tuned (in the s.s.b. mode) to pick up one of the 2·5 kc/s harmonics within its tuning range on the 80m band with the " signal " approximately centred within the passband (i.e. 1·5 kc/s audio note from the loudspeaker). By adjustment to the variable capacitor across the 100 kc/s crystal it was possible to vary smoothly the receiver audio output from zero-beat to 3·0 kc/s, thus proving that the divider stages were remaining in lock and further that the 100 kc/s crystal could be pulled to an extent that would enable the 2·5 kc/s spectrum around an output in the 3·0 to 4·0 Mc/s region to be " tuned," plus or minus, better than the required 1·25 kc/s. The long-term stability was checked by allowing the synthesizer unit to run continuously for several hours. The short-term stability was checked by switching off heater and h.t. voltage to all valves in the unit (having previously adjusted to give 1 kc/s audio output from the receiver), allowing the unit 30 minutes to completely cool down and then switching on. It was in fact quite uncanny to hear the 2·5 kc/s r.f. spectrum slide rapidly across the receiver passband and in approximately 30 seconds come to a standstill with exactly 1 kc/s audio note from the loudspeaker. Yes!—switching on from cold, in just about 30 seconds the output was locked to the crystal and stable.

Filter Function

Having verified that the line of approach so far was a workable proposition, the next step was to consider the requirement of the selective 500 kc/s bandpass filter. What would actually happen, assuming that this synthesizer unit was controlling the station exciter and it was required to net on to an operating channel? Rotation of the v.f.o. COARSE TUNING control would produce an exciter output in steps of 2·5 kc/s; therefore for any required netting channel the maximum error could not be greater then 1·25 kc/s. This is

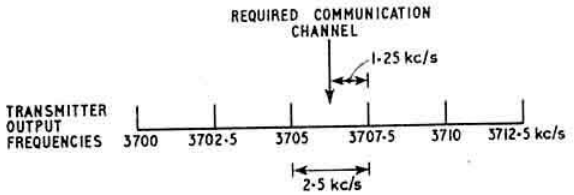


Fig. 3. Functional diagram showing the output of an exciter (controlled with the frequency synthesizer) when the " coarse tuning " control is moved, and showing that under the worst possible condition (when the required channel is mid-way between two harmonics) the netting error cannot be greater than 1·25 kc/s.

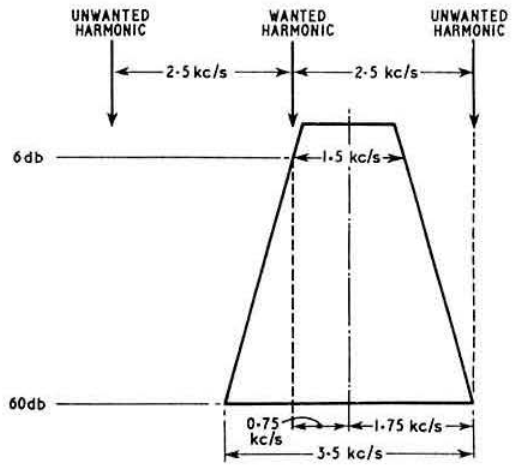


Fig. 4. Diagram of required 500 kc/s filter passband in relation to the 2·5 kc/s harmonics presented to the filter, after the first conversion process. From Fig. 3 the greatest netting error is 1·25 kc/s. A summary of the filter requirements is as follows:

(*a*) The greatest netting error cannot be more than 1·25 kc/s, therefore the filter is required to pass plus or minus 625 c/s, therefore bandwidth at maximum response is 1·25 kc/s.

(*b*) Nearest unwanted harmonic cannot—at worse condition—be nearer to the centre of the filter passband than 1·75 kc/s; therefore a filter bandwidth of 3·5 kc/s at 60db down will be satisfactory.

(*c*) These conditions can be met with a standard Collins mechanical filter, Type F500F-14.

perhaps more clearly illustrated by the diagram in Fig. 3. Secondly, assuming a filter passband of 1·5 kc/s (6 db points) at the worst condition with the required 2·5 kc/s harmonic at one side of the passband, the next adjacent harmonic will be 1·75 kc/s away from the filter centre frequency. Twice 1·75 kc/s equals 3·5 kc/s and this determines the maximum permissible filter bandwidth 60 db down. A summary of the required conditions is given in Fig. 4. Inspection of the current Collins catalogue shows that a suitable mechanical filter is available listed as Type F500F—14; this has a centre frequency of 500 kc/s and 6 and 60 db bandwidths of 1·4 kc/s and 3·5 kc/s.

Operating Procedure

For any required netting frequency, the synthesizer unit will replace the existing exciter v.f.o. and provide an heterodyning output at some position of the COARSE TUNING control that will be not more than 1·25 kc/s away from the wanted channel. Therefore under any condition the exciter will beat with the receiver carrier insertion oscillator to produce a heterodyne within the receiver passband that will appear in the loudspeaker as an audible note. Once the audible note appears the COARSE TUNING control is left at this setting. The FINE TUNING control is then adjusted to bring the audio tone to "zero beat": the exciter output is then netted exactly on the wanted communication channel, with crystal oscillator stability.

Circuit Detail

The synthesizer unit requires five valves excluding the v.f.o. It is possible to use semi-conductor diodes for the balanced converters in place of the valves. The unit is fairly complex and requires an oscilloscope to set up the dividers and some experience in using an oscilloscope on TV receiver blocking oscillator time bases would be helpful. These notes are given for the experienced constructor who is looking for something new and interesting.

(Continued on page 296)

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW*

A Quick-Release Aerial Mount

THE mounting to be described was primarily designed to overcome the disadvantages of the rather wide, downwards-opening boot door of an Austin A40, but the basic idea is capable of considerable modification to fit many other vehicles having channel section bumpers of sufficient strength to carry an aerial. In use, the hooks at the front of the side plates (A and A1 in Fig. 1) engage the top leading edge to the bumper and the channel, H, engages the bottom edge, clamping being effected by tightening the nut, G.

* 1 Shortbutts Lane, Lichfield, Staffs.

Construction is simple, and apart from welding up, requires no more than file, hammer, saw and a cold chisel. The side plates are made from 12 s.w.g. mild steel. After roughing out they are clamped together and filed round to finish, after which the sawcut is put into the nearside plate. They are then bent, left and right hand, the nearside plate being bent a thickness of metal further back so that, on assembly, both plates line up. Parts A, A1 and B (1¾ in. of 1¼ in. o.d. × 16 s.w.g. mild steel tube) are welded up, the tube being very strongly welded. The hook notches are then filed to fit the bumper, and the $\frac{17}{64}$ in. diameter hole drilled for the clamp.

If it is not possible to obtain a sufficiently long ¼ in. diameter bolt for part J it can be made by screwing a length of rod after bending, or can be bent up from a piece of ¼ in. diameter "allthread," usually obtainable from factory furnishers or nut and bolt retailers. If this is used, it is advisable to bend it *hot*, to avoid cracking across the bend. The final length should be such that the mount may be unclamped without allowing the nut G to come off the rod, which should project far enough for the end threads to be burred over after final assembly, so making a captive nut. The handle F is welded with care to the nut G (a ¼ in. B.S.F. full nut) and the channel H is welded to the inside of the bend in the rod, to give sufficient bearing so as not to damage the bumper. The spacer, K, is a suitable piece of tube or a quantity of washers.

The mount should be painted (aerosol sprays are obtainable to match most car finishes) or chrome plated. If the latter finish is chosen it is advisable to make the side plates from cold rolled, bright, annealed mild steel, thus starting with a good finish which will save time in polishing.

After plating, or painting, an insulating tube, C, of 1⅛ in. o.d. × ⅛ in. thick wall Paxolin, is inserted in tube B, and the base section of the aerial, D, fitted into it. The base section used by the writer is a piece of ⅞ in. diameter × 16 s.w.g. aluminium tube, with a stiffener E, a 1 ft. length of ¾ in. o.d. × 16 s.w.g. aluminium tube driven into it.

The finished mount weighs less than 1 lb. (excluding the aerial base section), and has been in use for four years, during which time it has carried a 13 ft. centre-loaded aerial at speeds up to 70 m.p.h. without undue stress.

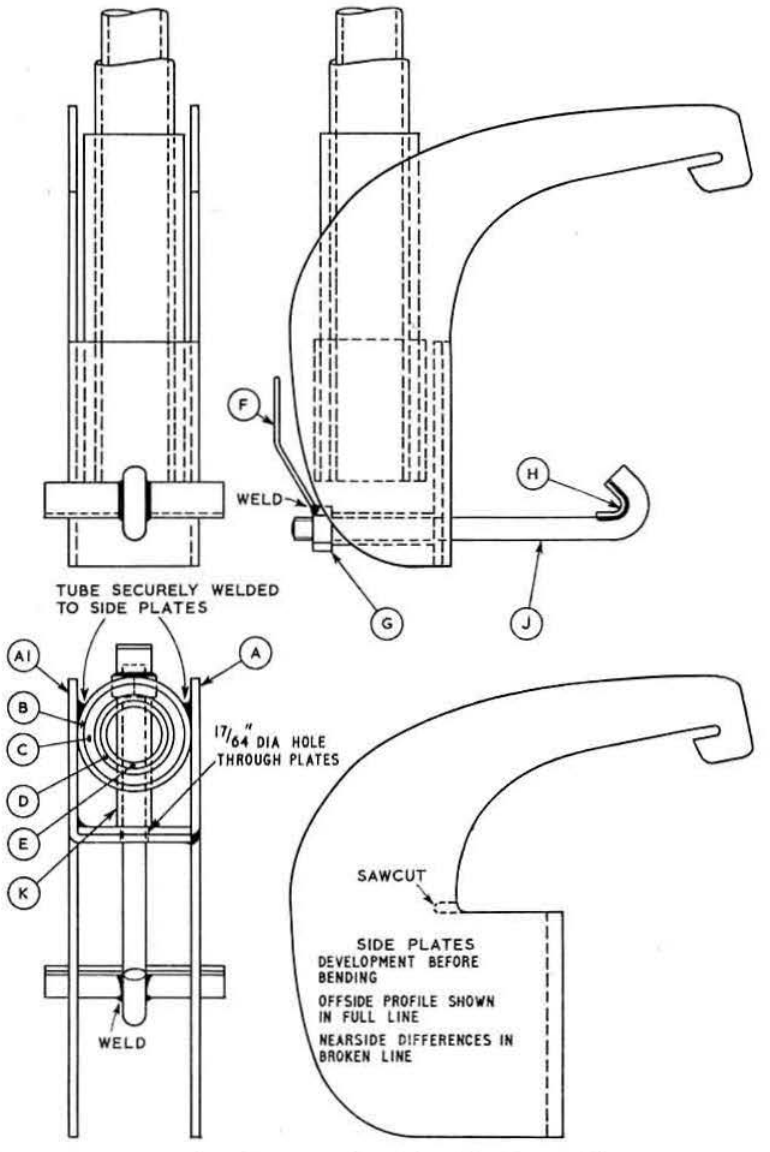


Fig. 1. Details of the construction of the quick-release aerial mount.

Rally Reports

Despite rather unpromising weather well over 700 people attended the Society's rally at **Woburn Abbey** which was held by kind permission of his Grace The Duke of Bedford on September 22.

Without doubt the highspot of the event turned out to be a display of radio-

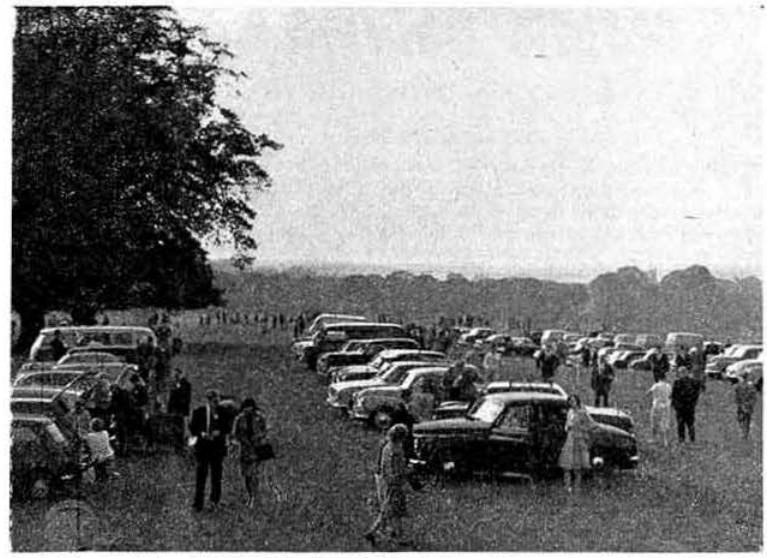
controlled model aircraft staged by members of the Society of Model Aeronautical Engineers. The evolutions carried out by their fully aerobatic, 75 m.p.h. models made a truly memorable performance. It was a great pity that the control frequency was jammed by an unidentified signal, resulting in the temporary loss of control of two of the models, one of which crashed and was seriously damaged.

Apart from the amenities of the Abbey, there was a parachute drop, various trade displays, and the usual grand raffle. The talk-in station GB3RS was operated on 1·8, 70 and 144 Mc/s by members of Verulam (St. Albans) Radio Club. Excellent all-round coverage on 144 Mc/s was provided by a J-Beam turnstile aerial.

Certificates for the best mobile installations were presented by the Society's Executive Vice-President, G. M. C. Stone, G3FZL, to the following: G2DUS (best home-built h.f.); G3MCG (best home-built v.h.f.); G3PSL (best commercial v.h.f.); G3MSS (best commercial h.f., and safest overall). Among the many interesting installations were a very neat three-band s.s.b. transmitter by G3JFH, and a prototype of K.W. Electronics' Project 2000 transceiver, which was being air tested by G3KAP.

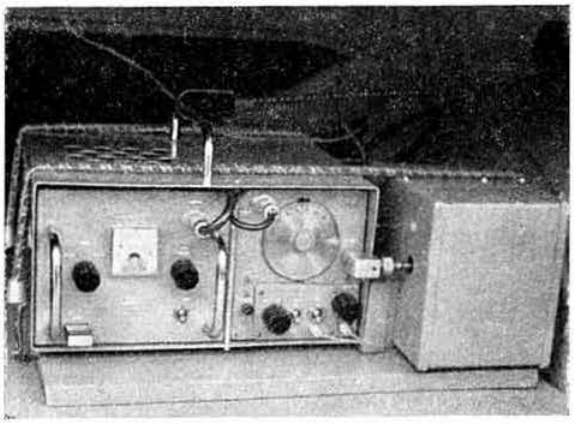
The Chairman of the Mobile Committee, C. L. Fenton, G3ABB, wishes to thank all members of the Committee and their wives for the hard work they put into the task of making this yet another successful rally.

The **Lincoln Rally** on September 15 was again blessed with wonderful weather and there was a noticeable increase in the number of mobile equipped vehicles which attended. There was a social aspect to the rally, with a coach party to Lincoln Cathedral, films by the Guide Dogs for the Blind Association and a clown to entertain the children. A " Joystick " aerial and a.t.u., donated by Partridge Electronics Ltd. to be raffled for RAIBC funds raised £6 5s., whilst the photoquiz competition, raffle and junk sale all proved to be popular items. Talk-in stations operated on 80 and 2m—the latter using a " Scott Special " aerial as described on page 168 of the September BULLETIN and getting S9 reports up to 100 miles. The competition for the best mobile installation was won by G3JEQ.



Part of the car park at the RSGB National Mobile Rally at Woburn Abbey on September 22, 1963.

(Photo by G2LW)



G3MCG's remotely controlled mobile equipment for 144 Mc/s which was judged the best home-built v.h.f. gear at the Woburn Abbey Rally.]

(Photo by G3HRO)

Timely Note

An article by G3BIC in the October issue of the Midland ARS *Newsletter* reminds us that the onset of winter brings greater demands on car batteries, and the fact that the ignition warning light is extinguished when the engine is running does not necessarily mean that the battery is receiving an adequate charge.

To adjust the regulator (assuming that the battery is in good condition) the leads from terminals *A* and *A1* on the regulator/cutout should be removed and connected together. With a voltmeter across terminal *D* and earth the voltage reading should be 16·7 maximum (or 8·45 volts for a 6 volt system) at a generator speed of 3,000 r.p.m. To adjust, the regulator (on the left of the control box) is screwed in to increase, and anti-clockwise to decrease, the voltage. The locknut should be tightened and leads *A* and *A1* replaced.

The article also refers to the fact that a poor battery may sometimes have its useful life considerably extended by discharging it completely through a suitable resistance (a headlamp bulb will do) if it fails to start gassing within 3 or 4 minutes of commencing to charge at 3 or 4 amps, and then charging it fully until the specific gravity is around 1·270. The discharge and charge process is repeated three times. If the battery still fails to hold charge it is useless, but the chances are that its useful life may have been considerably extended. A similar process may be applied to new, charged batteries to correct reverse polarity of individual plates.

Single Sideband (Continued from page 294)

The writer has limited spare time and it is quite impossible to answer individual letters in connection with this article but it is the intention to give detailed circuitry for the oscillator, divider chain and harmonic generator, in *Single Sideband* next month.

RSGB Intruder Watch

By Major D. W. J. HAYLOCK, G3ADZ *

THE average amateur communicates or experiments on the bands listed in his licence without giving much thought to what has happened in the past, or may happen in the future, although the advent of an International or Regional Conference brings a sudden change. The certainty of new or revised Radio Regulations produces many predictions and long arguments ending, we always hope, with a sigh of relief when the changes are not as bad as feared. Some may even spare a complimentary word for those who have worked and argued hard to maintain the amateur frequency allocations.

The pressure on all bands is great: commercial, government services and broadcasting needs increase as new nations are established, and others seek to extend their communication systems. The situation is a little easier when M.U.F.'s are high, but as they fall there is even more crowding of the available h.f. bands. Unfortunately, some countries regard even world-wide exclusive amateur allocations as fair game.

In the UK we are more fortunate than many countries in that we have a strong National Society which maintains friendly relationships with the licensing authority, the GPO. Furthermore, recognition is given in Government and industry to the contribution made by amateurs to the ever-growing world of electronic development, and to the service of amateurs to the community through RAEN.

This being the case, it is surely up to the Amateur Radio movement to see what can be done to preserve the amateur bands, and make it known that a regular watch is kept on all our exclusive frequencies. Some amateurs, a small minority, take the view that this task should be done by the GPO. The same people would be the first to complain if the licence fee were raised to £10 p.a. to pay for such a service.

* Honorary Organizer, RSGB Intruder Watch, 3 Norris Gardens, Warblington, Havant, Hants.

From: R.S.G.B. INTRUDER WATCH
To: R.S.G.B., G.P.O.

REPORT OF HARMFUL INTERFERENCE TO THE AMATEUR SERVICE

1 Jan 63 to 31 March 63

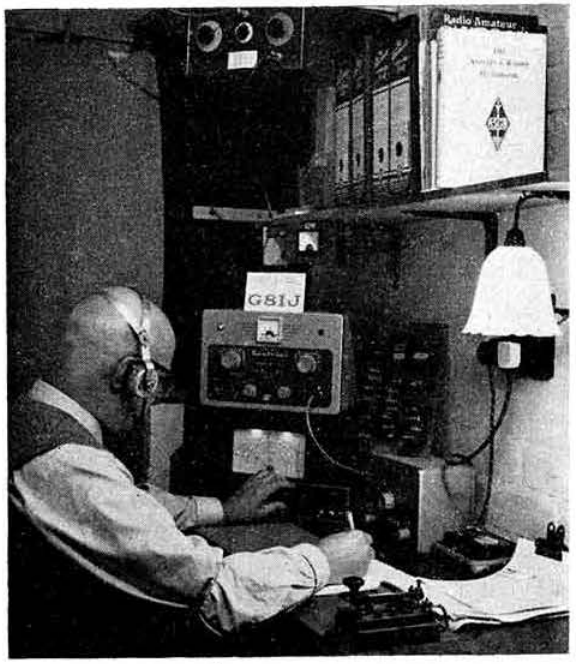
1 STATION IDENTIFICATION (OR SERIAL NUMBER)	2 FREQUENCY KC/S	3 TYPE OF EMISSION	4 TYPE OF TRAFFIC (SEE NOTE 1)	5 HOURS OF OBSERVATION
The following intruders, previously reported, continue to be heard at regular intervals.				
Serial Nos. 10*, 12*, 16, 31, 34, 103, 147*, 148, 140, 179, 185, 193, 211, 227, 289, 315, 325, 331, 332*, 338, 354, & 366.				Various

NOTE 1 - COPY OF TRAFFIC ATTACHED

6 NUMBER OF OBSERVATIONS (SEE NOTE 2)	7 LOCATION OF OBSERVATION POINT	8 SIGNAL STRENGTH	9 TYPE OF RECEIVER USED	10 REMARKS
	London Bridgnorth Portsmouth Exeter Cwmbran			NB. * - see log sheets and/or traffic samples attached.

NOTE 2 COLUMN 6 RECORDS THE NUMBER OF SEPARATE OCCASIONS, DURING THE PERIOD COVERED BY THE REPORT, WHEN THE INTERFERENCE WAS HEARD BETWEEN THE HOURS RECORDED IN COLUMN 5.

A typical Intruder Watch report form.



One of the most regular watchkeepers is G8IJ, seen here during a listening session.

RSGB Intruder Watch

It was in 1958, not long after G3ADZ returned from a mild adventure as MD5ADZ, that he was asked by the Society to formulate a plan for an RSGB Intruder Watch. After some discussion and modification, the plan put forward received the approval of the GPO. Some members may, however, still not be clear how this scheme works.

First of all, it is entirely reliant upon a number of amateurs who have come forward as watchkeepers. During the past four years or so, some twenty members have given their services for greater or lesser periods. It is impracticable to list them all, and others must remain anonymous, but mention should be made of G8IJ and GW3PSM (ex-ZC4CT) for their consistent reports of very high standard over a long period. Another is G3BTC who, as one of the first volunteers, has never failed to submit a valuable monthly report on the state of 7 Mc/s. Help has also been given by Service amateurs, notably through AWRARS, now part of the new Royal Signals ARS. The minimum standards for a watchkeeper are patience, a promise of two to three hours' work each week, a good receiver and frequency meter, ability to recognize (even if not to copy) most types of transmission, 20-25 w.p.m. c.w., and where possible, a working knowledge of non-amateur procedure and language patterns. Additional volunteers with these qualifications will be welcome.

Monitoring is confined to the exclusive amateur bands 7, 14, 21 and 28 Mc/s. Reports are in log form, giving date, time (GMT), frequency (measured), type of transmission, traffic sample, and call-sign or identity of the intruder where possible. The type of receiver in use by the watchkeeper, its intermediate frequency(ies) and the aerial system are also

noted, together with the location of the observer. These reports are sifted monthly, more frequently in urgent cases, by the Honorary Organizer, and are given a serial number plus the letter A or B. 'A' stations are persistent intruders, and 'B' those heard at least three times. A third list of 'C' stations heard only once is circulated to watchkeepers for further observations.

The serial numbers and letters save much clerical work when it comes to repeat reports, and also provide a useful check on intruders which change their call-signs at frequent intervals. Lists are kept both in order of serial number and frequency.

The 'A' report goes to the GPO, via RSGB Headquarters, on a special form. Traffic samples are submitted with all possible information. Since January 1959, 367 reports have been made (excluding those repeated), and the RSGB lists have been discussed at both Geneva and Stockholm ITU conferences.

When a report is received from RSGB, a GPO monitoring station listens for the suspected intruder, and if the Society's report is confirmed, all possible action is taken in an endeavour to get the intruder moved.

Often the GPO's efforts succeed, but in other cases the problem is much more difficult. Not all nations are signatories to the existing Radio Regulations. Others are openly unsympathetic towards the radio amateur. Nevertheless, results are obtained, and the world is made aware of the fact that no non-amateur station, audible in the UK, can park for long in an exclusive amateur band without having its transmissions monitored and reported. Thus, many would-be intruders are discouraged.

It is hoped that amateurs in other countries may find their own licensing authorities willing to agree to the setting up of intruder watch organizations similar to our own. The more this is done, the less will be the threat to, and misuse of, the exclusive amateur frequency bands.

Insurance on Amateur Radio Equipment

From time to time enquiries are received at Headquarters regarding insurance cover for radio equipment and aerials. Members may like to know that some companies regard Amateur Radio equipment as covered by the terms of the normal Householder's Comprehensive Policy but members are advised to check this with their own particular company. Cover for aerials can generally be arranged for a small extra premium.

In those cases where a company does not consider Amateur Radio equipment covered by the Householder's Comprehensive Policy, it is generally willing to extend the cover at a nominal extra cost.

Current Comment (Continued from page 283)

would almost certainly entail being in one of the larger cities.

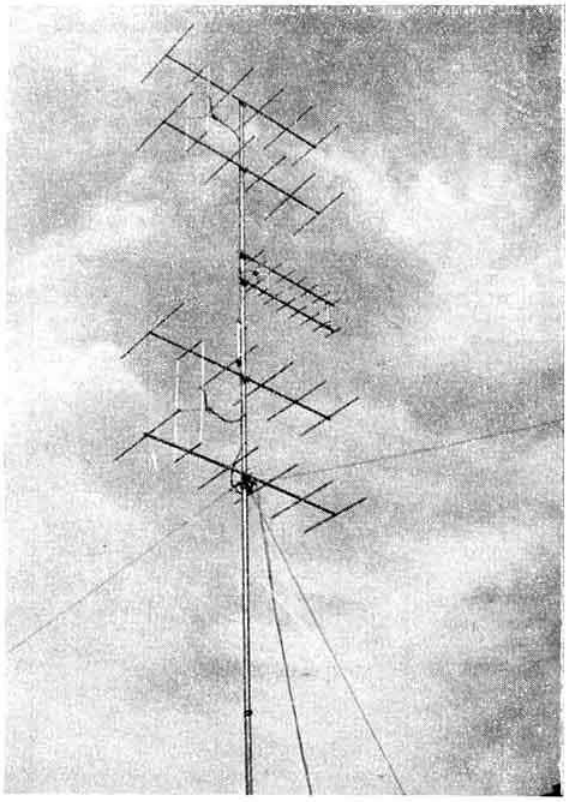
From a practical point of view, and ignoring preferences based on personal motives, it seems that London is the only possible choice, a view endorsed by the Regional Representatives at their conference in 1961.

In writing this summary of the position regarding Society Headquarters, we have tried to present the facts fairly and without bias. Some members will probably disagree. Whether they agree with our conclusions or not, we hope that members will express their own opinions when sending their contributions to the Headquarters Building Fund. Donations, large or small, will be most welcome and will help to bring about a Headquarters, wherever it is finally established, of which we are all proud. J. A. R.

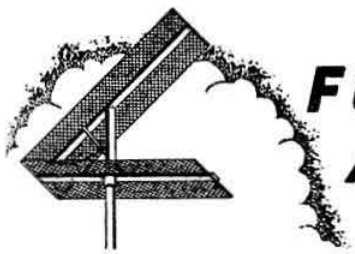
The Miniphase V.F.O. (Continued from page 291)

two main disadvantages: (i) the frequency drift of the unit is multiplied as the basic oscillator frequency is multiplied, and (ii) the frequency covered per division on the tuning dial increases as the basic frequency is multiplied. A mixer or heterodyne oscillator of the V7M type should have a high order of frequency stability and this is found in the Miniphase equipment where the manufacturer states that the warm-up drift from cold should not exceed 800 c/s, with any subsequent drift not exceeding 30 c/s. This makes the unit ideally suited for use on s.s.b. and break-in c.w. where the stability requirements are onerous for satisfactory operation. The use of the V7M in existing equipment is facilitated by the fact that the tuning dial, size and drilling template is identical to that of the comparable Geloso exciter unit, with which it is thus fully interchangeable. The unit is made in Italy.

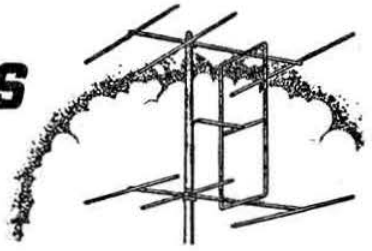
As far as the writer is aware this is the first mixer type exciter unit to become available commercially and it will obviously find many applications in transmitting equipment of all modes. Enquiries should be addressed to K.W. Electronics Ltd., Vanguard Works, 1 Heath Street, Dartford, Kent.



The Miniphase 16 element stack array for 144 Mc/s. The forward gain is claimed to be 16db and the front-to-back ratio 30db.



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW *

IT is some time since there was any news of auroral propagation but during the evening and night of September 22/23 there was such an opening. **GM3LDU** (Clarkston, Renfrewshire), reporting on this, says that it was very widespread indeed. It was apparently first noticed in Wales, as GW2HIY was heard at 20.15 GMT calling CQ aurora, although no auroral characteristics were then noted on his signals. GM3LDU worked GW2HIY who reported noticing auroral effects on TV. GW2HIY then contacted GM3OFY and during this QSO GM3LDU noticed auroral effects on GW2HIY's signals at about 20.55 GMT. This phase ended at about 21.10.

The next phase appeared at 21.28 GMT on GM2DRD's signals but there were no replies to CQs. At 22.54 GMT GM3LDU heard GB3VHF at about S4. By 23.10, GB3VHF was S6 and carriers were appearing all over the band. The first c.w. station heard was G3AWL, and EI4R/P was contacted at 23.25 GMT (57A/56A) followed by G3AWL (56A/59A). After this QSO at 23.26, GB3VHF was up to about S9. GB3CTC was also heard for the first time. At 23.40 ON4SY (58A/58A) was contacted. After this there were no QSOs until 00.11 GMT when GB3VHF was S9 and GB3CTC S7. OZ3GW, OZ6AL and an OZ2 station were all heard at this time, at 57A. At 00.11, SM6CSO (58A/58A) was raised, and at 00.28 PA0LX (58A/58A). At 00.53 SM6PU (58A/58A) was worked and at 01.02 ON4FG (58A/58A).

No more stations were contacted after this until close down at 01.40 GMT. During the latter period, however, SM6CSO was heard calling OH6PT and an SM5 station which were not heard by GM3LDU. At 01.40, GB3VHF was still S5 and EI2A, ON4TQ, PA0LX and SM6CSO were all heard just before close down.

Between 00.20 and 01.40 GMT on September 22/23 **G3JR** (Barnes) heard GM3LDU and EI2A peaking 57A and 58A most of the time. GM3LDU was heard working ON4FG, PA0LX and SM6PU. No other stations were audible and G3JR was regrettably unable to contact GM3LDU who was however audible and frequently called during this period.

G3LTF (Galleywood) observed very high solar noise on September 22 on both 2m and 4m and kept a lookout that evening until 23.00 GMT and heard nothing unusual. This is strange considering that GM3LDU heard the Wrotham beacon via aurora. The following day brought no joy either and the noise was then considerably lower.

Surprise Opening on 144 Mc/s

Under the influence of a high pressure system moving across the southern part of the British Isles and the Continent, a surprise opening occurred on 144 Mc/s on October 11, 1963. First signs occurred early in the day as Band II f.m. broadcast stations improved rapidly in strength, and that evening phone contacts were possible from Ireland to Germany and from Scotland down to Central France. Stations were heard from G, GM, GC, GI, GW, EI, F, PA0, DJ, DM, and SP, and the appearance of LX1SI gave many a new country. Conditions were equally good on the following morning, but a slow deterioration occurred as the day passed, until the evening left only the nearer and stronger Continental stations workable from the London area. By Sunday morning conditions had returned to normal as a sharp drop in pressure followed the "high" across the country. A short but interesting opening which for one evening produced conditions on 144 Mc/s approaching the congestion of the DX bands at sunspot maximum.

V.H.F. NFD 1963

Leading claimed scores in V.H.F. NFD, taken from the logs submitted, are listed below. They are, of course, subject to scrutiny, and the list must not be taken as a result, merely as preliminary information.

G3FRV/P G8RW/P	53460	G3FZL/P G3IIR/P	41181
G2RD/P G3ODY/P	53151	G3OHF/P G3BAK/P	33766
GW4LU/P G3MAR/P	48293	G3XC/P GI3KYP/P	32523 17887
G5ZT/P G3LMG/P	45648	GI3HXV/P GW2HIN/P	17169
G3ENY/P GW3KMT/P	45050	GW4CG/P GW3REQ/P	12593
G2HOP/P	42112	GM6XW/P	5242

V.H.F. Mobile Polarization

The question of polarization of v.h.f. mobile aerials was raised in a Letter to the Editor by G3GGK in the October issue of the BULLETIN. The V.H.F. Committee are anxious to consider the relative merits of vertical polarization as against the usual horizontal, and would be very interested to hear from anyone who can comment on experiences or tests carried out on 2 or 4m using vertical polarization. A report has already been received of a test on 2m involving G3IIR/M and G2LW/M, using alternative polarization while making an extended journey together, when the average signals received at G3OSS and G3JXN showed no advantage to either mode. Information on tests or theories should be sent to the V.H.F. Committee at Headquarters.

Two Metre News and Views

G2HIF reports that every member of the AERE (Harwell) ARS enjoyed V.H.F. NFD. They had their troubles including the failure of their main p.e. generator from which sprang many other electrical faults including some burnt-out transistors! Conditions were fair to average plus.

G3JGJ (nr. Newton Abbot) heard a fair number of

* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the December issue to arrive by November 8, and for the January issue by December 6.

stations during V.H.F. NFD but only worked two, G5ZT/P and G3LDY/P. The best DX heard appears to have been G3FRV/P, G5LK, and G3IOO.

G2PL (Wallington) has now had more than ten two-way QSOs on s.s.b. including one with PA0FB, but it was hard work and arrangements have been made to switch to high level a.m., which has paid dividends because ON, F, PA, DJ and GW stations have now replied. All the same, G2PL would like to fix some s.s.b. skeds. He recently called DJ5IA who was on s.s.b. for an hour, but it appeared that he was only working a.m. stations! Many good QSOs have been had with Lancashire and Yorkshire stations; G3RND is usually an outstanding signal at Wallington.

G3FD/P (Dunstable Downs) had a good time on V.H.F. NFD, working 44 portables 55 fixed and nine Europeans with a claimed score of 17,491. The best DX was G3BJD/P near Millom, Cumberland and the best European was PA0ZR/P. Other DX QSOs were G5ZT/P, GW3JGE/P, F9NJ and ON4BJ/P.

G3EMU (Canterbury) was active during the very good openings of September 14/15. The latter day was devoted mainly to DL stations. He would be very pleased to hear from anyone who has obtained reasonable results from a transistorized super-regen on 2m, as all his attempts so far have been unsuccessful! **G3GUD** is now working in Aylesbury, and will accordingly no longer be heard from Oadby, Leicester. He hopes to come up on 2m from a new QTH somewhere in North Bucks soon.

G2JF (Wye, Ashford) lists the following new G stations worked on 2m during September: G3RHO, G3PNI, G6UT, G3MPN, G3GDA, G3EAT, G3PD, G2FFT and G4JW. The excellent conditions around September 13/15 brought numerous DL/DJ contacts including a number in Berlin, in addition to half a dozen OZ stations and SM7BAE who is invariably around when conditions permit. The contest helped towards a total of 430 QSOs for the month, 278 of which were with Continentals.

G2BJY (Walsall) says that it was ironical that conditions should have changed so much for the better the week after V.H.F. NFD. During this period (September 12/17) conditions were good to the South and five French stations were heard, the best one being F8MX/A 59. Stations over 100 miles distant worked during the period were: G4CM, G3OBL, G3BDX, G4DC, G3NGS, G3PTB, G3MRA, G5ZG, G4PS, G8UR, G6GN, G8DV, G2AXI, and G3OUF. Conditions were very poor after this opening and the only QSO at any distance was with G3JXK/A in Ashford (Kent) on October 3 when the band appeared otherwise dead.

G3OCB (nr. Truro) says September was better than August but less good than the same period in 1962. Conditions were quite good during the V.H.F. NFD, when G3XC/P was manned by G3XC, G3NVJ, G3OCB, G2BHW and G3DCJ among others. Nearly 60 stations were worked by midnight Saturday; but only another 20/30 were worked in the remaining time and the final score claimed was just over 30,000. One amazing point: during the afternoon G5TZ could be heard working French stations which could not be heard at 1,000 ft. a.s.l. in Cornwall whilst at G3IGV's QTH only two miles or so away and much lower, they were S7. A few weak PAs and ONs were heard—too weak for QSOs. The weekend September 13/14 brought better conditions and GW2HIY was worked 59 both ways on the halo whilst /M at Redruth; others worked on the halo were EI2A (58 each way) and G5TZ (59+). From the Home QTH on September 14/15 G3HWR and G3KDG were worked on s.s.b. with a PA heard at good strength, all about midnight. The 16th was poor, although G3CCA was heard. G3BA and GC2TR were also heard. Weather on the 17th did not seem indicative of good propagation but a trip to the nearby high ground resulted in good QSOs with several stations including G6GN and G3NED (South Yorkshire). On the 30th G3BA was worked, the first s.s.b. contact between the two stations. G3OCB's opinion is that activity was low although conditions generally were not too good, but G2DQ and G2JF proved that GDX is possible more frequently than is suspected. Two new stations on the band are G3NKN (nr. Bodmin) and G2DCJ (Penzance).

G3JR (Barnes) has been awarded WALT ("Worked all London Town," Grafton Radio Society) No. 3 certificate, the first for all 2m working, and endorsed for phone. This is quite an achievement when it is remembered G3JR's indoor aerial is at near river level!

The award calls for QSOs with at least 65 London Postal districts and is by no means easy on any band. G3JR feels that this could prove a very interesting target for other 2m stations.

G3LTF (Galleywood) has had some MS reports on his Perseid signals. LZ1DW (Sofia) reported several half-minute bursts at S7/8. The distance is about 1,200 miles. He and HG5KBP reported S9 pings at times. UP2NMO (Lithuania) reported hearing G3LTF when the latter was trying to work UP2ABA. Having received two QSLs from OK listeners who heard him last year, G3LTF wonders whether we have any SWLs here who listen to European MS signals? On October 7, conditions were good to the south-west and G3OCB was worked on s.s.b. The Cornish beacon, GB3CTC, was S8, the best signal yet. G3SHK was called without success.

For **G3HRH** (Digswell, Herts.) a relatively quiet and inactive period early in October came to a very abrupt end on Friday evening, October 11 when the receiver was switched on ready for the Mid-Herts. net at 20.00 GMT. Before reaching the net frequency of 145·1 Mc/s a tremendous signal was found calling CQ, and it turned out to be GC2TR, who had been avidly sought by G3HRH for years for a first time Jersey contact to bring the all-time counties score up to 69. After exchanging reports of 59+ both ways, GC2TR passed on the information that French stations as far South as the Swiss border had been worked by him, and sure enough a quick check after that QSO revealed a very open band rapidly filling with activity. F8AV in the Vendee Department was worked, followed by F1AY (Oise), and ON4XJ on the German border. Then followed QSOs with F8AT (Indre-et-Loire), F8TP (Allier) and F8NB (Seine-et-Oise) before the first station was heard calling LX1SI who was soon found an S9 signal (surprising what hides behind G QRM!). An extended wait and a little less finger-nail finally brought the QSO for country No. 14 on 2m. At this stage G3HRH felt that he had earned his night's

The Society's V.H.F. Manager, G3HRH, in his roof-space shack.

rest! A comment on the Friday evening was that due to the extremely high activity level and fantastic signal strengths, for G3HRH the pleasure of operating was marred by the QRM reminiscent of 40m, and appalling cross modulation and overload, producing numerous image signals to add to the difficulties. It would seem that for such conditions, a receiver with perfect shape 2 kc/s bandwidth i.f. and a front-end capable of handling a dynamic range of signals of the order of 120db is now essential.

In contrast, conditions on the Saturday morning were excellent, with a well spread out level of activity and propagation conditions possibly better than the previous evening. Between 08.00 and 09.00 GMT excellent QSOs were made with F2RQ, F9DZ, F3FC, F3NB, F2NU and F1DG (all in Paris or suburbs), F1DC (Seine-Maritime), F9ZA (Calvados), and F3FX (Eure). Later that evening conditions were on the decline but F2LG (Nord) and DJ9DK/P (Solingen, DL66) were worked. A quick check on Sunday morning revealed normal band conditions and an end to a very short but quite spectacular opening. G3HRH comments on the similar opening to Scandinavia on the same weekend two years ago, and the generally good record of October for anomalous tropospheric propagation. It would seem to be a month worth watching.

For over a year a Sunday lunch sked. has been maintained on 145 Mc/s with **G3FUR**, with a record of 100 per cent on phone over the path between Digswell and Stamford, Lincs. During the period G3FUR has been slowly increasing his e.r.p. by changes to transmitter and aerial system and it is interesting to note that, although the peak signal strength has not appeared to increase significantly, a disproportionate improvement has been observed in the deep fades to which the signals are often subject due to the rather difficult path involved at the Digswell end. It is hoped to start a similar weekly test on 420 Mc/s in the near future.

From **G5UM** come details of his " holiday with radio " in Argyllshire at the end of September, when he took along the " pipsqueak " and a collapsible five element aerial capable of being erected alongside the car on what he calls " two broom sticks in cascade," at a height of about 10 ft. On the outward journey the station was set up near Hadrian's Wall in the National Trust Car Park, some miles West of Hexham in Northumberland. Nine stations worked in quick succession included G3FCY of Hull as the farthest at about 120 miles. A comment received from G3IOE of Newcastle was, " Please publicize as much as possible the large amount of activity that exists in the North-East, and persuade the southerners to turn their beams on us more often."

Arriving at the Kintyre Peninsula there was a warm welcome over the air from GM2FNF and GM2UU. G3IUD (Wilmslow) and G5YV (Leeds) were worked on c.w. at just under 200 miles. Later during the week operations by GM5UM/P had to be suspended due to a Force 10 gale. But towards the end of the week, when GM3GZA was visited, a 2m demonstration became imperative in order to " sell " the charms of the band. Once again up came GM2UU booming forth inside the car while the wind boomed outside, and then—despite the low barometer—a good contact was exchanged with G3BA in Warwickshire at just under 300 miles. In all, 19 contacts were made on five nights. Input was 7 watts telephony and 8 watts on c.w.

Nuvistor Converters

G3BLP suggests that by reducing the output coil (L5) in the G3FZL/G3IIR 144 Mc/s Converter (described in the October, 1962, issue of the BULLETIN) from 2½ to 1½ layers of 32 s.w.g. enamel wire, a bandpass effect can be obtained at the tunable intermediate frequency.

G3FZL states that output of the 70 Mc/s converter described in the same article can be modified for a tunable i.f. of 2·2-2·4 Mc/s by removing the fixed capacitors from the Maxi-Q i.f. transformer and connecting the two coils in series.

Meteor Scatter on Low Power

Apropos G5YV's remarks in the August issue **G3HBW** writes " It is indeed perfectly true that meteor reflection QSOs may be made without the use of high power, in some instances with great ease. The QSOs made by OK2LG and OK2VCG (as he then was) with 30 to 50 watts input provide sufficient evidence for this, and in fact, the bursts heard from certain stations are so very strong as to lead one to believe that meteor contacts might well be made with 10 watts input and a dipole, under the right conditions! However, such signals are received as a result of reflection from so-called " overdense " meteor trials, which are very effective reflectors but much rarer in occurrence than " underdense " ones, which provide far weaker signals. The signals received from these are usually in the " marginal " category and this is just where high system efficiency, i.e. high r.f. output and low receiver noise factor are of great importance. It is suspected that most, if not all, of the meteor scatter QSOs made in Europe to date have used only overdense trail signals, whose rate of incidence is such that contacts usually take from 1½ to 3 hours to complete. If underdense trail reflections may be used to pass readable information, this time could be shortened very considerably, without doubt. In some showers, these very weak background signals are received almost continuously, in fact.

This was very noticeable during my earliest QSO with OE1WJ and in many other attempts, including the most recent, with HG5KBP. Some of this is no doubt due to what is little more than meteoric dust resulting in what is virtually an enhanced level of ionospheric scatter. However, the point is that a few more db of system gain would no doubt have made these signals much more readable. It cannot be denied that the use of higher than normal power may only be justified over paths which give marginal signals and the original permits were granted for experiments in tropospheric scatter over very long paths, but it is also certainly true that the " underdense " signals in meteor working provide another equally justifiable case."

S.S.B. on 144 Mc/s

A member has queried Item 8 of the Recommendations of the Region I V.H.F. Committee made at Malmö in June (see page 185 in the September BULLETIN). It was felt that the wording of this item inferred an instruction to all s.s.b. operators that they *must* work in the sub-band 145·75-145·85 Mc/s. The intention of the Region I Committee is to *advise* s.s.b. operators to use that part of the band to restrict the amount of searching required, and to facilitate net procedure, but no obligation to do so is intended or to be inferred. As stated in the report, the RSGB was unable to accept this recommendation, due to the existence of the British Isles Two Metre Band Plan and for the time being all UK operators are strongly urged to abide by the Plan, irrespective of the mode of transmission employed.

Four Metres

G2HIF reports that G3NNG/P (one of the AERE Harwell stations in V.H.F. NFD) found conditions not so good as in June, but low activity gave the impression that conditions were worse than they actually were. Their claimed score for 4m is 6,963 points. **G3FD/P** claims 3,505 points for V.H.F. NFD with 17 portables and 17 fixed stations worked.

A.3278 (Goring-by-Sea) first heard signals on this band in March last, whilst using an old TV turret tuner, the coils of which he had rewound to cover 70 Mc/s. The output of this converter was fed into a 52 Set at 8 Mc/s. In May a new converter was built using an ECC85 as a cascode r.f. amplifier, one half of an ECC81 as the mixer, the other half serving

V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144.10 Mc/s	A1	North-East
GB3VHF	Wrotham, Kent	144.50 Mc/s	A1	North-West
GB3GEC	Hammersmith, London	431.5 Mc/s	A1	East

RSGB V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham, Kent, when measured by the BBC Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s):

Date	Time	Error
September 24, 1963	17.15 GMT	310 c/s high
October 3, 1963	10.27 GMT	840 c/s high
October 8, 1963	14.00 GMT	566 c/s high
October 15, 1963	11.15 GMT	906 c/s high
October 22, 1963	11.00 GMT	610 c/s high

as the oscillator. An EC91 preamp (*Amateur Radio Handbook* design) was also built. The 52 Set was retained as tunable i.f. This arrangement gave very satisfactory results and made it possible to compile a check log during this year's 4m contest, good enough to win a certificate of merit. An E88CC obtained in July for 1/6 replaced the ECC85 with astonishingly good results. The aerial system was now looked at as being an essential factor in a poor location (only 5 ft. a.s.l. with almost all round screening). A new three element beam in the loft is still only about 10 ft. " off the deck." This was completed just before V.H.F. NFD and a CR100 replaced the 52 Set. In all, 143 stations were logged, including 28 stations in eight counties, which brought the overall total to about 40 stations in 10 countries. The best DX were G3PYE/P and G2YU/P (Norfolk). Among others heard were G3GOX, G2DQ, G3IUL, G3FIJ, G8BJ, G3PEU/P, G3MFB/P, G3REI/P, G8RW/P and G2RD/P and, of course, most of the local Sussex stations. Conditions were best on the Saturday evening and Sunday morning. A good but somewhat short opening occurred between 10.00/12.00 GMT on October 6. G3JHM/H reported that stations as far away as G3FDW (Cumberland) and G3RND (Yorks.) were easily readable, whilst nearer stations were S9.

Seventy Centimetres

G3NNG/P found conditions " abysmal " until September 8, but maybe the rain water (25 c.c. approximately) in the feeder didn't help; anyway, the claimed score of 9,498 points is not so bad as all that! **G3FD/P** worked seven portable and four fixed stations in V.H.F. NFD and claimed 3,705 points. **G3EMU** (Canterbury) made his first attempt on 70cm working PA0COB and F8MX with his 8012 tripler. He also heard several DLs and ONs, so the receiver is now quite in order. A lunch-time sked with PA0EO has only missed three times recently. Another sked has commenced at 06.30 GMT with PA0WX to study early morning propagation conditions.

Twenty-three Centimetres

G3NNG/P worked G3HBW/P during V.H.F. NFD and has claimed 910 points. Regarding the G5NF/F8MX/A QSO reported recently, **G2RD** asks us to say that the " G2RD square cavity " is basically a design of G3FP's and was made from some of the latter's drawings. G2RD was very pleased to work G3LTF and G3LQR on September 16. The path to G3LQR is about 62 miles.

Tests by **G3LTF** with F8MX/A after their QSO resulted in the French station being heard *each night* until Bert returned to Paris. Signals were usually about S2/3 but on several occasions solid copy phone at S6/7. Until September 26 the 4 ft. dish was used but after this a 15 ft. unit which is more solidly mounted and better able to stand the winds was brought into service.

G3NOX/T (Duddenhoe End, Essex) worked **F8MX/A** (St. Valery) on 1296 Mc/s at 22.30 GMT on September 14 but although phone signals were of excellent strength, it was not possible for F8MX/A to receive a picture.

The 1296 Mc/s equipment at G3NOX/T includes a 3CX100A5 tripler in a cavity (to the design in the RSGB *Amateur Radio Handbook*) at about 25 watts input and a crystal controlled converter of the type described by B.R.S. 1224 in the February 1963 issue of the BULLETIN. The aerial is a 4 ft. parabola.

Three Centimetres

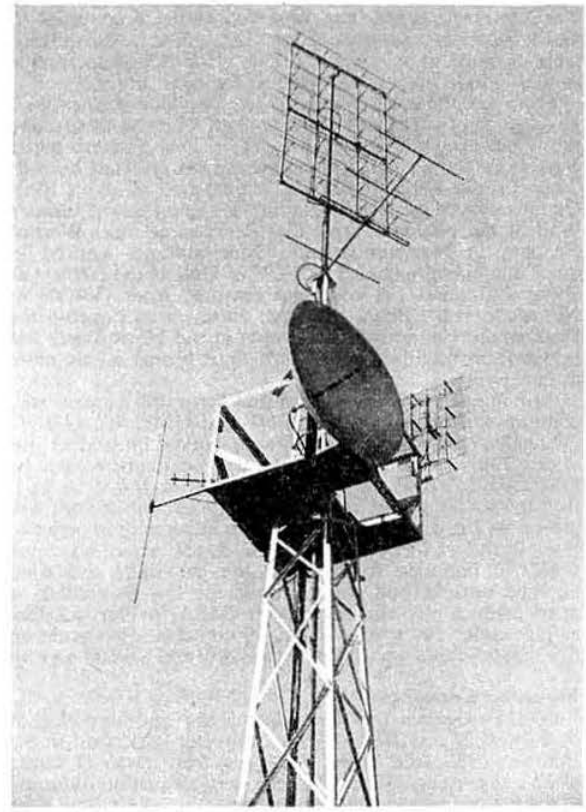
G3GUD (Aylesbury) has been experimenting with 3cm equipment. With the aid of a 723A/B and the necessary waveguide and parabola, a signal was put out. Part of this signal was mixed in a 1N23B diode with the signal bounced back from a moving object and fed to an oscilloscope. This, of course, is the basis of a Doppler radar system, but, says G3GUD, it is surprising what can be observed (e.g. someone walking 60 ft. away!) with such simple equipment " and it's a change from the usual run of amateur radio!" Some of the gear was loaned by G3HAN.

North West V.H.F. Convention

The North West V.H.F. Convention, organised by the North West V.H.F. Group, and held in Manchester on October 5, 1963, was a great success. The guest of honour was the Society's President, Norman Caws, G3BVG.

During the afternoon, there were visits to Ringway Airport to see the telecommunications and radar facilities and to the Jodrell Bank Observatory, followed by a series of

(*Continued on page 308*)



The aerial installation at G3NOX/T showing the 4 ft. parabola for 1296 Mc/s. Other aerials include a 64 element stacked array for 420 Mc/s at the top of the mast, a 16 element stack at the side of the platform, and aerials for u.h.f. TV.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS, G2BVN *

WITH the approach of the minimum of the current sunspot cycle, operators on the h.f. bands will be interested to have information from the Swiss Solar Observatory at Zurich dealing with solar activity during 1964. The annual mean of the sunspot numbers since the last maximum are:

1957	190	1960	112
1958	185	1961	54
1959	159	1962	38

It is expected that the mean number for 1963 will be in the region of 25. For this year it had been predicted that the smoothed sunspot number would drop from a figure of 28 at the beginning of the year to about 15 at the end, whereas the observed number at the beginning of 1963 was 29, and the figure for the end of the year cannot yet be determined. The year 1964 is expected to show a decrease from about 18 at the beginning to about 10 at the end of the year.

The question now arises for how long will the solar activity continue to fall and at what time activity will again increase. Although it is true that the first sunspot of the next cycle appeared on August 28, 1963, it is not probable that the minimum of sunspot activity will occur before the end of 1964, and this is expected to be a weak trough with a smoothed sunspot number not higher than about 5. As the predicted number for the end of 1964 is 10, it seems likely that the actual minimum will occur during the early months of 1965, although the time of the minimum depends very much on the rising rate of the coming cycle. As this is expected to be one with a weak maximum it is not impossible that the minimum could be delayed until 1966.

Whatever the actual date of the minimum it is certain that solar activity will be at a low level throughout 1964 and 1965. Conditions for short wave communication are not materially different whether the sunspot number is 0, 5 or 10, and the next two years will bring a quiet ionosphere with the minimum electron density, leading to critical frequencies of low values with the consequent employment of lower frequencies to ensure satisfactory communication.

The Swiss Short Wave Service transmits regularly the daily relative numbers for the past month in addition to predictions for the coming six months. These transmissions take place at 20.35 GMT on the first Saturday in every month (except February 1964 when this broadcast will take place on the 8th of the month) on wavelengths of 49·55 metres and 42·19 metres and are specifically directed to Great Britain.

The writer is indebted to Professor M. Waldmeier of the Swiss Solar Observatory for permission to reproduce the above information.

* Please send all news items to RSGB Headquarters to arrive not later than **November 8** for the December issue and **December 6** for the January 1964 issue.

News from Overseas

VK4JQ on **Willis Island** has been sporadically active during recent weeks, mainly using s.s.b. The equipment in use is a Swan transceiver (provided by W6HYG) which can only tune above 14,180 kc/s, but has in addition crystal controlled frequencies of 14,120, 14,130 and 14,148 kc/s. If therefore VK4JQ is transmitting on 14,148 kc/s it is a waste of time to call him on this frequency as he will be listening above 14,180 kc/s. Aerials in use comprise two dipoles, one directed towards Europe and the other towards the USA. Log details are passed over the air to VK3AWX and thence go by air mail to **W6HYG**, who is acting as QSL manager. In so far as the UK is concerned VK4JQ has been worked at times between 10.30 and 14.00, with his signals peaking towards the latter time.

A request from the engineers of **Radio Ceylon** comes via VS1LV and G3WP and asks for reports on their transmissions on 15,333 kc/s between 06.30 and 07.30. Details of readability, signal strength and fading should be given on any reports which may be sent to Radio Ceylon, Colombo.

Perim Island, at the mouth of the Red Sea, one mile from the Yemen, 150 miles from Kamaran Island and 100 miles from Aden, is the scene of current activity by **VS9PHH** (ex-5H3HH). ARRL have said that for DXCC the island will count only as Aden. QSLs should be directed to W2CTN.

5N2JKO continues activity from Zaria with the emphasis on s.s.b., being now up to 111 countries in 12 weeks of operation on that mode. 5N2JKO mentions that no less than five Nigerian stations were active on s.s.b. on Republic Day, October 1. **5N2SMW** leaves Nigeria for good on December 12 and **5N2RSB** is being posted to Germany, and not Northern Ireland, as previously mentioned. 5N2JKO has provided the writer with a list of the licensed stations in Nigeria, and any reader desiring a copy may have this by sending a s.a.e. to G2BVN.

VK4SS (Brisbane) has been concentrating on 7 Mc/s and has found Europe workable around 06.30-07.00 and again at 19.30-20.00. Stations consistently heard include G3ASG, G3JQS, G3JAG, G3PAN, G3PEK, G3PIT, G5DQ and G8JR. VK4SS draws attention to the frequent waste of spectrum space in the segment between 7000 and 7010 kc/s, where many stations call CQ, listen only for a few seconds and then call again, generally receiving answers from large numbers of short skip stations. Careful listening would often reveal a second layer DX station desirous of a contact.

Hurricane Flora, unhappily the cause of loss of life and devastation in the Caribbean, has damaged many amateur installations in the area, and dislocated the dxpeditionary plans of several groups. This hurricane, first spotted by the Tiros weather satellite, achieved velocities of up to 140 m.p.h., far too high for the comfort of any normal beam array.

Floyd McCoy, **VR6AC**, reached Pitcairn Is. in *s.s Gothic*,

but unhappily did not long survive the journey and was interred on Pitcairn in mid-September.

VS9MB continues active on s.s.b. and c.w., but the present operators will become due for posting in the next few weeks, and nothing is yet known of any replacements who will continue to man the station. Operator Dave of VS9MB returned home on October 22 and will be pleased to deal with any outstanding QSL requests for contacts made by him; the requisite paperwork should be addressed to 6 Manor Close, Todwick, nr. Sheffield, Yorks.

DXpeditions

The **Kuria Muria** trip arrangements forecast that operation will commence from Hallaniya Is. on or about November 8, the operators concerned being VS9AAA, VS9ARV, VQ4IN and W4BPD. It is anticipated that the party will stay on the island for about two weeks, and the call will be VS9H, e.g. VS9HAA. All QSLs for this and any other operation involving VS9H should go to **W4ECI**.

Before going to Aden and Kuria Muria it is hoped that Gus, **W4BPD**, will have covered Nepal (9N1MM), Afghanistan and East Pakistan (AP5GB?). After returning from Kuria Muria Gus plans to return to AC7, AC5 and AC3, eventually arriving in Burma around December 29. AC3PT will again be on the air when Gus tests the installation ordered by the King of Sikkim for the amateur station to be set up within the Palace.

Juan Fernandez Is. was due to be activated by W4QVJ and party w.e.f. October 25 for a period of up to ten days, or possibly longer if circumstances allow. Operation was to be concentrated on s.s.b. using a SR150 and a SX117, and QSLs should go to W4QVJ (see *QTH Corner*). The use of GMT on QSLs is a must. The call is **CE0ZI**.

It is hoped that **VE3BSB** will be successful in obtaining

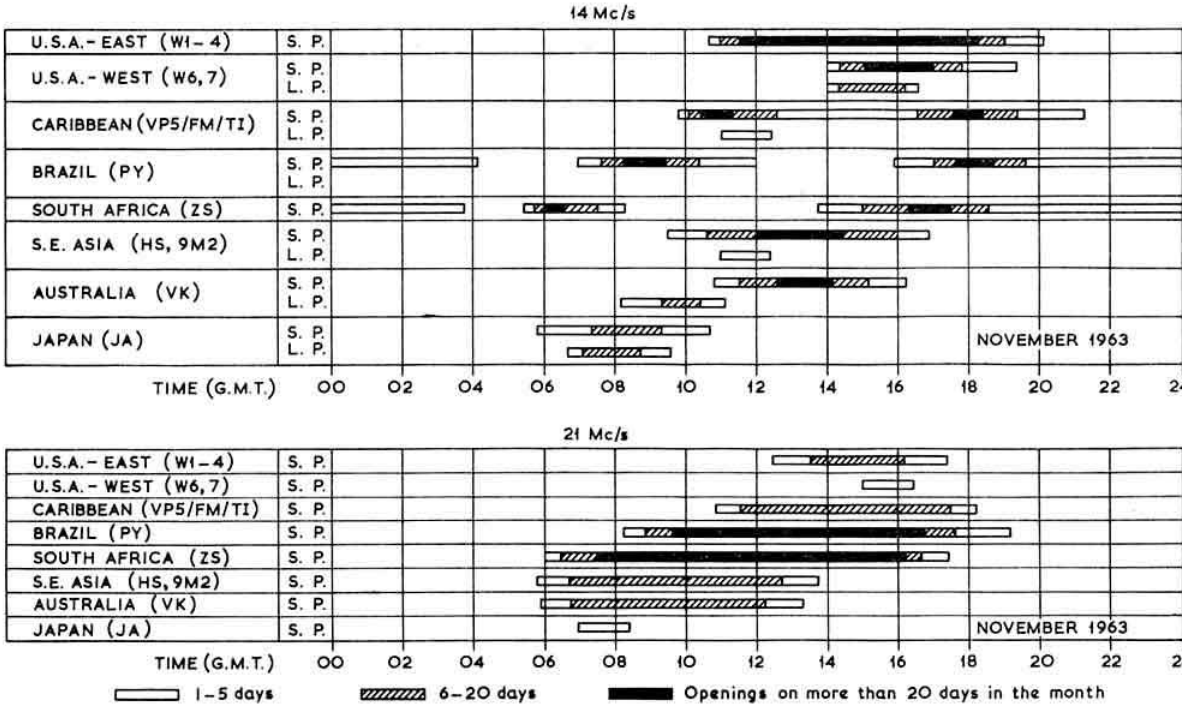
PROPAGATION PREDICTIONS

The month of November brings optimum conditions on the 28 and 21 Mc/s bands, but the improvement is much less noticeable at the present time due to the low sunspot activity. Additionally, the days are short and the average operator will have little opportunity for working DX during the evening hours.

On good days, the 28 Mc/s band will be open to South America between 10.00 and 16.00, and from 08.00 to 15.30 to Africa. On 21 Mc/s almost the same conditions will prevail as during the previous month, but due to the shorter days the band will close earlier. There will be few Sporadic *E* openings during the winter as this type of propagation occurs mainly between May and September. However contacts by auroral reflection may be possible on isolated occasions.

Conditions on 14 Mc/s will show little difference from the previous month but, again, the band will close earlier. In favourable conditions during the mid-winter months contacts may be possible with some areas by the indirect path. Such contacts are basically possible when the Great Circle path through both stations lies in the twilight zone, and in very good conditions it may be possible to contact Hawaii over the long path between 16.45 and 18.30. With the earlier closing of the higher frequency bands, 7 and 3·5 Mc/s assume greater importance, and communication is helped by the reduction of atmospheric noise which occurs during the winter months. On some days during the latter half of the night, the m.u.f. on the path to the Eastern USA may drop below 7 Mc/s.

The provisional sunspot number for September was 41 with the period of greatest activity lying between the 15th and the 23rd of the month. Predictions of the sunspot numbers for December and January, 1964 are 19 and 18 respectively.



permission to operate from **Togo** for a period of up to four months. Activity will be concentrated on s.s.b. at the low end of the band, e.g. around 14,120 kc/s. QSLs should go to VE3AXC.

An announcement by the **Hammarlund Manufacturing Co.** regarding the despatch of QSLs for dxpeditions sponsored by them gives October 15 as the date by which all **F9UC/FC** cards should have been posted, and **K8ITH/4** and **K8ITH/8** cards should have been posted by October 25. It was expected that QSLs for operation from Christmas Island (**VK9DR**) would commence on or around October 15 and continue during the period of the dxpedition as the logs will be received on a periodic basis. All QSLs from Hammarlund are confirmed by a committee consisting of eleven licensed amateurs headed by the President, Stuart Meyer, W2GHK.

During September **GW3MWZ/P** operated from the counties of Caernarvon, Montgomery, Radnor, Cardigan and Anglesey on 1·8 Mc/s. Results were very variable ranging from poor in Anglesey to excellent in Radnor, on which evening 24 contacts were made including PA0PN and OK2KGV. Commercial phone made reception difficult, whilst on some evenings very few amateur stations were heard. A later trip to Rutland produced good local contacts but little G DX. In all cases operation was from a car using a home built transmitter and an R109 receiver. The aerial was a Joystick mounted on a five-foot pole. GW3MWZ/P has now operated portable from eight Welsh counties.

Logs for the **VK6ZS/VK9** operation have been forwarded by VK9DR to VK6RU who has answered the few cards sent to him, and has sent the logs to **W8EWS,** to whom further QSL requests should be addressed. (G3AAE).

DXCC News

ARRL announce the **deletion** of five countries w.e.f. September 15, Singapore, Malaya, Sarawak, North Borneo and Manchuria, and the **addition** of (i) Singapore and Malaya, and (ii) Sarawak and North Borneo. Contacts for the two new countries must be dated September 16, 1963, or later, and no cards will be accepted for credit before February 1, 1964.

In response to enquiries ARRL have said that VS9PHH will count as Aden, and JB8 (Torishima) as Japan. Countries on the " banned list " at present are Cambodia, Indonesia, Viet Nam and Thailand.

A new prefix will come into operation in **Kenya** on December 11 at midnight, and this will probably be **5Z4.** This is subject to confirmation by the ITU.

Contests

The c.w. section of the **1963 CQ World Wide DX Contest** will take place between 00.00 Saturday, November 23 and 24.00 Sunday, November 24. The rules appear on page 262 of the BULLETIN for October, and log sheets may be obtained by sending a foolscap s.a.e. to G2BVN, stating participation in one or both sections of the Contest.

The **TOPS C.W. Club 80m Test** will take place between 12.00 December 21 and 12.00 December 22. European stations will score one point for European contacts and three points for all other contacts. Contacts with stations in the participant's own country will not count, but separate call areas in W/K, VE/VO, VK and U count as though they were separate countries. A bonus of ten points is allowed for each completed WAC. Contest exchanges consist of the RST report plus a serial number commencing at 001 for the first contact. The score is the total points multiplied by the total number of countries/call areas worked. Note: W/K, VE/VO, VK and U do not count as separate countries in addition to the multiplier allowed for each call area.

Awards

The **Diploma do Cafe de Angola** will be awarded to all amateurs who can produce proof of contact with the station of the Luanda Industrial Fair which operated under the call **CR6ARC** between October 5 and 27. Applications should be sent to Liga dos Amadores de Radio de Angola, PO Box 434, Luanda, Angola, Portuguese West Africa.

Don Miller, HL9KH, noted for his DXpeditions in the Pacific area during his tour of duty in Korea, recently visited CR9AH in Macao.

The **Worked All Islands Award** is announced by *The Denpa Kagaku*, a Japanese radio magazine. Full particulars may be obtained from JA1BN, Akira Tani, D541, Mukoharajutaku, Mukohara, Itabashi, Tokyo, Japan.

The first UK member of the Top Honours group of the **Certificate Hunters' Club** is **G2GM,** who has obtained over 200 awards in achieving this distinction. The membership of CHC now exceeds 1,000, and a large number participated in the **Annual QSO Party,** the leading UK stations being: *CHC:* G3LHJ (11,448 points); G5GH (4,998); G2GM (3.240). *HTH:* G3HRY (8,510); G3PEU (4,872); G3EYN (4,536). *SWL:* A.2340 (15,886); B.R.S. 24733 (9,471) and G.10414 (1,989). Awards offered by **Chapter 8** of **CHC** for highest European CHCer, highest HTHer and highest SWL were won by SP8YA (18,136); UB5KSP (23,660) and A.2340 (15,886), respectively.

The RSGB Honorary Certificates Manager, G3NBC, has been receiving a number of enquiries regarding **WAC** certificates, the applications for which were submitted some time ago. It is emphasized that WAC certificates are issued by IARU HQ at Newington, Connecticut, USA, and the RSGB can do no more than forward the applications as they are received from members. As soon as the certificates are received from the IARU they will be despatched by G3NBC.

Notification has been received from *CQ Magazine* that the Sideband feature edited by Irv and Dorothy Strauber, K2HEA/K2MGE, will be discontinued, and the S.S.B. Certificates programme will be taken over by Urb LeJeune, W2DEC, the DX Editor of *CQ*. It is certain that sidebanders everywhere will support a vote of thanks to K2HEA and K2MGE for their efforts both in connection with the certificates programme and also the Sideband Contests.

Around the Bands†

Two popular contests found excellent conditions during the past month. The Scandinavian Activity Contest (SAC) filled all bands 3·5 Mc/s to 21 Mc/s with signals. SM, OH, OH0, LA and OZ were equal in strength but no sign of OY, OX or LA/P was heard at G3PSY. The conditions on 14 Mc/s were excellent for the VK/ZL Contest on October 12/13.

† Compiled by J. G. Cottrell, G3PSY.

VKs in particular were roaring through on the Saturday and reports of 579 and 589 were common. Your compiler even received 599 from one VK but found it hard to believe! VP8GQ (South Orkneys) commented the same evening that conditions must have been good because of the activity he had heard during the day.

The general synopsis is that 1·8 Mc/s is again showing signs of life whilst 3·5 Mc/s is beginning to produce DX. On 7 Mc/s DX is to be found regularly through the jammers, chirpers, RTTY and other interlopers who have no business to be there. 14 Mc/s is as busy as ever whilst a number of reports for 21 Mc/s have appeared this month. Contacts on 28 Mc/s have virtually declined to nil response.

From **5N2JKO** (Nigeria) comes a useful report for **1·8 Mc/s.** During early September DL1FF, W1BB, G3GRL and G3OQT were heard and W2KQT and G3OQT were worked. QSOs between VP8GQ and G stations were logged. The latter part of the period was very frustrating for 5N2JKO as storms brought his aerials down and power cuts further impeded activity. **B.R.S.20317** (Bromley) reports dull conditions particularly when compared with previous years. He found 5A3CJ at 00.15 on 1828·5 kc/s but otherwise nothing interesting.

On **3·5 Mc/s 5N2JKO** (Nigeria) although troubled by static is now working Europeans after 23.00 GMT with best results between 03.00-04.00 GMT. **B.R.S.20317** (Bromley) lamenting that this band seldom brings prizes for the c.w. addict these days, does most of his listening on this band between 23.00 and 00.00 GMT, when a few Ws can be heard, notably W1SWX (23.04) and W2FYT around S5. PY1BTX has been heard on three occasions recently between 22.50-23.30 GMT at S4/5. Nearer home much activity in a Russian contest produced two new ones with UH8AA and UF6KAF both between 23.30 and 00.00 GMT at S7 on 3·525 Mc/s.

QTH Corner

AP2AR	Arifur Rahman, 36 Purana Paltan, Dacca 2, East Pakistan
CE0ZI	via W4QVJ, Box 3045, Jacksonville, Florida, USA
EI0RDS	via IRTS, 24 Wicklow St., Dublin 2, Eire
FK8AU	Box 637, Noumea, New Caledonia
FP8AZ	via K2IAD (home call)
FP8BT	via W2JBL (home call)
HL9TF	via W5MML
HS1B	Box 1038, Bangkok, Thailand
HS1L	via W7YB
KS6BA	P. Hodges, Box 307, Pago Pago, American Samoa
KV4CE	P.O. Box 1511, St. Thomas, Virgin Is. of USA
MP4BED	P.O. Box 116, Mamana, Bahrein, Arabian Gulf
PJ5MF	via VE6TP, G. H. Krehbiel, 12907, 136th Avenue, Edmonton, Alberta, Canada
TC3ZA	via G8KS, S. L. Hill, Rivenhall, Holwood Park Avenue, Farnborough, Orpington, Kent
TF2WIG	via K9RNQ
UR2BU	K. Kallemaa, Vaike-Tahe 14-1, Tartu, Estonia, USSR
VP2AJ	via W6JFG
VP2VS	via VE6TP, address above
VS1LP	R. Snyder, 53P, Nutmeg Rd., Singapore, 9, Malaysia
VS4IH	B. Shirlow, c/o GPO, Kuching, Sarawak, Malaysia
VS9PHH	via W2CTN
XW8AL	via K4KTR
XW8AU	P.O. Box 46, Vientiane, Laos
ZD8HB	H. Booth, c/o GMRD, Ascension Is., MU 660, Box 4187, Patrick AFB, Florida, USA
ZL1AZD	S. H. Mayne, Box 232, Kaitaia, New Zealand
5N2HJA	H. J. E. Alcock, PMB 5067, Ibadan, Nigeria
5N2LJM	Mrs. R. Mewse, c/o Airport Commandant, Aviation Division, Kano Airport, Nigeria
5N2RAM	R. A. Mewse, address as 5N2LJM
5U7AC	via W9RKP
9L1JC and 9L1CR	via WA4CXR
9L1TL	via ISWL
9L1NH	P. N. Heywood, Technical Institute, Freetown, Sierra Leone
9N1MM	(*operation by W4BPD*) via W4ECI, 3101 Fourth Avenue, Birmingham, 5, Alabama, USA

* * *

RSGB QSL Bureau: G2MI, Bromley, Kent

Also logged were UA9AR and UL7KBF same time and place. **A.2111** (Ilford) reports an interesting batch with 5A3CJ (20.25), VE3HF (06.05), VE2WN (06.04), VE3FSK (06.02) and ZL4LM (06.38) all on s.s.b. between 3·78 and 3·79.

The **7 Mc/s** band varies and conditions are not as good as some expect but DX is available for those who can work through the interference. **G3JAG** (Rochdale) spotlights AC7A giving 589 signals at 17.30 and 9N1MM, 599 at 23.30. Excellent signals also from HP1IE (06.30, 599), VK3AOY (17.30, 579) and K6IEC (06.45, 599). The last was the first opening to W6 heard by G3JAG this season and produced laudatory comments from the other end. Stations worked on c.w. also included KL7PI, VP2VS, FP8AS, W6YAW and 9L1TL, all between 06.00 to 07.30. Also VS1LU (16.40), AC7A (17.30), UA0SU (17.30), 5H3HD (18.30), HL9KH (19.55), JA6AK (20.10), KV4CI (21.40), 9Q5AB (22.30), VS9AAX (22.30), VP8GQ (23.05) and 5N2LAF (23.40). In Nigeria **5N2JKO** (Zaria) is finding regular contacts with Europeans and the USA, occasional G stations heard but no QSO yet and VKs coming through 20.40 to 22.00 and JAs around 21.00 to 21.30.

All who report on 7 Mc/s complain of the interlopers but it seems that this is a cross we must continue to bear. **B.R.S. 20317** (Bromley) provides his usual continental round-up as follows:

Europe. Little of note other than CT2BO at 23.40.

Africa. Americans have been heard calling VS9MB and ZD8HB (23.12). VQ4GT (17.50), ZD7BW (00.66), 5N2ACB at S7 and 5N2LAF, S5 at 23.37 GMT, all heard.

Asia. AC7A on both s.s.b. and c.w. 17.28-47 and 00.00-00.15. BY1PK in Peking S6 at 16.35-55 on 7·007 Mc/s. Although the paths to Central Asia have opened to UH8KAA at 14.50 only a few other stations have been logged. UI8ZE, UJ8AB, UL7BG and UA9s have appeared at fair strengths. Europeans are heard calling Japan without answer. VS9AAX still calls Europe 17.50 to 18.00. VS1LP has been heard in QSO with DL1FF at 23.06 (S6) and UA0AG appears at 23.36.

Oceania. KC6BO (16.00-16.50) appears regularly and VK5ZP at 15.46.

North America. The path has declined since August and the earliest openings heard have been at 22.25 (W3WJD/3) and W3LC (07.20) latest. The best signals came from W8FGX and VE1UH at 23.40. FP8AS was a good draw at 23.20-50.

Central America. Good signals from KP4AOO and KV4CL regularly (23.25), VP2MV (23.05), VP6LJ (23.20).

South America. Other than a few PY stations, HK1QQ was weak at midnight whilst the best DX is VP8GQ (22.40).

The above all indicates that success is very much a question of good listening.

As always **14 Mc/s** is giving good results and contact with any part of the world is only a question of timing. **G3YF** (Chingford) turns in a magnificent log to illustrate the point as follows. On s.s.b. HL9KR (14.15), 9N1DD (14.40), 9M2CP (14.20), VS1JH (14.35), 5N2JKO (15.52), HS1X (14.20), VS9MB (14.40), KC6BO (15.10), KM6BI (08.10), K7NNE/KG6 (14.00), VK9MD (14.50), AC7A (15.10), KB6EPN (08.15), VK4JQ (11.40), VS1MA (15.55), VK9DR (14.45), VS1MC (14.50), AC3PT (14.18), JT1CA (10.10) whilst c.w. provided FB8ZZ (17.20), UW0IH/0 (07.50), YA1AN (15.50), KC6BO (13.50), CR9AH (14.40), KG6AOX (14.00), PX1CR (14.10), XZ2KN (14.15), KR6AG (15.20), AC7A (13.40), VS4IH (14.15), VR2DK (09.15), HS1X (08.30), VR2EK (09.45), AP5CP (17.30), 9N1MM (14.30) and YI2WS (13.35). **G3POI** (London) reports ZS7C (17.58), 9L1TL (18.29), VP2AV (22.19), 5H3HV (18.39), AC3PT (17.26), VS4RS (14.05), OD5LX (15.03), TN8AF (17.33), ZD8HB (18.14), ZD7BW (18.17), 9N1MM (16.16), VP3YG (19.40) and FG7XJ (20.22) all on c.w. **G8JM** (Chingford) found on s.s.b. VK4JQ (11.30), KC6BO (14.00), ST2AS

(17.45), MP4MPA (14.50), XW8AU and XW8AL (15.40), MP4QAI (17.00), MP4TAX (16.00), HS1X (14.30), VR2BC (08.00), YA1AN (18.00), KS6BA (08.00), KM6BI (07.45) whilst c.w. yielded 5R8HB (16.00), ZD8WF (18.00), ZD8HB (18.10) and TN8AF (18.00). **G3PJW** (Wigan) has worked 9Q5PS (18.25), EA6AY (17.30), AC5A (16.20), TA4ON (14.50), VS9MB (16.30) whilst **A.3633** (also in Wigan) logged many interesting stations including KV4CE (01.54), BY1PK (12.46), OY7ML (13.00), AP2AC (15.40), 9K2AY (15.44), JT1CA (16.00), ZK1CD (18.12), 9A2BO (21.05), ZP5OG (21.36), CP3CN (23.19). **G3AAE** (Loughton) exchanged c.w. with VK9LA (16.15), HL9TF (16.00), UA1KED (13.00) on Franz Josef, UW0IH/0 on Wrangel Is., VP8HJ (19.15), KR8AG (15.30), FK8AB (12.00), XZ2KN (13.15), CR9AH (16.45). **A.3353** (London) reports hearing s.s.b. from XW8AL (12.55), JA0IA (13.43), ZL3OY (13.03), VP7NS (20.35) amongst others. **A.2111** (Ilford) provides an extensive list including HC2JT (21.20), VE7MO (20.30), PJ2CV (21.40), YN1LC (21.37), IS1VAZ (08.20), 9M2DQ (16.07), VS1MC (16.25) 5X5IU (19.58), KG4BQ (21.50), KA5RB (13.08), KA7AA (12.51) all on s.s.b.

OZ5S (Copenhagen) logged c.w. QSOs with AC7A (16.19), AP5HQ (16.45), CR7IZ (15.45), KL7FBK (07.48), VK5ZP (15.52), VQ4IQ (15.35), VS1LD (15.25), VQ2BC (16.30), TA2BK (17.25), UM8KAB (16.08), 6O1ND (15.08), 9L1TL (21.48) and 9N1MM (17.38), whilst s.s.b. accounted for AC3PT (17.03), F9RY/FC (18.35) and 6O1WF (19.30).

On 21 Mc/s **G3AAE** (Loughton) found FB8ZZ (12.00), ET3USA (16.15), ZD6OL (16.15), and 5R8AB (16.20). **G2BJY** (Walsall), seeking the DX again after a three year break, worked A1 with CR6FY (18.40), CR6FW (18.13), HK7ZT (18.40), HK7AJP (19.00), JA1EM (09.10), KZ5HK (16.45), KG4BX (19.45), KP4BJI (19.53), KP4AOO (17.53), PY5ASN (15.36), PY7BX (18.45), VP8GQ (11.45), YV4BE (19.12), ZD6OL (16.28), ZD3A (12.04), ZS6BJS (16.18), ZS6OA (16 41), 4X4LO (12.30), 5H3JI (10.05), 5N2RSB (16.15), 9Q5EH (16.18), MP4DAH (10.13). **G3RMF** (Worcester) found 9K2AY (15.45), TT8AM (11.55), ZE2JA (16.18), ET3GN (15.57), PY1NBA (16.10), PY1CBS (14.50), 5N2RSB (15.40), 5R8BX (16.10), and wishes that more activity was available on this band. **A.1798** (Winchester) heard a.m. from CR6FN (18.20), VP7NX (20.10), 9Q5TL (18.30), 9U5BB (18.43), FG7XL (18.15), CR7IZ (17.40), 9G1DM (17.43), LU4AW (18.10), PZ1BO (19.02), 5H3JL (17.31) and ZS1MV (18.00).

The **28 Mc/s** band is virtually dead again and the only comment comes from 5N2JKO (Zaria) who managed a QSO with a DL who worked all bands during September.

DX Briefs

Logs for the **Willis Island** operation of VK4WV and VK4HG are now with VK2AGH.

Activity from **Christmas Island** is provided by **VK9DR**, who is usually active at weekends, and by the club station **VK9MD**, which is on the air on Mondays.

TU2AU, operated by W8HMI, is active on most days until 23.00 or thereabouts. Frequencies used lie in the region of 14,050 kc/s for c.w. and 14,115 kc/s for s.s.b. QSLs should go to the US Embassy, Abidjan, Ivory Coast.

BY1AD has been active on 14,070 kc/s c.w. and has been heard calling CQ to Europe and making QSOs outside the usual countries.

VS4IH, VS4MD and **VS4RS** are all active on 14 Mc/s c.w. from Sarawak.

TC3ZA has been sporadically active from Turkey, and QSLs from stations outside the Americas should be sent to **G8KS** together with the necessary reply stamps or IRC. G8KS particularly asks that these cards should be sent direct to him and not through the Bureau to avoid causing excessive work to a voluntary service.

W2VZV asks why more UK stations do not operate at the low end of 14 Mc/s and specify the frequencies on which they will be listening at the high end. This procedure is most useful when the band is crowded as at weekends.

W1BB, one of the best-known DX operators on Top Band.

ZL1PV was worked by G3AAE at 19.50 over the long path on 14 Mc/s c.w. This is a time when New Zealand stations are heard only infrequently.

The call allocated to Bing Crosbie, G3NMQ, ex-5A3BC, has been corrected to **MP4DAH,** but the QTH given under MP4DAE in *QTH Corner* last month remains correct.

The trophy offered by K6MLS to the first operator contacting 300 countries on two way s.s.b. has been claimed by well-known DX'er Humberto Perez, **TI2HP.**

FK8AU is active during most weekends on s.s.b. on the low end of the 14 Mc/s band, and may often be heard in QSO with F9RY/FC.

QRA Locator Map

A QRA Locator Map of Western Europe, including the UK, can be obtained from Emiel Tielemans, ON4TQ, Grote Goddaert 12, Antwerp, Belgium, for 31 Belgian francs, post free.

The European Band Plan

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

Frequency Band	Type of Emission
3500— 3600 kc/s	Telegraphy only
3600— 3800 kc/s	Telephony only
7000— 7050 kc/s	Telegraphy only
7050— 7100 kc/s	Telegraphy and Telephony
14000—14100 kc/s	Telegraphy only
14100—14350 kc/s	Telegraphy and Telephony
21000—21150 kc/s	Telegraphy only
21150—21450 kc/s	Telegraphy and Telephony
28000—28200 kc/s	Telegraphy only
28200—29700 kc/s	Telegraphy and Telephony

RAEN Notes and News

By E. ARNOLD MATTHEWS, G3FZW *

Membership Registration

At its meeting on August 31 the RAEN Committee resolved that membership of RAEN shall be on an annual basis from January 1 to December 31 each year.

Members are therefore requested to send their membership cards to the Honorary Registrations Secretary, F. C. P. Flanner, G3AVE, 40 Parkhouse Drive, Birmingham 23, any time between October 1 and December 31 so that their cards may be franked as being valid for 1964. A member who fails to remit his card by December 31 will be deemed to have relinquished his membership.

It will be appreciated if members will send a s.a.e. for the return of the card to them after franking.

CCs and independent ACs may collect their members' cards and send them to the Honorary Registrations Secretary in bulk if they find this convenient.

Surprise Test for Norfolk

AT 5.30 p.m. on September 5 the Norfolk Group was called out in a surprise test by the County Police and requested to provide communications from Mundesley, along the coast to Caister, to three sub-control stations at Acle, Stalham and North Walsham, and thence to County Police HQ at Norwich, by not later than 7 p.m.! Apart from a failure of the rear link the test went off very well and the police verdict was good. The call-out system worked well; stations were operational within the allotted time and the mobiles and portables provided excellent communication with their sub-controls. Message handling was also good. Despite bad conditions this was the most useful exercise the group has had and a great deal was learned from it.

A repeat is being planned to overcome the snags, and an " inquest " was held on October 1. The CC, G3HRK, says that there is more genuine interest than ever in RAEN in the county now and there is plenty of activity.

Surrey Group Practice Alert

Of 23 members, 17 were immediately available when Surrey Group held their first full practice alerting test at 8.15 p.m. on September 6. The figures show that the revised alerting scheme does work, and, more important, that the group could respond effectively to an emergency call.

The group has erected a 30 ft. mast carrying a 2-over-2 turnstile array at G3RCL, Leatherhead, together with a vertical co-axial dipole for 4m. It is hoped to instal equipment and aerials at G3RCF, Farnham, by Christmas.

Each Monday night is an " activity night " for the group, with suggested frequencies of 144·15, 70·32 Mc/s and 1980 kc/s. It is hoped, when more 4m gear is available, to confine the net to that band.

Rugby " Save-a-Life " Film Week

Members of Rugby Group attended the premiere of a locally made film entitled *Disaster* on October 7. The film was presented jointly by the Local Disaster Committee and Rugby Centre, St. John Ambulance Brigade and inaugurated by the Mayor of Rugby, Cllr. Arthur Taylor. Based on a disaster exercise held at Napton, produced and filmed by amateurs, this film makes its points in a most professional manner. Shown with it were two films, one American, one British, dealing with life saving, with particular emphasis on the " kiss of life " method of artificial respiration.

Discussing communication matters with a county ambulance superintendent G3IKL, Rugby AC, and G3FZW were left in no doubt that, even where a user service already has its own radio, there are many occasion when RAEN assistance can be of great help in providing extra channels. This fact is not sufficiently appreciated by groups or members having no direct contact with the users.

The Rugby Group has acquired a quantity of mobile and base station equipment and plans are being made to instal a control station in a local ambulance depot.

* 1 Shortbutts Lane, Lichfield, Staffs.

Grafton Radio Society Christmas Party

For several years the Grafton Radio Society of North London has been organising a social evening for London amateurs. This year's Christmas Party will be held on Saturday, December 7, 1963, at the Bedford Corner Hotel (home of the London Members' Luncheon Club), Bayley Street, Tottenham Court Road, London, W.C.1, commencing at 7.30 p.m.

Tickets, price 12/6 single or 22/6 double (prices include refreshments) can be obtained from the Honorary Secretary, A. E. Bristow, 37 Tyndale Mansions, Upper Street, London, N.1 or from any member of the Grafton Radio Society.

Four Metres and Down (Continued from page 302)

lecturettes on UK efforts to establish world wide communications on 144 Mc/s by moon bounce reflection. The speakers included G2HCG and G2HCJ.

There was an attendance of 120 at the Dinner in the evening, at which the chair was taken by the Executive Vice-President, G. M. C. Stone, G3FZL, in the absence of Austin Forsyth, G6FO, editor of *Short Wave Magazine*, who was unfortunately indisposed. A toast to the ladies was proposed by Tom Douglas, G3BA.

On behalf of the Swedish society, SSA, Sten Larsson, SM5MC, presented to Mr. Caws a glass bowl of the type that should have been presented at the Golden Jubilee Dinner on July 5.

Following the Dinner, the President assisted by G6NB, G3MED and G3FZL (members of the V.H.F. Committee) conducted a discussion principally concerning the British Isles Two Metre Band Plan.

Among the visitors were Barney Patterson, GI3KYP (Zonal Representative for Northern Ireland and Scotland), L. F. Benzies, GM3DDE, and W. C. Bradford, GM3DIQ.

LONDON U.H.F. GROUP

will meet at the

BULL AND MOUTH TAVERN

corner of Bloomsbury Way and
Bury Place, London, W.C.1,

at 7.30 p.m. on Thursday, November 7, 1963

" Aerials for V.H.F. and U.H.F.," by F. J. H. Charman, B.E.M., G6CJ

and at 7.30 p.m. on

Thursday, December 5, 1963

" R.F. Front-ends "

All v.h.f. and u.h.f. enthusiasts welcome

Annual Report of the Council

THE Council has pleasure in submitting the following Report which covers the more important events and happenings that occurred during the year ended June 30, 1963.

A Supplementary Report dealing with the period from July 1, 1962 to the early part of December 1962 was submitted to the Annual General Meeting held on December 15, 1962. The Supplementary Report was published in the January 1963 issue of the RSGB BULLETIN.

Membership

Once again, and for the seventh successive year, membership has shown an increase. The net gain amounted to 586 compared with 491 last year and 608 during the previous year. At June 30, 1963, the total membership was 11,721 compared with 11,135 on the same date in 1962.

The following table compares the number of members in each grade over the past four years.

Grade	June 30				Gain during year 1962/3
	1960	1961	1962	1963	
Corporate Members:					
Licensed ..	6473	6686	6910	7155	245
Not Licensed ..	2756	2942	3047	3241	194
Associates.. ..	807	1016	1178	1325	147
Totals	10036	10644	11135	11721	586

An analysis shows that at June 30, 1963, approximately 60 per cent of all Home Corporate members held an Amateur (Sound) Licence.

Details of the analysis for the last four years is as follows:

Grade	June 30			
	1960	1961	1962	1963
Corporate Members: Licensed				
Country ..	3963	4145	4334	4523
London ..	1325	1413	1473	1516
Overseas ..	1185	1128	1103	1116
	6473	6686	6910	7155
Corporate Members: Not Licensed				
Country ..	1766	1883	1923	2106
London ..	793	833	900	913
Overseas ..	197	226	224	222
	2756	2942	3047	3241
Associates.. ..	807	1016	1178	1325
Totals	10036	10644	11135	11721
Gains during year	496	608	491	586

There has again been a reasonably satisfactory increase in the number of Home Corporate members and Associates, with a slight increase in the number of Overseas Corporate Members. During the year about 1,500 new members were elected.

Licences

Information supplied to the Society by the Radio Services Department of the GPO shows that 10,118 Amateur (Sound) Licences were in force as at June 30, 1963, and of that number 1,378 Amateur (Sound Mobile) Licences. In addition 135 Amateur (Television) Licences were current at that date.

Compared with a year earlier the number of Amateur (Sound) Licences increased by 496, the number of Amateur (Sound Mobile) Licences by 227 and the number of Amateur (Television) Licences by 27.

Affiliated Societies and Clubs

The number of societies and clubs affiliated to the RSGB as at June 30, 1963, was 191 compared with 172 a year earlier, a net increase of 19. This satisfactory increase is further proof of the value which local clubs and societies attach to affiliation with the National Society.

Golden Jubilee of the Society

During the year arrangements were made to celebrate the Golden Jubilee of the Society. The task of organizing the Golden Jubilee Week programme of events was undertaken by an *ad hoc* Committee with Mr. Frank Fletcher, G2FUX, as Honorary Business Manager. The Golden Jubilee celebrations, which took place from July 1 to 5, 1963, will be referred to in the Supplementary Report of the Council.

Presidential Installation

Mr. Norman Caws, F.C.A., G3BVG, was installed as President of the Society at an informal ceremony during the course of a social evening held at the Kingsley Hotel, London, on January 25, 1963. The function was much enjoyed by all who attended.

Committees of the Council

During the year the Council established the following Committees:

Name	*Chairman*
Contests	Mr. W. H. Matthews, G2CD
Exhibition	Mr. E. W. Yeomanson, G3IIR
Finance & Staff	Mr. G. M. C. Stone, G3FZL
GPO Liaison	Mr. L. E. Newnham, G6NZ
Golden Jubilee Celebrations	The President (Mr. N. Caws, G3BVG)
Headquarters Building	The President (Mr. N. Caws, G3BVG)
Membership & Representation	Mr. J. D. Kay, G3AAE
Mobile	Mr. C. L. Fenton, G3ABB
RAEN	Mr. G. A. Allcock, G3ION
Scientific Studies	Mr. G. M. C. Stone, G3FZL
Technical	Mr. R. F. Stevens, G2BVN
TVI/BCI	Mr. E. W. Yeomanson, G3IIR
V.H.F.	Mr. R. C. Hills, G3HRH

In addition, the Technical Committee set up a Technical Development Sub-Committee.

The Council records its thanks to all members who served on Committees and especially to those who had to make long and often tedious journeys to be present.

The Council has decided that in future each Committee shall prepare for publication a brief report on its activities during the year and these reports will appear in the February and/or March 1964 issues of the RSGB BULLETIN.

Scientific Studies Committee

The Council gave approval in principle for the Society to participate in the programme for the International Years of the Quiet Sun (IQSY). The Committee has been working on the detailed programme which is now well advanced. One particular item will be the setting up of an experimental transmitter, call-sign GB3LER, at The Observatory, Lerwick, to be used for the study of v.h.f. auroral and tropospheric propagation. The IQSY commences on January 1, 1964. The Committee has also continued the analysis of IGY data and several papers on the subject are being prepared at present.

Council and Committee Meetings

During the year under review the Council met on 16 occasions and was in session for a total of 66¼ hours. Committees of the Council met on 87 occasions. In addition, the Contests Committee held a number of checking meetings whilst the Technical Development Sub-Committee met on several occasions. An average of two Council or Committee meetings took place each week throughout the year at Headquarters.

Council Meeting Attendances

The following table gives a list of attendances at meetings and adjourned meetings of the Council during the period from July 1962 to June 1963.

Name		Possible Attendances	Actual Attendances
H. A. Bartlett ..		16	10
N. Caws		16	16
E. S. Cole		16	2
C. H. L. Edwards ..	(1)	9	8
D. A. Findlay ..	(2)	7	6
L. N. Goldsbrough ..	(3)	2	1
J. C. Graham.. ..	(4)	4	4
R. C. Hills		16	15
E. G. Ingram ..		16	16
J. D. Kay	(5)	9	9
A. O. Milne		16	13
L. E. Newnham ..		16	15
F. K. Parker		16	8
A. D. Patterson ..		16	9
R. F. Stevens ..		16	16
G. M. C. Stone ..		16	14
J. W. Swinnerton ..		16	15
P. H. Wade	(6)	7	6
A. C. Williams ..		16	0
E. W. Yeomanson ..		16	16

(1)	Deceased	January 31, 1963
(2)	Co-opted	January 24, 1963
	Resigned	May 20, 1963
(3)	Elected	May 20, 1963
(4)	Co-opted	April 27, 1963
(5)	Elected	January 1, 1963
(6)	Deceased	December 24, 1962

New Headquarters

The Council had anticipated that at some time during the year under review a suitable venue for new Headquarters would have been obtained but notwithstanding a great many enquiries, no success had been achieved up to June 30, 1963.

Several suitable premises in Central London came on the market but in each case the price demanded was in excess of that which the Society could afford to pay.

The Council wishes to thank those members who made a donation to Headquarters Fund during the year.

QSL Bureau

For the 24th year in succession Mr. Arthur Milne, G2MI, has been in charge of the RSGB QSL Bureau which again handled over a million cards. Mr. Milne was assisted by a number of sub-managers, all of whom are thanked for their help.

RSGB Bulletin

Volume 38 of the RSGB BULLETIN ran to 700 pages compared with 616 pages in Volume 37. In accordance with the promise made by the Council when announcing an increase in subscription rates, each issue of the BULLETIN since January 1963, has contained not less than 64 pages.

The Council records its thanks to those members who contributed to Volume 38 of the BULLETIN and in particular to the regular contributors, Mr. F. G. Lambeth, G2AIW (*Four Metres and Down*), Mr. R. F. Stevens, G2BVN (*The Month on the Air*), Mr. G. R. B. Thornley, G2DAF (*Single Sideband*), Mr. C. R. Plant, G5CP (*Mobile Column*), Mr. J. P. Hawker, G3VA (*Technical Topics*) and Dr. A. C. Gee, G2UK (*RTTY*).

During the year a number of contributions of an advanced nature were published several of which qualified for Society awards.

Members of the Technical Committee and of the Technical Development Sub-Committee co-operated closely with the editorial staff and gave valuable advice on a wide variety of technical matters. The need for simple constructional articles still exists.

RSGB Publications

In order to meet a world-wide demand the second edition of *The Amateur Radio Handbook* was twice reprinted during the year. The Council is pleased to report that orders for the *Handbook* have been received from many overseas countries including in particular Australia, New Zealand, the Netherlands and Italy.

The 1963 edition of the *RSGB Amateur Radio Call Book* appeared in time for it to be placed on sale at the 1962 Radio Communications Exhibition. During the year practically the whole of the printing of 7,000 copies was disposed of. The 1963 edition contained more than 2,000 additions and amendments to the previous edition.

A new RSGB publication entitled *Radio Data Reference Book* appeared during the autumn of 1962. Compiled by Mr. G. R. Jessop, A.M.Brit.I.R.E., G6JP, sales have been fairly good although demand has been somewhat less than expected.

A revised (10th) edition of *A Guide to Amateur Radio* became available early in July 1963. The work of revising the 10th Edition was undertaken by Mr. J. P. Hawker, G3VA.

Due to steady demands it became necessary to reprint *Communication Receiver Design Considerations* by Mr. G. R. B. Thornley and to print a revised (5th) edition of *Service Valve Equivalents*. Messrs G. C. Fox, G3AEX, and G. R. Jessop, G6JP, collaborated in the revision.

Work began during the year on a new book of circuit information compiled by Mr. G. R. Jessop, G6JP. Publication is expected towards the end of the year.

The Council records its thanks to all who have assisted in the preparation of material for Society publications.

RSGB News Bulletin Service

Throughout the year the RSGB News Bulletin Service has been well maintained on 3600 kc/s and on frequencies in the 145 Mc/s band.

The Council wishes to thank the news readers for the valuable services they rendered to the Society during the year and all those who provided material for the bulletins.

Slow Morse Practices

During the year Slow Morse Practice exercises were transmitted nightly for the benefit of those seeking to pass the GPO test. Until his sudden death in January 1963, the organization of the Morse Practice Transmissions was undertaken by C. H. L. Edwards, A.M.I.E.E., G8TL, of Theydon Bois, Essex. The practices are now being organized by Mr. M. A. C. McBrayne, G3KGU, also of Theydon Bois.

Exhibitions

As recorded in the Supplementary Report, the Society's stand at the National Radio and Television Show at Earls Court from August 22 to September 1, 1962, again aroused much interest. During the ten days of the Show more than 100 new members were enrolled.

The RSGB International Radio Communications Exhibition held at the Seymour Hall, London, from October 31 to November 3, 1962, was well supported by exhibitors although the attendance was slightly less than in recent years. The Exhibition was opened by the Engineer-in-Chief of the GPO Mr. (now Sir) Albert Mumford, O.B.E., in the presence of a distinguished gathering of representatives from the Services, industry and the technical press.

The Society's stand at both the Earls Court and Seymour Hall Exhibitions was under the management of Mr. F. F. Ruth, G2BRH, while the overall organization was undertaken by the Society's Exhibition Committee.

London Lecture Meeting

During the year one lecture meeting was held at the Institution of Electrical Engineers, London. The lecture took place on October 26, 1962, when Mr. R. W. White (Senior Controller of Experiments at the GPO Goonhilly Telstar Station) spoke on the subject of Satellite Communication. An attendance of 100 was recorded.

Official Regional Meetings

Official Regional Meetings were held in Weston-super-Mare (Region 9) on September 23, 1962, Trentham Gardens (Region 3) on April 21, 1963, and Colwyn Bay (Region 11) on May 12, 1963. In addition a Golden Jubilee Year celebration meeting was held in Belfast on May 4, 1963.

The Council records its thanks to those who organized the various meetings.

Mobile Rallies

National Mobile Rallies, organized by the Mobile Committee were held at Woburn Abbey, Bedfordshire, on September 9, 1962, and at Wethersfield, Essex, on June 2, 1963. Good attendances were recorded at both rallies. In addition to the National events a number of other rallies took place during the year. Many of these were organized by local RSGB groups or societies affiliated to RSGB.

Occasionally rally dates clashed but on the whole organizers realized the desirability of avoiding any overlapping in the same general area.

The standard of equipment displayed at rallies has shown a great improvement in recent years.

Intruder Watch

The Society has continued to furnish the Post Office with information concerning intruders in exclusive amateur bands. Altogether more than 350 intruders have been reported by the members of the RSGB Intruder Watch and although, for reasons of policy, the GPO is unable to provide the Society with precise information concerning the outcome of its investigations it can be safely assumed that as the result of the reports a good many intruders have moved outside the exclusive amateur bands.

The Council records its thanks to Major Dennis Haylock, G3ADZ, and those associated with him in the work of the Intruder Watch.

The Council would appeal to members interested in Intruder Watch work to contact Major Haylock, who is in urgent need of further helpers. (An article by Major Haylock describing the work of the Intruder Watch is published in this issue.—EDITOR.)

Licence Matters

During the year the Society's GPO Liaison Committee discussed a number of licence matters with representatives of the Post Office but no final decisions had been reached up to June 30, 1963. Among the matters discussed was a suggestion that the Post Office should issue a V.H.F. Technician's Licence.

The Society again asked the Post Office to look into the question of granting licences to foreign amateurs on a basis of reciprocity but the Post Office reiterated that in the " interests of national defence " licences may only be granted to British subjects.

The Society again asked the Post Office to extend the Amateur (Maritime Mobile) Licence to permit operation on frequencies in the exclusive 14 and 21 Mc/s amateur bands. (The Council hope to report on this matter at an early date.)

Radio Amateurs' Examination

Two examinations, both conducted by the City and Guilds of London Institute, took place during the year. At the first, in November 1962, 295 (70 per cent) of the 418 candidates were successful. At the second, in May, 1963, 861 (also 70 per cent) of the 1,229 candidates were successful.

During the year, acting on the advice of the RSGB members on the Advisory Committee, the City and Guilds of London Institute convened a special meeting to obtain the views and opinions of four Society members who have had considerable teaching experience in connection with the RAE. The views and opinions of these members proved of value to the Advisory Committee for the examination.

In order to assist candidates for the examination the Society published during the year the first of a new series of RAE Questions and Specimen Answers prepared by Mr. Alan Bayliss, B.Sc., G8PD.

IARU Region I Conference

During June 1963 the Society was represented by the President (Mr. N. Caws, F.C.A.), Mr. L. E. Newnham, B.Sc., Mr. R. C. Hills, B.Sc. (Eng.), A.M.I.E.E., A.M.Brit. I.R.E., and Mr. R. F. Stevens at an IARU Region I Conference held in Malmö, Sweden. Valuable contacts were made and much useful information exchanged. The Conference was organized by Lt.-Col. Per Anders Kinnman, SM5ZD (Vice-Chairman of the Region I Committee), and the General Secretary of RSGB (Mr. John Clarricoats, O.B.E.) in his capacity as Secretary of IARU Region I Division.

Visit of Mr. Herbert Hoover

The Council were privileged, during the early part of January 1963, to entertain the President of the American Radio Relay League (Mr. Herbert Hoover, Jr., W6ZH), during his visit to London. Both Mr. Hoover and members of the Council found the exchange of views of considerable value.

Visit of Mr. E. P. Tilton, W1HDQ

As an outcome of discussions which took place during Mr. Hoover's visit, the Board of Directors of the ARRL authorized a visit to England during May 1963, of Mr. E. P. Tilton, W1HDQ, V.H.F. Editor of *QST*. During his visit Mr. Tilton was guest of honour at the International V.H.F. Convention and at various other functions. He also made an extended tour of visits to places of technical interest.

Silent Keys

The Council records with deep regret the passing of the founder of the Society (Rene Klein), two of their colleagues (Philip Wade, G2BPJ and C. H. L. Edwards, G8TL), and of H. A. M. Clark, G6OT, a Vice-President of the Society, who,

(Continued on page 314)

Society News

Geneva Space Conference

The first Space Radiocommunications Conference was opened in Geneva on October 7, 1963, by the oldest Head of Delegation, Mr. G. Marelli of Spain. The Chairman of the Conference is Mr. Gunnar Pedersen of Denmark.

Delegates from about 70 Government administrations as well as representatives of many operating and international organizations were present at the opening Plenary Assembly.

The International Amateur Radio Union Region I Division was represented during the early stages of the Conference by Mr. John Clarricoats, O.B.E., G6CL (General Secretary of RSGB) in his capacity as Secretary of IARU Region I Division. During later stages the Division was represented in turn by Lt.-Col. P. A. Kinnman, SM5ZD (Vice-Chairman of Region I Committee) and Mr. Arthur Milne, G2MI (Past President, RSGB, and previously Secretary, IARU Region I Division). Mr. W. J. L. Dalmijn, PA0DD (President of VERON) was due to join the team of IARU observers but was prevented from doing so due to illness.

During the progress of the Conference a "Grand Hamfest" organized by the International Amateur Radio Club, Geneva, was held in the new ITU Building. The Hamfest coincided with a visit to Geneva of a Ham Tour organized by Mr. Wayne Green, W2NSD, Editor of *73 Magazine*.

Throughout the Conference, 4U1ITU, the station of the International Amateur Radio Club, was in constant operation, many visiting amateurs having the pleasure of talking back home.

In attendance at the Conference were many well-known amateurs including George Jacobs, W3ASK, Bill Orr, W6SAI and John Huntoon, Secretary of both ARRL and IARU, the last two as IARU observers.

An examination of the sixty odd documents issued up to the opening of the Conference indicated that no immediate demands appeared likely on the frequencies assigned to the Amateur Service. However during the first week and a half of the Conference considerable discussion took place regarding a proposal by the United Kingdom to permit amateurs to conduct experiments in space research in the band 144-146 Mc/s. The IARU observers at the Conference were given an opportunity to state a case on behalf of Amateur Radio, following which an IARU document on Project Oscar was submitted to the Conference. Incidentally the UK proposal was, up to October 17, 1963, the only proposal directly affecting the Amateur Service. A fuller account of the discussions will appear next month.

Retirement of Northern Ireland QSL Sub-Manager

At an informal dinner party held at the Woodburn House Hotel, Belfast, on September 6, two presentations were made to Mr. W. H. Martin, GI5HV, recently elected a Vice-President of the Society.

On behalf of the Council, Mr. A. D. Patterson, GI3KYP, Zonal Representative, presented GI5HV with his Vice-President's Certificate and congratulated him on being the first member in Northern Ireland to receive such an honour.

On behalf of the Region, Mr. J. William Douglas, GI3IWD, Regional Representative, handed over a plaque, suitably inscribed, to record GI5HV's 30 years' service to the QSL Bureau, together with a cheque. Presenting Mrs. Martin with a box of chocolates, Mr. Douglas paid tribute to her many years of forbearance and wished them both a long and happy retirement.

Old timers present included GI2KR, GI3ML, GI4RY, GI5UR, GI5DX, and GI5AJ. The early days of radio in Northern Ireland were recalled by these speakers and many a laugh raised by their reminiscences.

In his speech of thanks, GI5HV recalled that he was clearing QSL cards even before the formation of the Society's Bureau and outlined some of the difficulties of the job for the benefit of his successor, Mr. R. Parsons, GI3HXV.

A congratulatory telegram was received from Mr. Arthur O. Milne, G2MI.

In a letter of thanks Vice-President Martin has intimated that the cheque will be used to purchase a tape recorder.

J.W.D.

South Wales Golden Jubilee Convention

More than 130 members and friends attended the Region 10 Golden Jubilee Convention on Saturday, September 14, 1963, at University College, Cardiff. The Council was represented at the Convention by the President (Mr. N. Caws), the General Secretary (Mr. John Clarricoats) and Mr. J. W. Swinnerton. The Zonal Representative (Mr. A. C. Williams, GW5VX) was prevented from attending due to illness.

During the morning session a visit was paid to the Department of Physics, where a Standard Telephones and Cables Ltd. Zebra Mk.II Computer was demonstrated, and a piece of research equipment, new to most members, in the shape of the Proton Resonator, examined. Later a lecture was given by Dr. D. T. Bidgood entitled "Radio and Geology." This lecture received a particularly enthusiastic reception from the 80 members who attended, because it threw new light on problems of radio siting and their geological relationship.

In the afternoon the usual business meeting was held, at which a presentation was made to the General Secretary as a mark of appreciation by members in the Region of his outstanding service to the Society. After thanking the members for their gift and kind expression of appreciation, Mr. Clarricoats in his address emphasized the close ties

The President, Norman Caws, G3BVG, with some of the members who attended the South Wales Golden Jubilee Convention on September 14, 1963.

which existed in the early days between Headquarters and the South Wales district. He also referred to some of the future problems facing the Society and the Amateur Radio movement generally.

After high tea, members listened with rapt attention to a lecture entitled " Communication Satellites " by Mr. R. W. White, Officer in charge Post Office Radio Research Laboratories. The lecture was illustrated by colour slides, film and tape recordings, and dealt with the history of the Post Office station at Goonhilly and its association with Telstar and later communication satellites. In thanking the lecturer, the President rightly made the point that the audience had seen history in the making.

Throughout the day one of the largest laboratories in the College was used to accommodate a comprehensive display of commercial equipment, including noteworthy exhibits by Marconi Instruments Ltd., Standard Telephones and Cables Ltd. and M-O Valve Co. Ltd. Great interest was also shown in the transistor products of Sinclair Radionics, Cambridge.

It was a great pleasure, particularly for the older members, to welcome as a guest Mr. Austin Forsyth, O.B.E., G6FO, Editor of *The Short Wave Magazine*. His work in contributing *The Helping Hand* and other articles to pre-war *T. & R. Bulletins* was referred to by the General Secretary in his address and is well remembered, as also is the fact that he was District Representative for South Wales for many years.

It was generally considered that the Convention was the best function yet held in the Region and the fact that it was possible to hold it in such ideal surroundings was a major contribution. C. H. P.

Region 16 Lecture

The Chelmsford Amateur Radio Club were hosts to RSGB members in Region 16 on October 1, 1963, when a Regional Lecture was held at Marconi College, Chelmsford. There was an attendance of 60 to hear Mr. Frank Hyde, F.R.S.A., F.R.A.S., M.S.E., lecture on " Radio Astronomy." The RSGB Council was represented by Mr. G. M. C. Stone, G3FZL, and Mr. Eric Yeomanson, G3IIR.

Mr. Hyde described the difficulties and rewards of the radio astronomer, illustrating his lecture with many records he had obtained at his own observatory at St. Osyth, Essex. He talked of the fascination of " real " DX, measured not in thousands of miles but in millions, and he showed how anyone with sufficient enthusiasm and patience could receive signals from space even on simple communications receivers. Like their more numerous optical counterparts, the radio astronomers do much work at night, when QRM from man-made radio signals is low.

Mr. Hyde finished his talk with a display of coloured slides of his observatory, and made many mouths water with the sight of his aerial farm! Question time proved that the v.h.f. men in the audience were aware of the importance of the subject, and some highly involved and technical points were discussed.

The Region 16 Representative, Peter Naish, G3EIX, concluded the meeting by thanking the Chelmsford club for arranging the lecture, and said he hoped that the future would bring more events of this nature to the Region. P. N.

New Society Beacon Station

The Post Office have authorized the establishment of an experimental transmitting station at The Observatory, Lerwick, Shetland, and have allocated the call-sign GB3LER.

The station will be controlled by Mr. R. G. Flavell, GM3LTP, and will operate under the general direction of the Society's Scientific Studies Committee. A frequency of 145·995 Mc/s will be used.

The Region 10 Representative, Cyril Parsons, GW8NP, left, with Bernard Randall, G3ALE, at the South Wales Golden Jubilee Convention. *(Photo by G6CL)*

RSGB Recorded Lecture and Film Libraries

Applications from RSGB Groups and Affiliated Societies to borrow films and tapes from the Libraries should be sent to the appropriate Honorary Curator:

Films: C. W. Austin, B.R.S.22019, 135 Shaftesbury Avenue, Kenton, Harrow, Middlesex.

Tapes: N. C. Ta'Bois, G3HWG, 81 Snakes Lane, Woodford Green, Essex. A recently revised list of tapes summarizing each recording may be obtained from Mr. Ta'Bois on receipt of a stamped addressed envelope.

Headquarters Fund—List No 21

The following is the twentyfirst list of those who had contributed to the Headquarters Fund up to October 15, 1963:

Noel Eaton (VE3CJ), R. C. Hewitt (G3NIX), G. D. N. Wilcock (G2FKS), Dr. R. L. Smith-Rose, C.B.E., G. G. Carter (B.R.S.3015), R. M. Mugford (G3SFQ), Medway Amateur Receiving and Transmitting Society (Building Sub-Committee), R. E. Sparry (G3BJC), L. Miles (GW3IMQ), P. Casling (G3MWZ), H. G. Hughes (GW4CG).

Total amount contributed to date: £1747 14s. 8d.

London Lecture Meeting

Friday, November 8, 1963

Television Sound Production

By W. E. Sutton, G3FWI

in the

Faraday Room,

Institution of Electrical Engineers,

Savoy Place, Victoria Embankment,

London, W1

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

Group Visits by air to USA proposed

Mr. John Brodsky, G3HQX, 2 Greenhill, Sutton, Surrey is considering a scheme whereby a group of RSGB members and their friends would spend two weeks holiday in the United States next year.

The cost of the return air fare by Boeing 707 jet air liner is expected to be about £70 for a party of about 100 while the overall cost is expected to be about £150 a head depending upon the hotels chosen.

Members interested in this project are invited to write to Mr. Brodsky for further particulars.

Region 1 is arranging a trip to America during the period July-August, 1964. The trip will last approximately 14 days, and travel will be under first class conditions by Boeing 707 from Manchester to New York, allowing about 13 full days in America, and returning by Boeing 707 to Manchester.

The return fare is not expected to exceed £60, but the trip is available only to fully paid up RSGB members, their wives and immediate relatives living at the same address as the member.

Members who wish to avail themselves of the chance for a unique holiday in the USA, and an opportunity of meeting their opposite numbers, should contact any one of the organizers listed below who will be pleased to supply further details on request. Whilst the trip is intended primarily for Region 1, any RSGB member will be welcome, but tickets are strictly limited and early application is essential.

B. O'Brien, G2AMV,
1 Waterpark Road,
Prenton,
Birkenhead.

W. Shaw, B.R.S.25539,
31 Bonis Crescent,
Great Moor,
Stockport.

E. C. Wigzell, B.R.S.18465,
54 Clarendon Road,
Hazel Grove,
Cheshire.

A. Evans, B.R.S.22125,
c/o 54 Clarendon Road,
Hazel Grove,
Cheshire.

Silent Keys

Due to pressure on space a number of Silent Key tributes have been held over.

Annual Report of the Council

(Continued from page 311)

for more than 20 years, had been Chairman of the Technical Committee. In the last three cases death came very suddenly.

The Council also records with deep regret the death of a number of other members including Cyril Hunt, G6ZJ, A. T. Gillies, GM3FIW, Harold Millington, GW2BMN, Walter Pennell, GW3FVI, Basil Davis, G2BZ, Norman Brundle, G2CPL, R. J. Dixon, G3HSY, Alex Donaldson, G4WJ, Clemence "Pim" Bradley, G2AX, W. H. Harris, B.R.S. 15876, W. E. Harris, G3DPH, F. Tillotson, G6XT, D. T. Bradford, VQ4EV/G3GBO, J. E. Cory, G5CY, L. W. Hooke, G5XH, G. F. Kellaway, G3BDL, Fred Mayer, G2LZ, H. H. Thompson, G2FXK, H. J. Hunt, G5HH, A. H. Bird, ex-G6AQ, C. Bowtell, G5GN, V. Dunk, G2SG, R. C. Harrison, G2RH, H. J. Parker, B.R.S.24758, A. Peterick, B.R.S. 14251, Earle Turner, VE2CA, Tom Vickery, ex-G5VY, R. A. Walker-Alexander, G5RA ex-VS7RA, W. H. Burnet, G3GQZ, M. Eskdale, G2SU, Leslie Lomas, GM2HB, H. Swift, G3ADG, Arthur Tibbits, VP6MC, George Wigglesworth, G2BH, S. D. Marshall, G3COT, Bert Phillips, GW5PH, J. F. Smith, B.R.S.16871, C. W. Thomas, C.B.E., ex-G6MW, W. G. L. Creaton, G3ANB, William Gilmour, GM3FPX, B. G. Logan, G5GA, W. E. L. Malings, G3TM, W. Millar, GM3CCT, and Stanley Vanstone, G2AYC.

Retirement of the General Secretary

On December 31 this year our General Secretary, Mr. John Clarricoats, O.B.E., G6CL, retires after over 30 years' service with the Society. It is a great tribute to him that we are a thriving and vigorous Society today, for if it had not been for his foresight and enthusiasm, we should in all probability have ceased to exist during the war years.

I believe that many members would like to contribute towards a presentation to be made to him on his retirement. This is of course over and above the pension arrangements already made by the Council. If you wish to make a donation please send it to Mr. A. O. Milne, G2MI, who has agreed to act as a treasurer for this presentation, at 29 Kechill Gardens, Hayes, Bromley, Kent, marking the outside of the envelope "G.S. Presentation." Cheques should be made payable to A. O. Milne, No. 2 A/c.

Norman Caws, G3BVG,
President

Society Affairs

A digest of the business discussed at the August, 1963, meeting of the Council

THE August meeting of the Council was held on August 26, 1963, and was attended by Messrs. N. Caws (President), J. C. Graham, R. C. Hills, E. G. Ingram, J. Douglas Kay, A. O. Milne, L. E. Newnham, F. K. Parker, A. D. Patterson, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, E. W. Yeomanson (Members of the Council), John Clarricoats (General Secretary) and John A. Rouse (Editor). Apologies were submitted for the absence of Mr. H. A. Bartlett, Major-General E. S. Cole, Mr. L. N. Goldsbrough and Mr. A. C. Williams.

Society Trophies

The award of trophies for the year 1963 was discussed. (A list of awards for 1963 appeared in the October issue of the RSGB BULLETIN.)

Membership

The Council approved 107 applications (77 Corporate and 30 Associate) for membership of the Society. In addition, eight applications for transfer from Associate to Corporate grade were approved. It was agreed to waive for a period of 12 months the subscriptions of two members who suffer from blindness.

The Council granted affiliation to the Britannia Radio Club, English Electric Radio and Electronics Society and Royston and District Amateur Radio Club.

Regional Representatives' Conference

Arrangements for the Conference to be held in Birmingham on November 23, 1963, were discussed and the agenda considered.

History of the Society

It was agreed in principle to invite Mr. Clarricoats to write a history of the Society after he has retired.

Headquarters Building

Further consideration was given to the problem of finding new Headquarters for the Society. In this connection, properties in Streatham and Victoria were mentioned as being under consideration.

It was agreed to circularize a large number of estate agents again and to publish a report on progress in the RSGB BULLETIN.

Publications

An estimate from Loxley Bros, Ltd. for printing 1,000 copies of the article *Fifty Years for the Advancement of Amateur Radio* for use as publicity literature was accepted.

It was also agreed that suggested layouts for the new cover of the BULLETIN should be submitted to Council in due course.

Prototype Equipment

The Council accepted an offer from Mr. J. I. Brown, G3EUR, Managing Director of Aveley Electric Ltd., to donate to the Society prototypes of war-time and other radio equipment.

Tiger Amateur Radio Club

The Council decided to authorize Mr. J. A. Beard, B.C.R.S. 1033, to use the name of the Society in connection with a silver key he proposes to present as a trophy to the Tiger Amateur Radio Club of East Pakistan.

Reports of Committees

The Council accepted a recommendation put forward by the V.H.F. Committee at its meeting on July 8, 1963, that charges should be made to non-members for the issue of " Four Metres and Down Award " certificates.

The RAEN Committee met on July 20 to discuss a variety of business connected with the organization of the Network.

At its meeting on July 22 the TVI/BCI Committee reviewed all cases at present under consideration. Particular attention was paid to reports of interference from television relay services in Scotland.

On July 25, the Technical Committee received a report from the Technical Development Sub-Committee, made a number of recommendations relating to the award of premiums and trophies, discussed the London Lecture Programme, and considered matters relating to the Society's " build-it-yourself " leaflets sold at exhibitions.

The Finance and Staff Committee, at its meeting on July 29, gave consideration to a number of matters including the proposed design of new Society notepaper, the provision of a fire extinguisher, the production of stencils for addressing BULLETIN wrappers, staff pensions and service agreements, and the compiling of the 1965 issue of the *RSGB Amateur Radio Call Book*.

The Contest Committee met on August 8 to consider matters relating to the Affiliated Societies' Contest, Low Power Contest, D/F Qualifying Events, the 70 Mc/s Contest and National Field Day.

The following day, August 9, the Exhibition Committee discussed at length detailed arrangements for the RSGB International Radio Communications Exhibition.

On August 14, the Scientific Studies Committee considered arrangements for the setting up of an experimental station at Lerwick, a report on the analysis of GB3VHF records, participation in the IQSY, *Oscar III*, *Echo A12*, and BULLETIN articles.

The GPO Liaison Committee met on August 14 to discuss a number of current licensing matters.

At its last meeting on August 16, the Golden Jubilee Celebrations Committee met to discuss a report from the Honorary Business Manager and to examine the final accounts for the Celebrations.

The Council was in session from 6 p.m. to 10.50 p.m.

Bulletin Stencil Plates

Stencil plates used for the preparation of BULLETIN wrappers occasionally become worn or lose ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

GB2RS SCHEDULE

RSGB News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
145·30 Mc/s	10.30 a.m.	Beaming north west from Sutton Coldfield
	10.45 a.m.	Beaming south west from Sutton Coldfield
145·50 Mc/s	11.00 a.m.	Beaming north from Leeds
	11.15 a.m.	Beaming east from Leeds
145·8 Mc/s	11.30 a.m.	Beaming west from Belfast
	11.45 a.m.	Beaming north east from Belfast
145·10 Mc/s	12 noon	Beaming north from London area
	12.15 p.m.	Beaming west from London area

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

CLUBROOM

A Monthly Survey of Group and Club Activities

Have *YOU* Got One?

Is there a club or Group in *your* district? If not, why not start one now? Talk it over with the chap on the other side of the town or the keen SWL who seems to be listening whenever you want a report on your s.s.b. and can't whip the band into life—perhaps *he* is looking forward to the day when he can give you a quick over-the-air report and can't find a friend to share his enthusiasm and his RAE studies. Every town seems to have its share of "lone rangers," and all that is needed is the initial effort and co-ordination to put a club on its feet. "What? Cause more QRM?" may a natural reaction for some, who are used to working on a band clear of "locals." But if Amateur Radio is to enhance its strength and prestige it must go out and find and "nurse" the newcomers lest they feel "out on a limb" and their enthusiasm falters to the point where some new interest takes its place. This is especially true of the young teenager, whose status is catered for by Associate membership of the Society—but no magazine can take the place of the personal friendship and contact of the local "get-together"—be it only monthly. Many active clubs run excellent Newsletters, but nothing succeeds like a personal chat with someone who has met and overcome the problems faced by the newcomer. In these columns it is proposed to consider from time to time some of the snags and pitfalls encountered by clubs in their early days, and while there is often no single or simple solution, a few suggestions may help to avoid the need for writing the letter which sometimes reaches HQ and begins, "Owing to lack of support . . . ". The movement needs all the support it can get, and the local club is the ideal centre for gaining recruits *and keeping them.*

News from the Newsletters

A large batch of publications this month, ranging from the single-sheet Mitcham and District RS *Newsletter* to the ambitious *Lothians Radio Amateur* and an issue of the Coventry ARS *CQ CARS* which runs to 26 pages! The latter contains an article by G3NBQ on "Designing RC Amplifiers" which would form the basis of a useful BULLETIN article. The issue also reminds readers that the record of 110 *seconds* for a WAC—achieved by G5ML in 1938 on 20m—appears not to have been beaten in spite of modern techniques and operating methods. For the record, the other participants in this event were W4DLH, VU2CQ, HK5AR, VK4JU and SU1WM/SU1RO. CARS now has a trophy which is awarded to the member claiming the shortest WAC—to be held until a new claimant weighs in. The Lothians bulletin records the continuance of PA0AA code practice and proficiency runs on Fridays on 3600 kc/s—evenings but no time stated. The Irish RTS Journal *EI* gives a survey of the RSGB Jubilee Celebrations and the recent Malmö Conference. Mitcham report that a recently advertised Junk Sale produced *one* item and even that was unsold.

AERE ARC newsletter *QAV* carries an entertaining report on V.H.F. NFD—imagine searching for ball bearings for the beam rotator in long grass, then raising the beam into position only to find that the feeder is 6 ft. too short! No doubt other contestants have their tribulations, but a scribe with a happy knack for description can preserve such incidents for many a later chuckle. Wirral ARS *Newsletter* No. 8 of Volume 16 also calls for an increase in the volume and quality of material for Junk Sales. November 9 is the Annual Dinner date. Southern Hampshire *QUA* contains an article by G3IXN on a transistorized d.c./d.c. converter using a 12-volt vibrator transformer. It also mentions prompt action by SWL Tony Miles (aged 16) who rang Niton Radio to draw attention to an unanswered distress call—an error by the ship concerned, so it proved, but Tony earned Niton's thanks for his alertness.

Reigate ATS *Feedback* carries an interesting note on the "Sexagesimal System" which, it appears, was used by the Babylonians and has come down to us in our measures of time and rotation. The Sumerians used this system in 2000 BC because 60 has more factors than any lesser numbers—is this an argument against decimalization? North Kent *Newsletter* No. 72 mentions a recent article in the national press on experiments with microminiature transmitters "installed" in animals, and asks, "Who will be the first to go /M on a kangaroo?" Or would an electric eel be self-powered? On a more serious note, help is asked for a new club started at Crown Wood School, and a rota of members is suggested to help the youngsters to make their first steps in the hobby. Thames Valley ARTS *News* also reporting the East Molesey RSGB Group makes its Issue No. 1 with an attractive two-column layout. Crawley ARC September *Newsletter* reminds members that slovenly operating can lead to infringement of GPO licence conditions and possibly a "pink ticket." Hastings *Natter Net Notes* carries comments on interesting new components and a description of the G3MGQ Special—a development of two G5RV doublets which also works as a top-hatted vertical for the l.f. bands. Cray Valley RS offers the following outstanding bargain: "Ironcrete Wheelbarrow 1962 (May)—little mileage, no spares or handbook"—perhaps it is only one's energies that are taxed! And so to the month's activity reports.

Dorking Radio Society's stand at the local Model Railways and Engineering Exhibition on October 3-5, 1963.

Points North

Lothians RS report thriving Radio Societies in three of Edinburgh's largest schools—hence a boost for their own meetings. The November 14 meeting will be a talk, "Monkey Glands for the HRO," by GM3PQU; this will be followed

by a Visitors' Night on November 28—7.30 p.m. in the YMCA. Southwards over the border, the same dates will find **Spen Valley** ARS hearing a talk on "The Electronic Marshalling Yard" by a representative of British Railways and another on "Office Electronics" on November 28—both at Heckmondwike Grammar School at 7.15 p.m. **South Manchester** RC meeting at the Rackhouse Community Association, Northenden will hear D. Hyde describe "Lasers" on November 8, enjoy a Hot Pot Supper on November 15 (tickets from G3HZM, G3KIQ or G3MAX) and relax listening to a RSGB Tape Lecture on November 29, with slides shown for good measure. **Wirral** ARS bemoan the lack of a local RAE Course this year, but will endeavour to make up for this at the club meetings. The Annual Dinner will be held on November 9—other events are G8BM on s.s.b. (November 6) and G3FOO on "Electronics in Industry" (November 20). **Halifax** and District ARS will meet at the Beehive and Crosskeys on November 12 for RAE Instruction and G3NIZ on QSLing: G3IGW handles the publicity. The other Halifax club—**Northern Heights**—is pleased with growing support and reports a RAE Course at the Percival Whitley College. November meetings include a Fire Officer lecturing on November 6 and a visit to the Electricity Showrooms on November 20.

Midland Miscellany

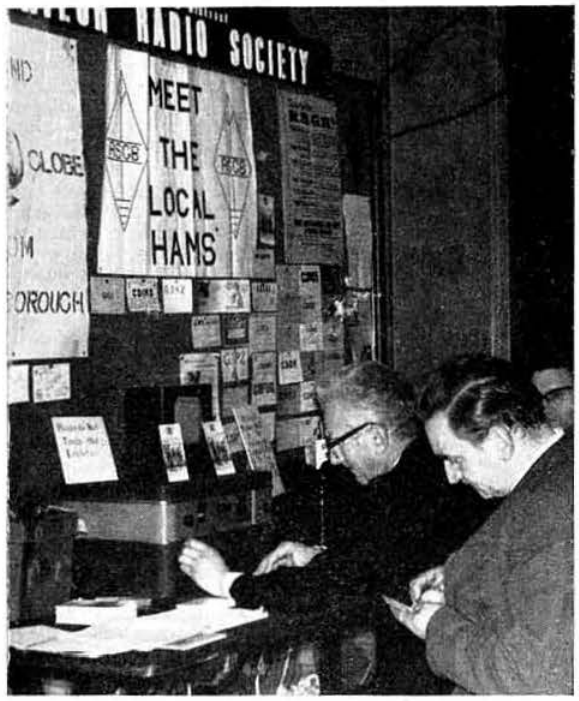
Coventry ARS now meets every Monday at "Westfield House," Radford Road, at 8 p.m.: G3PQQ is the Secretary. **Midland** ARS meets at the Birmingham and Midland Institute on the third Tuesday each month; on November 19 G3BA will talk on "Going V.H.F. with Transverters." **Peterborough** and District ARS have had a demonstration of the KW77 receiver and heard G3BK talk on s.s.b. G3KPO will provide membership details. A newcomer to the feature is **Bursiem** ARC which meets at the Town Hall on the third Wednesday each month at 7.30 p.m.—the Honorary Secretary is W. Luscott, 36 Rothsay Avenue, Sneyd Green, Stoke-on-Trent.

Derby and District ARS, having now completed its autumn programme of D/F events, will be holding a Social Evening and Supper on November 13, while on November 27 a small party will visit the **Burton** RS Annual Dinner: on the same date G3ESB will talk on "Finishing Touches." A membership target of 200 is set, and a magazine is planned. **Midlands Radio Contest Club** has launched a club "electronic key" project on lines indicated in the last issue, with G3GVA in charge. On November 4 final preparations will be made for a Fireworks Display run in conjunction with the Birmingham Association of Youth Clubs. Secretary G3OVA now lives at 23 Beechwood Road, Kings Heath, 14. **Mansfield** ARS operated GB3MRS at a local Hobbies Exhibition for a week from September 30, and made over 100 contacts; special QSLs will follow. The Secretary is G8HX. **Stourbridge** and District ARS will be holding a "Brains Trust" on November 5, and members will be playing their part in RSGB contests during the coming season.

Western Mail

After hearing G3HGE talk on his 2m gear, **Cheltenham** Group spent V.H.F. NFD struggling with 2 watts input and wishing G3HGE had forgotten to take his equipment away! Several members are working s.s.b./M. **Bristol** Group have heard a hi-fi demonstration. (Clubs and Groups are asked to note that word of *future* events is better "copy" than past events, unless these are of exceptional interest). **Cornish** R & TC will be hearing a series of lectures at the SWEB Recreation Hall, Camborne on the first Thursday of the month at 7.30 p.m.

Torbay ARS welcomed old-timer G6MC to a recent meeting. At its November meeting G3NBR will talk on



Members of Peterborough Radio Society operated G3KPO/A at a radio show held in the Town Hall, Peterborough recently. In this photograph, G3KPO is operating with the assistance of SWL Yeomans. In four days 116 contacts were made on 80 and 160m.

"Loudspeakers—then and now." **Cotswold Radio Contest Club** now has a permanent HQ at the home of G3OLN, where it is hoped to participate in contests: eight of them by December! A club call is hoped for: meanwhile the club is "at home" most evenings. **Wessex** AR Group were favoured by good weather for their "Hare and Hounds" Rally, which was won by G3NAE and his SWL assistant, G3LSC coming second. **South Dorset** RS visited the USAF Tropospheric Transmitting Station and were "hosted" by W0PI.

"Town" and Around

Wolverton and District RC meets at the North Western Hotel, Stratford Road at 7.30 p.m. on the first Friday of each month, except in December and January, when there will be lectures at the local College of Further Education—G3NOC dealing with "Filters" on December 6. **Crawley** ARC will hear Council Member G3IIR demonstrating and talking on "RTTY" on November 27—details from G3FRV. **AERE** ARC (Harwell), encouraged by success in the recent 70 Mc/s contest, reports meetings at the Social Club on the third Tuesday each month from 7.30 p.m.—no "security" check, and outside members are welcomed; contact C. Sharpe, G2HIF, Electronics Building 347.3 for details. **Crystal Palace** RC will share a hi-fi evening with **Clifton** RC on November 16. The club's first five-member QSO on "two" was recently curtailed by a DX opening on the band. **Wimbledon** RS under G3EPU and W2DRS is a new venture, and has a "star" attraction for November 8 when Peter Jones of Decca will show films and slides of his firm's electronic equipment: venue—the local Community Centre, and all for a shilling with tea and biscuits thrown in!

To cater for the needs of its large intake of young enthusiasts the **Welwyn Garden City** Group staged on September 12

a special " getting started " night, when it was privileged to have the attendance of Messrs. J. B. Turner and S. W. Smith from the GPO London Region Telecoms Engineering Department. There was an animated two-hour discussion upon licensing matters, interference both by and to the amateur, the dire results of piracy, plus some eye-opening information about the extent to which the Post Office monitors what goes on in the amateur bands.

Farnborough Technical College RS held its AGM on October 16, and hopes to run a RAE Course: details from G3PPU. **Medway** RS has decided that a place of its own is infinitely preferable to its previous " nomadic existence " and is seeking to purchase a property. Any club with a similar project is invited to " swap ideas " with Medway—meanwhile full and lavish support from *all* local amateurs is solicited. **Edgware** and District RS are meeting at John Keble Hall, Deans Lane on the second and fourth Monday each month: G2BVN will be talking about s.s.b. on November 11, while a " radio photograph " contest is billed for November 25—a nice combination of radio and photography which other clubs might well copy. G3VW, 10 Holmstall Avenue will provide details. **Chelmsford** ARC committee had the satisfaction of being re-elected *en bloc* at the recent AGM: " Interference " will be discussed with a GPO engineer at a coming meeting. **East London** Group heard G3BPT talk on the Port of London Communications system, and heard some unexpected angles on this complex layout. **Dorking** and District Special Activity station at a local Exhibition worked 20 countries including VK2, and in conjunction with the ambitious display was voted a great success in press comments. **Thames Valley** ARTS meets on the first Wednesday each month at the Caernarvon Castle Hotel, Hampton Court, where the 30th Annual Dinner will be held on November 9. A talk on Nuclear Power follows on December 4. **Reigate** ATS will hear G2YL describing her African tour on November 23. Members are constructing 23cm and 70cm gear, and the many and varied activities of this club are featured below.

Club of the Month

REIGATE AMATEUR TRANSMITTING SOCIETY

This society was founded in March 1959 by a group of seven enthusiasts, all but one of whom are still members in prominent positions. Its objects are described as " furtherance of the interests of the licensed radio amateur and the short wave listener in the field of radio communication." Membership is open to all over 15 years of age, annual subscriptions being 7s. 6d. for Senior members and 5s. for Juniors under 18, with attendance fee of 1s. 6d. and 9d. per head respectively.

Members of the Reigate Society during NFD.

The Clubroom is at The Tower, High Street, Redhill, where meetings are held on the third Saturday in each month at 7.30 p.m. A varied programme of activities is aimed at, and outside speakers are welcomed. There is a friendly rivalry with the Crawley and Dorking clubs, with which visits are exchanged: all three clubs compete for the G5LK Cup awarded for NFD success. Other club trophies include the G8KW Cup for constructional work and the XYL Cup presented by wives and mothers of members. The Annual Dinner takes place in January or February. Visits are arranged to places of interest such as the BBC Listening Station at Tatsfield and Gatwick Airport. The society publishes its own monthly newsletter, *Feedback*, issued free to members.

Contests such as NFD and inter-club events are undertaken with enthusiasm, while members compete individually and do well in both national and international competitions. The majority of members hold transmitting licences, and many have obtained their tickets through the help of club-mates—three before the age of 18, thanks to the wealth of experience and knowledge which is always at their disposal. Several members are licensed for mobile working, and a popular activity is an outing to a rally in which the rest of the family can join. Notable members include mast expert G3PNA and old-timer G5LK now living in Hampshire.

Exhibition stations are often staged at local fairs and fêtes to give the general public an insight into Amateur Radio, using the club call-sign G3REI. Monthly reports are submitted to the local and radio press, and valuable publicity gained thereby. From a membership of 35 (including 22 call-signs ranging from G3FM to G3RRR) an average clubroom attendance of 25 suggests that the society can support many worthwhile activities. Intending members should contact Honorary Secretary G3NKT, 12 Willow Road, Redhill, who will be pleased to supply further information.

* * *

A final note from the **Royal Naval** ARS (which held its AGM on the last day of the Exhibition) reveals that the Captain of H.M. Signal School has consented to become the society's first President. Exhibition visitors will have seen GB3RN on the Royal Navy stand, under the direction of " globe trotter " G3JFF.

Closing Dates

That concludes the " newsreel " for this month. Closing date (final) for next month's issue is **November 8** and for the January issue **December 6**, 1963.

Glasgow Group Exhibition of Home-built Equipment

Glasgow RSGB Group is arranging a display of home-built amateur equipment during the latter part of this year. Full details are available at group meetings (see *Forthcoming Events*) and from the Area Representative, Cameron Lindsay, GM3KTZ, 17 Dukes Road, Cambuslang, via Glasgow, Lanarkshire.

The organizers hope that all local members will support the event and help to make it a success.

Closing date for the December issue
November 8

Closing date for January 1964 issue
December 6

Copy received after these dates may be held over to the following issue if still topical

Letters to the Editor

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Polarization on Four Metres

DEAR SIR,—With reference to G3GGK's letter in the October BULLETIN, I hope we shall get general agreement to use vertical polarisation on 4m because I consider this a better band to use for mobile work than 2m. I have taken part in a number of tests over the last few weeks and find the amount of flutter and fading due to a station in motion is appreciably less on 4 than on 2.

There are now a considerable number of amateurs equipping themselves with the older design of radio telephone sets which have come on the market and are finding these are very good for communication over 15-20 miles. With modifications they should be capable of working over greater distances. The vertical aerial, having an omni-directional characteristic, is ideal for mobile work, and as G3GGK says, it is easy to mount on the vehicle.

The vertical polarization has a disadvantage in the Midlands as it is more likely to produce TVI, the 70 Mc/s band being so close to the Midland television channel; nevertheless, I still support the claim for vertical aerials as one is able to operate out in the country away from TV aerials and on good locations. Furthermore I think the TVI problem with these sets will be overcome in due course.

It will be interesting to hear the views of others on this subject.

Yours faithfully,
H. TURNER, G8VN

Glenfield Frith, Leicester.

DEAR SIR,—I hasten to add support to G3GGK's plea for action firmly to adopt vertical polarization for 4m mobile operation. The many advantages of vertical polarization hardly need to be enumerated when thinking of fitting an aerial to a vehicle—just a rod with no need for strange circles and other shapes at the top end. Matching problems are greatly reduced and it is even possible to use a telescopic element to be collapsed when not in use. There must be others who wish to make their aerials as inconspicuous as possible. All vehicle-mounted aerials must have a vertical element as a first requirement. Why not make it the only element?

The fixed station vertical also has much to recommend it: no rotation problems, maximum available height can be used. In many cases a 4m vertical can be fitted above any existing aerial system or fitted beside the chimney stack.

Yours faithfully,
JOHN N. CARTER, G3OWB

Cambridge.

DEAR SIR,—I cannot agree with the suggestion by Peter Simpson, G3GGK (October BULLETIN) that vertically polarized aerials should be adopted as standard for the 70 Mc/s band.

As our 70 Mc/s band is not intended for purely mobile operation, it seems irrelevant to base any decision regarding polarization on the fact that business radio installations employ the vertical mode. These installations seek to achieve reliable communication within a specific radius of a base station. This is not the sole object of the art of Amateur Radio communication as I understand it.

One of the problems of the 70 Mc/s band is caused by its close proximity to certain television channels (see page 503 *RSGB Handbook*). With the very wide bandwidth of modern television tuners, their susceptibility to blocking and cross modulation, TVI can be a real problem even with a transmitter having a clean bill of health. Considerable alleviation from blocking and cross modulation can nearly always be achieved by using a transmitting aerial which is cross polarized with respect to the local Band I TV channel. Of the nineteen frequency allocations in Channels 1-5, eleven are vertically polarized, and of these, seven relate to services covering areas of highest population density. To use a vertically polarized transmitting aerial—especially if a multi-element beam—on 70 Mc/s with a transmitter running appreciable power is inviting trouble of this nature, particularly where the signal strength of the Band I signals is low.

Being myself active on 70 Mc/s mobile, and using a quarter wave whip, I agree that these aerials are neat, and, of course, mechanically simpler than a "halo." However, a mobile aerial of this kind invariably operates on a much lower plane than the TV aerial, and this, coupled with the power limitations of mobile transmitters, does much to reduce TVI. A television aerial—as with all parasitic arrays—has a reasonable rejection in respect of signals from a dissimilar plane, the rejection rate rising rapidly as the angle between the planes becomes greater.

As cross polarization introduces considerable attenuation, it is unfortunate that the most convenient mode from the mobile point of view is directly opposed to that which it is prudent for a fixed station to employ. Nevertheless I feel that it is quite incorrect to suggest that vertical polarization should be used by fixed stations for the benefit of mobiles when this is more than likely to cause difficulties for them which may restrict operation and so limit the available time for study of the 70 Mc/s band and its potentialities.

Yours faithfully,
PAUL HARRIS, G3GFN

Bognor Regis, Sussex.

The Bent Aerial

DEAR SIR,—I was interested in George Howe's Bent Aerial, or as it is known in this part of the world, the half-pint version of the G8ON aerial (BULLETIN, Sept. 1957). It was designed as a short-garden *Top Band* aerial, and George Howe may be surprised at its performance on that band.

However, having used this type of aerial since 1954, I would suggest a smaller loading coil about 17 ft. from the end of the lower horizontal. The aerial, when correctly set up, is *not* broadband, and if it appears so it may be operating in a " travelling wave " mode which does not give the best results. The feed current should, in the " half-pint " version, be very small on 3·5 Mc/s and large on 14 Mc/s, but the s.w.r. does not necessarily indicate correct function, since the aerial reactance is naturally compensated by the adjustment of the a.t.u. capacitor.

A good deal of data on this type of folded aerial, together with a mathematical analysis by G6CJ, is available for members who are interested. If Top Band operation is not required, a " still smaller garden " version is available, at some loss of efficiency on 3·5 Mc/s. The original, still in use, works on all bands, and all versions work on the higher frequencies, though the polar diagrams can become a bit weird as the frequency is increased.

Finally, my original Top Band version was not chosen for its space saving properties, but because it out-performed the 300 ft. " long " wire previously in use.

Yours sincerely,
H. S. CHADWICK, G8ON

Worksop, Notts.

Omni-Aerials for V.H.F. Nets

DEAR SIR,—I read with interest the article by Mr. Hum entitled " Omni-Aerials for V.H.F. Nets " in the September issue of the BULLETIN. Crossed dipoles have of course long been recognized in commercial fields, particularly v.h.f. broadcasting, as a very simple way of obtaining a near-circular polar diagram. However, I feel that a word of warning is necessary in order that prospective builders of this aerial are not disappointed with their failure to achieve anything resembling a uniform pattern.

The electrical feeding system is such that one dipole is separated from the end of the main feeder by a quarter-wavelength of 75 ohm line, in order to achieve the correct phasing. If this dipole has an input impedance of 75 ohm resistance, then this short piece of line will be matched, and the input impedance of this dipole will appear in parallel with, and equal to that of the second dipole. The load presented to the end of the feeder will be two equal resistances in parallel, and the available power will divide equally between them, to produce the polar diagram shown in the article. If, however (and this is unfortunately very true in practice), the input impedance of one dipole is significantly different from 75 ohm resistance, then the phasing line will act additionally as a quarter-wave transformer, and will place in parallel with the second dipole an impedance

which is quite different from that of the dipole itself. Then the load presented to the end of the main feeder will comprise two unequal impedances, and the power will divide between them in the ratio of their resistive components. This unequal power sharing between the two dipoles will inevitably result in distortion of the polar diagram in an elongated manner, which can depart considerably from the omni-directional pattern required.

A practical half-wave dipole will probably have associated with it at the input terminals some reactance due to the difficulty of achieving *exact resonance* of the element, and will not match the phasing line as it stands. This will be aggravated by the use of co-axial line to feed a balanced radiator due to coupling between the current in the outer of the co-axial feeder, and the radiating element. Neither of these effects is easy to overcome in a simple installation like the one described, but the resulting order of distortion of the polar diagram will not be excessive (less than 3 db). However, any attempt to modify the perfect mechanical symmetry achieved by the aerial described in the article, by off-setting the dipole elements, or even by the introduction of a metal support pole in one corner of the cross, will introduce a considerable mutual impedance between the two dipoles, which can modify the input impedance of each single element in its own right by a factor of two. This will in turn, due to the transforming action of the phasing line, give rise to a power difference of 4 : 1 between the dipoles, and a consequent variation of 6 db in the maximum-to-minimum of the resulting elliptical polar diagram. If two stations in the net are unfortunate enough to orientate their aerials in the most unfavourable position they could well be 12 db down to one another compared with other stations in the net.

Whilst this latter case is somewhat alarmist, it does serve to indicate the pitfalls of this apparently simple aerial system, which, by avoiding such pitfalls, can be made to work elegantly in the manner described in the article.

Yours faithfully,
R. C. HILLS, G3HRH

Digswell, Welwyn, Herts.

Receivers

DEAR SIR,—With reference to Mr. Austin's letter about receivers in the October BULLETIN, I would like as a business man (although not in the electronics world) to say that in the UK amateur market it is a source of astonishment to me that any of the present firms now advertising their products can survive. Mr. Austin's arguments are quite valid in the sense that manufacturers of receivers for the amateur are able to obtain their components at lower prices but the crux of the matter is not how many thousands of cheaply made (?) receivers (for instance) can be turned out, but how many of us are likely to buy them? In my immediate circle of licensed friends none have bought a new commercial receiver in the past and do not intend to for the reason that they cannot afford to—and they do not imagine they will ever be able to do so in the foreseeable future. (And they are not all young!) Furthermore, from what I have learned on the bands since 1946 at least 99 per cent of UK stations use old and/or home-built gear and the underlying motto of these stations seems to be ' If you can do the job just as well for half the price—do it.'

We are told in the popular press that this is an affluent society but like most popular press utterings this is bunk and non-existent in the sphere of Amateur Radio.

I think that contemporary manufacturers in Great Britain are to be commended for their courage in catering to such a tiny market—particularly as the people in this market are so fussy. I am building a receiver at present and when it is performing properly I shall gain great satisfaction from the fact that I have saved myself £110 or so.

Yours smugly,
J. JOHN

Birmingham.

Heathkit RA-1 Review

DEAR SIR,—May I congratulate your contributor Mr. D. V. Newport, G3CHW, on his evaluation of the Heathkit RA-1 in the June 1963 issue. The whole article sets a standard for the purchaser, whereby he knows what to expect.

I trust this will be the BULLETIN's future approach to all reviews of new equipment.

Yours faithfully,
B. J. MITCHELL, G3HJK

Heald Green, Cheshire.

Group Visit to USA

DEAR SIR,—I have been making enquiries regarding the possibility of a group visit of RSGB members next year to New York. As well as the World Fair in 1964 it is also the 50th anniversary of the foundation of the ARRL. Members that I have spoken to have shown an interest, but like everything else, until they are sure something will be done, will not commit themselves.

Having available all the information required for such a visit, I would be pleased to hear from members who might be interested to have further particulars sent to them. If sufficient support can be found the return jet air fare could be as low as £70 per person.

It would be appreciated if you would spare the space for this letter since early planning is necessary to make such a venture a success. Many people arrange their holidays by the New Year and therefore the sooner they know of this trip the better.

Yours faithfully,
JOHN BRODZKY, G3HQX

2 Greenhill, Sutton, Surrey.

The Bulletin

DEAR SIR,— I note that there is a move afoot to alter the BULLETIN to some other fancy name. It has been known as the BULL for many years now, and as I have personally received a copy each month since 1934, I would hate to think of it under some other name.

The tendency these days is to alter anything after a few years, and before we know where we are there will be a request to alter G call-signs in favour of the prefix of 6SN etc.

Let sleeping dogs lie, I say, with the anticipation of receiving the RSGB BULLETIN for many more years.

73,
MAL. GEDDES, ZE3JO, late G2SO

Salisbury, Southern Rhodesia.

Headquarters

DEAR SIR,—Presumably the search for a new Headquarters building goes on but where is it taking place? Not, we hope, in the heart of London.

It has been mentioned that at least £20,000 will be required to establish a new headquarters in the London area. Surely with such a sum it is possible to purchase a veritable palace of a building outside the London area, somewhere equally accessible by road and rail.

In spite of the arguments put forward in *Current Comment*, May, 1962 issue of the BULLETIN, we feel that London with its high costs, by reason of supply and demand, planning restrictions which are not likely to improve, limited space, traffic congestion, etc., is not the most suitable area for a new headquarters. We hope that it will not be so.

This subject is evidently highly controversial and in our opinion the matter should be decided by a referendum.

Yours sincerely,

E. G. GIBBINS, G3JTG
C. RENSHAW, G2AQN
P. B. BRISCOMBE, G8KU
T. AGAR, B.R.S.23427
R. C. PHILPOT, B.R.S.2359
F. L. POSTLETHWAITE, G5KA
D. A. WODD, G3HKO
S. STEPHENSON, G3KS
R. S. SCALES, G3NRS
M. R. TETLEY, G3RIX
B. A. GOSPEL, A.3567
H. C. HOPKINS, G3NRI
G. R. SMITH, B.R.S.22194
G. THOMPSON, B.R.S.25123
P. BLAKEBOROUGH, G3PYB
E. C. FINLEY, B.R.S.25282
D. P. TIPPER, G3JBR
E. BROOKS, G3HFW

A Great Fighter

DEAR SIR,—It is with much pleasure that I endorse most heartily the text of the letter by Mr. Scarr, G2WS in the October issue.

Jack is an old friend of mine—we met on one of my early vacations from Malaya. When in Penang in the mid 1930's, Jack and I, VS1AA, ran a schedule on 14 Mc/s every Thursday at 4 p.m. GMT (23.20 Malayan time) for some considerable time and this helped greatly in putting Malaya, and VS1AA too, on the map.

I feel sure that I voice the thoughts of many amateurs when wishing Jack a long and happy retirement and that Mrs. Clarricoats and he should enjoy good health.

Yours sincerely,
JIM MACINTOSH, GM3IIA, ex-VS1AA, VS2AA, VS2AF

Cradlehall, Inverness

CONTEST NEWS

— RESULTS — REPORTS — RULES —

70 Mc/s C.W. Contest

The Council and Contests Committee have responded to requests for another 70 Mc/s contest by introducing a c.w. event in December. It is hoped that this event will encourage activity during the winter period and entrants are invited to comment on the rules; the rules are based on those for the January 144 Mc/s c.w. event which has proved extremely popular.

1. **When:** 10.00 GMT to 22.00 GMT on Sunday, December 1, 1963.
2. **Eligible Entrants:** All fully paid up members of the RSGB resident in I ARU Region 1. Only single operator stations may enter.
3. The General rules relating to RSGB Contests published in the January 1963 issue of the BULLETIN will apply except as superseded by the rules of this contest.
4. **Contacts** may be made on A1 only.
5. **Scoring** will be on the basis of 1 point per mile.
6. **Contest Exchanges:** RST reports followed by the contact number (starting with 001) and the location (e.g. RST579015 5 NE Oxford). The location of stations in the UK must be given as a distance and bearing from a place shown on the Ordnance Survey 10 miles to the inch map of Great Britain or actually at such a place.

It is the responsibility of the receiving operator to obtain sufficient information to enable him to calculate his score.

7. **Entries:** (a) Logs must be tabulated in columns headed in this order (i) Date/Time (GMT); (ii) Call-sign of station worked; (iii) My report on his signals and serial number sent; (iv) His report on my signals and serial number received; (v) Location of station **as received;** (vi) Points claimed.

(b) The cover sheet must be made out in accordance with RSGB General Contests Rule 5 and the declaration signed. The location as transmitted, the NGR in the case of stations in G, GC, GD, GM and GW, and latitude and longitude in the case of other stations, must be included on the cover sheet.

(c) Entries must be postmarked not later than **Monday, December 16, 1963.**

8. **Awards:** At the discretion of Council of the RSGB certificates of merit will be awarded to the leading station and to the runner-up. A certificate of merit may also be awarded to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

144 Mc/s C.W. Contest 1964

Rules for the 144 Mc/s C.W. Contest to be held on January 26, 1964, are substantially the same as for previous events.

1. **When:** 10.00 GMT to 22.00 GMT on Sunday, January 26, 1964.
2. **Sections:** (a) High Power (up to 150 watts input to the p.a. stage); (b) Low Power (up to 30 watts input to the p.a. stage).
3. The General Rules relating to RSGB Contests, as published in the January, 1963 issue of the RSGB BULLETIN, will apply except as superseded by the rules of this Contest.
4. **Eligible Entrants:** All fully paid-up members of the RSGB resident in Region 1.
5. **Contacts:** May be made on A1 only.
6. **Scoring:** For each completed contact with a station in the operator's own COUNTRY, 10 points may be claimed: for each completed contact with a station in any other COUNTRY, 25 points may be claimed. A bonus of 25 points may be claimed for the first contact in each new COUNTY in accordance with the list on page 376 of the January 1963 issue of the RSGB BULLETIN. The whole of the London Postal District will count as one county only.
7. **Contest Exchanges:** RST reports followed by the contact number, location of station and county (e.g. RST559001 Trebudannon, Cornwall or RST579002 Hendon, London). Since distances do not have to be calculated in this contest the restriction of QTH to one found on the 10m to 1 in. Ordnance maps does not apply: any convenient town or village may be given for the location.
8. **Logs:** (a) Must be tabulated in columns headed (in this order) " Date/Time (GMT)," " Call-sign of Station Contacted," " My report on His Signals and Serial Number Sent," " His Report on My Signals and Serial Number Received," " Location of Station Contacted," " County," " Points Claimed."

(b) The cover sheet must be made out in accordance with RSGB Contests Rule 5 and the declaration signed. The address of the station must include the county.

(c) Entries must be postmarked not later than **Monday, February 10, 1964.**

9. **Awards:** At the discretion of the Council of the RSGB, certificates of merit will be awarded to the leading station in each section.

Owing to increased pressure of work it is proposed to enlarge the Contests Committee. Members who are prepared to attend meetings at Society Headquarters are invited to forward their names to the General Secretary. The Committee usually meets at least monthly on Thursdays at 6.30 p.m.

Can You Help?

● J. S. Nicholson, GM3FJP, 15 Beauchamp Road, Edinburgh 9, who requires the circuit diagram and manual for the ex-government R109 receiver?

● J. Ayres, G3DQT, 7 Berrylands Road, Surbiton Hill, Surrey, who requires the manuals and/or circuit diagrams for the type B44 Mk 2 and Mk 3 transceivers?

● J. R. Tinning, G3FIX, 9 Eston Road, Lazenby, Middlesbrough, Yorkshire, who requires the manual for the Indicator Unit 248 (Part of monitor 56)?

● W. Ward, G3PCP, 8 Melrose Avenue, Crosby, Liverpool 23, who requires the circuitry of the modulator section of the G73 heterodyne oscillator/wavemeter?

CONTESTS DIARY

November 2–3 - RSGB 7 Mc/s DX Contest (c.w.). (See page 67, July, 1963).
November 9–10- Second 1·8 Mc/s Contest. (See page 195, September, 1963.)
November 16–17 RSGB 21/28 Mc/s Telephony Contests. (See page 126, August, 1963.)
November 23–24 CQ WW DX Contest (c.w.). (See page 262, October, 1963.)
December 1 - 70 Mc/s C.W. Contest (See this page.)
December 7–8 - OK C.W. DX Contest.

1964

January 26	— 144 Mc/s C.W. Contest (See this page).
February 1-2	— Affiliated Societies' Contest.
February 15-16	— BERU. (For rules, see page 261, October, 1963.)
February 29-March 1	— First 1·8 Mc/s Contest.
*March 7-8	— 144 Mc/s Open and Listeners' V.H.F. Contests.
April 5	— Low Power Contest.
April 12	— D/F Qualifying Event (Rugby).
April 19	— D/F Qualifying Event.
April 26	— D/F Qualifying Event (Newbury or Oxford).
*May 2-3	— First 144 Mc/s Portable Contest.
May 10	— D/F Qualifying Event (Manchester).
*May 30-31	— First 420 Mc/s Contest.
June 6-7	— National Field Day.
June 14	— D/F Qualifying Event (High Wycombe).
June 20-21	— 70 Mc/s Contest.
June 28	— D/F Qualifying Event (Derby).
June 27-28	— RSGB 1250 Mc/s Tests.
*July 4-5	— Second 144 Mc/s Portable Contest.
July 12	— D/F Qualifying Event.
July 19	— D/F Qualifying Event (Wirral).
July 26	— D/F Qualifying Event.
*September 5-6	— V.H.F. National Field Day.
September 13	— D/F National Final.
September 19-20	— Low Power Field Day.
October 3-4	— RAEN Rally.
October 21-22	— Second 420 Mc/s Contest.
October 31-November 1	— RSGB 7 Mc/s DX Contest (Phone).
November 21-22	— RSGB 7 Mc/s Contest DX (C.W.).
November 28-29	— Second 1·8 Mc/s Contest.
December 5-6	— RSGB 21/28 Mc/s Telephony/Receiving Contests

** To coincide with Region 1 IARU dates.*

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the first of the month preceding publication. A.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out the copy, preferably typed double spaced, in the style used below. Standing instructions for more than three months ahead cannot be accepted.

REGION 1

Ainsdale (ARS).—November 13, 27, Russell Road Methodist Church Hall, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate.
Bury (BRS).—November 12 (Talk by Jack Bennett, G3PVG), December 10 (AGM), 8 p.m., Knowsley Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., YMCA.
Eccles (E & DAC).—Tuesdays, 8 p.m., The Congregational Mission Church, King Street.
Liverpool (L & DARS).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield.—November 12, 26, December 10, 42 Jordongate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10. **(SMRC).**—Fridays, 7.45 p.m., Rackhouse Community Centre, Rackhouse, Daine Avenue, Northenden.
Morecambe.—November 6, December 4, 125 Regent Road.
Preston.—November 12 (" Police Radio," by Chief Inspector Eve, Lancs. County Police), November 26, December 10 (" Two Metres " by Darwin Evens, G3JAH). St. Paul's School, Pole Street. (All meetings start with Morse practice at 7.30 p.m.).
Southport (SRS).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport.—November 6, 20, December 4, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral.—November 6, 20, December 4, 7.45 p.m., Harding House, Park Road West, Claughton.

REGION 2

Barnsley.—November 22 (Pie Supper), December 13 (Discussion—Modern Trends in Amateur Radio), 7.30 p.m., King George Hotel, Peel Street.
Bradford.—November 12—Mullard Film Show at Queens Hall, Bradford. November 26 (Junk Sale). December 3 (" Transceivers " by D. Millard, G3OGV), 7.30 p.m., 66 Little Horton Lane.
Catterick Camp.—Tuesdays and Thursdays, 7.30 p.m., Clubroom, Vimy Road.
Halifax.—November 12 (" QSL-ing " by G3NIZ) December 3 (Quiz and Barnsley Radio Club), 7 for 8 p.m., Beehive & Cross Keys Inn. **(Northern Heights).**—November 6 (Halifax Fire Brigade talk on use of Electrical Energy). November 20 (Informal). December 4 (" Aerial Problems " by G3IBN), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., Chapman's Yard, North Street.
Spen Valley.—November 14 (" Electronic Marshalling Yard " by S. Jones). November 28 (" Office Electronics " by G2HHV), 7.15 p.m., Heckmondwike Grammar School.
York.—Tuesdays (Learners and Morse Training), 7.30 p.m., Thursdays (Club Night), 8 p.m., Clubrooms, Fetter Lane.

LOOKING AHEAD

December 7.—Barnet Radio Club Annual Christmas Party.
December 7.—Grafton Radio Society Christmas Party, Bedford Corner Hotel.
December 20.—RSGB Annual General Meeting.
April 5, 1964.—RSGB National Mobile Rally.
April 24, 1964.—RSGB National Mobile Rally.
May 24, 1964.—Northern Mobile Rally.
June 21, 1964.—Longleat Mobile Rally.
August 16, 1964.—Derby Mobile Rally.
September 13, 1964.—RSGB National Mobile Rally.

REGION 3

Birmingham (MARS).—November 19 (" Going V.H.F. with Transverters," G3BA) 7.45 p.m. Birmingham and Midland Institute, Paradise Street. **(MRCC).**—November 8, 7.30 p.m., Windmill House, Weatheroak, Wythall, Birmingham. **(Slade).**—November 8, 22, 7.45 p.m., The Church House, High Street, Erdington.
Cannock (CCARS).—November 7, The Tavern, Bridgtown.
Coventry (CARS).—Mondays, 8 p.m. Westfield House, Radford Road, Coventry.
Lichfield (ARS).—November 19, 7.30 p.m., Swann Inn, Lichfield.
Redditch (East Worcestershire).—November 14 (" Transistor Applications " by G3KWK) 8 p.m., Old People's Centre, Redditch.
Shrewsbury (Salop ARS).—November 14 (Bring and Buy Sale), 7.30 p.m. The Tennis Club, Harlescott Crescent, Harlescott Lane, Harlescott, Shrewsbury.
Stourbridge (St. & District ARS).—December 3, 7.45 p.m. Foley College, Stourbridge. " Brains Trust."
Sutton Coldfield (ARS).—November 8, 22, 7.30 p.m., 92 The Parade, Sutton Coldfield.
Wolverhampton & District (ARS).—November 18 (talk by G3NOW), 8 p.m., Neachells Cottage, Stockwell Road, Tettenhall.

REGION 4

Burton-on-Trent (ARS).—Wednesdays, 7.30 p.m., Club Room, Stapenhill Institute, Burton on Trent. Wednesday, November 27 Annual Dinner at Midland Hotel.
Chesterfield (C&DARS).—November 13, December 11, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.
Derby (D&DARS).—November 2 (Trip to RSGB Exhibition), November 6 (Surplus Sale), November 13 (Social Evening, MC—T. Darn, G3FGY), November 20 (Open Evening—Juniors Question Night), November 27 (The finishing touches to Amateur Equipment—A. Hitchcock G3ESB), December 4 (Surplus Sale), 7.30 p.m. Room No. 4, 119 Green Lane, Derby. **(DSW Exp. S.).**—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grantham (G&DARS).—Mondays, 7.30 p.m., Club Room, rear of Manners Arms Hotel, London Road, Grantham.
Grimsby (G&DARS).—November 7, 21, December 5, 8 p.m., Grimsby Model Engineers Club Room, Fletchers Yard, Wellowgate. Grimsby.
Leicester (LRS).—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (LSWC).—First Wednesday in each month, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.
Loughborough (RCL).—Fridays, 7.30 p.m., Corporation Hotel, Wharncliffe Road, Loughborough.
Magnus GS (SWC).—November 5 (Practical), November 8 (Hi-Fi), November 12 (The TRF Receiver), November 15 (The Valve-Voltmeter), November 19 (Practical), November 22 (Mileposts in Receiver Design), November 26 (Methods of Frequency Changing), November 29 (The Modern BC Receiver), 4 p.m., Physics Lab.
Mansfield (MRC).—Fridays, 7.30 p.m., Hope and Anchor Hotel, Union Street, Mansfield.
Melton Mowbray (ARS).—November 21, 7.30 p.m. (Shack Visit), D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill.
Nottingham (ARCN).—Tuesdays, Thursdays, Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood.
Northampton (NSWC).—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.
Peterborough (P&DARS).—December 6 (TVI—Interference Prevention), 7 p.m., Room 13, Electronics Block, Peterborough Technical College.
Worksop (NNARS).—Tuesdays (Beginners), Thursdays (Informal), 7.30 p.m., Club Room, Victoria Institute, Eastgate, Worksop, Notts.

REGION 5

Cambridge (CUWS).—Tuesdays, 8.15 p.m., Psychology Department Lecture Rooms, Downing Site, Cambridge. November 5 (" Radio Receivers in Rockets and Satellites," J. Hugill), November 12 (Tape Recorders), November 19 (" Industrial Automation," S. L. H. Clarke of Elliot Brothers), November 26 (" Semiconductors," Texas Instruments). All amateurs welcomed to these lectures. **(C & DARC).**—Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge. November 8 (Informal), November 15 (" QRA Locator Maps," Arnold Tomalin G3PTB), November 22 (Informal).
Luton.—Mondays, 7.30 p.m., Surrey Street Schools, Luton.
March (M & DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, High Street, March, Cambs. November 12 (Grand " Bring and Buy " Sale of Gear), December 3 (Provisional date for Social Evening at Police and Fire Services Club).
Shefford (S & DARS).—Thursdays, 7.45 p.m., Digswell House, Hitchin Road. November 7 (" Annual Dinner Preparations and Junk Sale "), November 14 (" Quiz "), November 21 (" Demonstration of Ten Watt Transistor Amplifier," by C. Brown). November 28 (" Crystal Processing," by W. Bigley, G2AUA), December 5 or 6 (Annual Dinner.—Keep dates open).

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
Wolverton (WDRC).—December 6 (" Filters " by G3NOC), 7.30 p.m., Wolverton College of Further Education.

REGION 7

Acton, Brentford & Chiswick (ABCRC).—November 12, 7.30 p.m. (Film Show), AEU Club, 66 High Road, Chiswick.
Bexleyheath (NKRS).—November 14 (Quiz), November 28 (Meeting, VOA), 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.
Barnet (BRC).—November 26 (VOA Tapes), December 7 (Sixth Christmas Party), 8 p.m., Red Lion Hotel, Barnet.
Chingford (SC).—Fridays (except first), 8 p.m., Chingford Community Centre, Enday Hill.
Chingford Group.—November 10, Contact G3NQT, Loughton 2397.
Croydon (SRCC).—November 12 (" Colour TV," by P. S. Carnt), 7.30 p.m., Blacksmiths Arms, South End, Croydon.
Dorking (D&DRS).—November 12 (Informal Meeting), 8 p.m., Wheatsheaf, Dorking.
East Ham.—November 5 to 8, GB3LTE at Leisure Time Exhibition; November 19, 7.30 p.m., Tuesdays fortnightly, 8 p.m., 12 Leigh Road, East Ham.
East London District.—November 17 (" My Golden Jubilee Year," John Clarricoats, O.B.E., G6CL), 2.30 p.m., Town Hall, High Road, Ilford.
East Molesey (TVARTS).—November 6 (Constructional Contest), November 9 (Annual Dinner), 8 p.m., Carnarvon Castle Hotel, Hampton Court. December 4 (" Nuclear Power " by A. Taylor, B.Sc. (Eng.), A.C.G.I., A.M.I.Mech.E.).
Edgware & Hendon (EARDS).—November 11 (R. F. Stevens, G2BVN, on " Single Side Band "), November 25 (Home Constructors and Radio Photograph Contest), 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Enfield.—November 21 (R. C. Hills, G3HRH,

" Your Aerial Problems Answered "), 7.30 p.m., George Spencer School, Southbury Road, Enfield.

Gravesend (GRS).—November 20, 7.30 p.m., RAFA Club, 17 Overcliffe, Gravesend.

Guildford (G&DRS).—Second and fourth Friday in each month, 8 p.m., City Cafe, Onslow Street, Guildford.

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

Harlow (SRC).—Wednesdays, 7 p.m., Edinburgh Way, Harlow.

Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harrow.

Holloway (GRS).—Mondays and Wednesdays, (RAE and Morse), 7 p.m., Fridays (Club), 7.30 p.m., Montem School, Hornsey, N.7.

Hounslow (HADRS).—Mondays, 7.30 p.m., Canteen, Mogden Main Drainage Dept., Mogden Works, Isleworth.

Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).

Kingston.—November 14, 28, 8 p.m., YMCA, Eden Street, Kingston. (Morse classes weekly on Fridays at 2 Sunray Avenue, Tolworth.)

Leyton & Walthamstow.—November 26, 7.30 p.m., Leyton Senior Institute, Essex Road, E.10. (Interested new members contact A. Rix, 17 Forest Drive East, E.11.)

London U.H.F. Group.—November 7 (" Aerials for V.H.F., and U.H.F.," by F. J. H. Charman, G6CJ), December 5 (Lecture on R.F. Front-ends), 7.30 p.m., The Bull and Mouth, Bury Place, Bloomsbury Way, London, W.C.1.

Loughton.—November 8, 22, 7.30 p.m., Loughton Hall (nr. Debden Station).

Mitcham (M&DRS).—November 8, 7 p.m., " The Canons," Madiera Road, Mitcham.

New Cross (CARS).—November 22 (Quiz by G3OGE), Wednesdays and Fridays, 8 p.m., 225 New Cross Road, S.E.14.

Norwood & South London (CP&DRC).—November 16 (Hi-Fi Evening with Clifton), CD Training Centre, Bromley Road, Catford.

Paddington (P&DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.

Purley (P&DRC).—November 15, 29, 8 p.m., Railwaymen's Hall (Side Entrance), Whytecliffe Road, Purley.

Reigate (RATS).—November 23 (Miss Nell Corry, G2YL), 7.30 p.m., High Street, Reigate.

Romford (R&DRS).—Tuesdays, 8.15 p.m., RAFA House, 18 Carlton Road, Romford.

Science Museum (CSRS).—Mondays, 6.30 p.m., November 4 (" Short Wave Listening " by J. Douglas Kay, G3AAE), November 18 (Tape Recording by W1HDQ).

Sidcup (CVRS).—November 7, 7.30 p.m., Congregational Church Hall, Court Road, Eltham.

Slough (SARS).—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street, Slough.

Southgate & District.—November 14, 8 p.m., Atlasta Lodge, Tottenhall Road, N.13.

St. Albans (Verulam ARC).—November 20, 7.30 p.m., Headley Road, St. Albans.

Sutton & Cheam (SCRS).—November 19, 8 p.m., The Harrow, High Street, Cheam.

Uxbridge (UDRS).—November 11, 25, 7.30 p.m., St. Andrew's Church Scout Hut, Uxbridge Road.

Welwyn Garden City.—November 14, 8 p.m., (Visit to Police H.Q., Hatfield), Vineyard Community Centre, Digswell Road.

Wimbledon (W&DRS).—November 8, 8 p.m., Community Centre, St. George's Road, Wimbledon, S.W.19.

REGION 8

Crawley (CARC).—November 13—Informal, for details contact G3FRV. November 27, 8.0 p.m., " RTTY " (lecture and demonstration by E. W. Yeomanson, G3IIR), West Green Centre.

REGION 9

Bath.—November 6, 7.30 p.m., Committee Room, Technical College, nr. Borough Walls, Bath.

Bristol.—November 22, 7.15 p.m., Royal Fort, Bristol University, Woodland Road, Bristol 8.

Burnham-on-Sea.—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea. November 12, " Marine Radio Standards and Requirements " by T. N. Carter, Officer-in-Charge, GPO Radio Station.

Camborne (CR & TC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, nr. Camborne.

Exeter.—First Tuesday in each month 7.30 p.m., The George and Dragon Inn, Blackboy Road, Exeter.

Plymouth (PRC).—First Tuesday in each month, 730 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St. Andrew's Cross, Plymouth.

South Dorset (SDRS).—First Friday in each month, 7.30 p.m., alternately at Waverley Hotel, Westham, Weymouth and Labour Rooms, West Walks, Dorchester. November meeting at Dorchester.

Torquay (TARS).—November 9 (Quiz Match, Torbay *v.* Plymouth), Club HQ, Belgrave Road, Torquay.

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

Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Cardiff.—November 11, 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 11

Prestatyn (FRS).—November 11 (7.30 p.m., Slow Morse; 8 p.m., " Around Local Hams," Slides and Tape), November 25 (7.30 p.m., Slow Morse, 8 p.m., Constructional Competition Judging—details from Hon. Secretary), Clubroom, Railway Hotel, Prestatyn.

Llandudno (CVARS).—Second Thursday in the month, 7.30 p.m., Albert Hotel, Madoc Street, Llandudno.

REGION 15

Belfast.—Third Friday in each month, 8 p.m., Toc H Room, 73 Lisburn Road, Belfast. November 22, " Top Band Operation " by F. Robb, GI6TK, and final arrangements for visits to UTV Studios on November 29 and December 6.

REGION 16

Basildon (BDARS).—Details of meetings may be obtained from G3RQT, 59 Waldegrave, Basildon.

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

Southend (SDARS).—Fortnightly meetings on Fridays, 8 p.m., the Executives Canteen of E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Further details from Mrs. P. M. C. Collop, 53 Beedell Avenue, Westcliffe-on-Sea. Next meeting November 15.

Great Yarmouth (GYRC).—Fridays, 7.30 p.m., Electric Social Club (opposite Steward & Patersons), North Quay, Gt. Yarmouth.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Fridays, November 15 and December 13, 1963

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

Workshop boxes for storing small parts are being marketed by Erecto Slotted Angle Co., Newport Road, Hayes, Middlesex. At the back of each box is a lip which will hook over narrow horizontal beading; alternatively, two slots are provided so that the box can be hung on screws. The boxes are coloured for easy identification and cost 1s. 6d. each.

Details of a range of triangular section, galvanized **steel towers** are available from the manufacturers, Tubewrights Ltd., Kirkby Industrial Estate, Liverpool. The masts are of simple tubular steel construction, and five models cover heights from 20 ft. 6 in. to 40 ft. 6 in. in 5 ft. steps, each incorporating either a foundation grid or stubs, and a safety hoop at the tower top. The loads which can be accommodated vary with overall height and wind resistance of the aerial, but are nominally 640 lb. for the 20 ft. model, which has a distance of 14 in. between the tubes at the base; and 535 lb. for a 40 ft. tripole, the latter having base measurements of 22 in. The cost of a 20 ft. tripole is approximately £27, increasing to £48 for a height of 40 ft. For an additional £5 a special aerial mounting can be fitted.

The D.909 **transistor tester and power supply**, by Beulah Electronics, 126 Hamilton Road, West Norwood, London, S.E.27, will test both *p-n-p* and *n-p-n* transistors. It can measure leakage currents Ico and I'co, and, with the transistors in circuit, α and β gain, as well as providing a general test for a.f. transistors through the use of an integral audio generator. A variable smoothed d.c. supply is incorporated.

An illustrated catalogue describing **laminated tubes** is available on request from Langley London Ltd., Kelvin Way, Crawley, Sussex. Standard stock sizes, and much technical data concerning available " Lantex " paper, fabric, glass and asbestos base tubing is provided in the 18 page booklet.

LONDON MEMBERS' LUNCHEON CLUB
CHRISTMAS MEETING
FRIDAY, DECEMBER 13, AT 12.30 FOR 1 P.M.

Bedford Corner Hotel, Bayley Street,
Tottenham Court Road, London, W.1.

Ladies most welcome

Tickets, price 12/6 each, may be obtained from the Honorary Secretary, Graham Leicester, G3IKC, 153 Park Road, Chiswick, London, W.4 (Telephone: CHIswick 3970)

Publications for the Radio Amateur and Shortwave Listener

RSGB PUBLICATIONS

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MANAGING DIRECTOR required urgently. Take complete charge of Company. Salary, plus 50% of profits. Suit semi-retired Amateur with organising ability. Olympic Works, Winton, Bournemouth.

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GENERAL. Free accommodation, return passages by sea/air, outfit and trunk allowances are provided. Three weeks, three days' leave with pay, rising to 4 weeks, 2 days after 10 years' service is granted. Families are granted free passages to the overseas station (and return to U.K. in due course) as soon as suitable accommodation is available.

Selection will be by interview in London. Application form and further details may be obtained from The Director, British Forces Broadcasting Service, Kings Buildings, Dean Stanley Street, London, S.W.1. Closing date for receipt of applications 9th December, 1963.

OFFICIAL APPOINTMENTS (continued)

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WHY NOT MAKE IT a personal QSO? By offering hospitality to visiting Radio Amateurs, or better, you may visit them. This can be arranged by joining the International Ham-Hop Club. Membership is open to all Radio Amateurs and SWL's. Subscriptions 10/- per year, including free *Newsletter*. Contact G. B. Division Hon. Sec., G3HZP, H. James, "Mayfield," Rampton Road, Willingham, Cambs., or Deputy Gen. Sec., J. Coote, 56 Dinsdale Avenue, Kings Estate, Wallsend, Northumberland.

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A.3621 has R107 in good condition in exchange for 19 set + P.S.U. in working order. A.3621, 19 w, B Flt., 2 Sqn., 1 Wing, R.A.F. Cosford, Wolverhampton, Staffs.

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COLLECTING FOR PRIVATE MUSEUM.—Early Marconi tuners, detectors, spark coils, high voltage transformers, Leyden jar and plate condensers, keys, spark gaps, oscillation transformers. Commercial gear and commercially made amateur gear before 1920 especially tubes, magazines, catalogues and *QSTs*. RSGB BULLETINS before 1937. Old Post Office manual morse telegraph equipment including needle systems. All letters answered.—E. W. Freeman, KØMOA, Box 57, Yankton, South Dakota, U.S.A.

WANTED: Type "A" mk. III, Underground movement TX/RX, must be complete and in original condition, with original manual, etc. 32 West Belvedere, Danbury, Near Chelmsford, Essex.

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80 Mc/s WALKIE-TALKIES for mountain rescue team. Must be GPO approved types G3NQX. W. H. Brown, 1 Gib Lane, Hoghton, Nr. Preston, Lancs.

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WANTED.—All types of communication receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Electronics Ltd., Ashville Old Hall, Ashville Road, London E.11. (LEYton 4986).

FOR SALE

LG 50 TX perfect with spare PA £35. G2MA Linear in cabinet c/w 813 transformer and spare 813 £27. Several large transformers and condensers, cheap. **Wanted** LG300 c/w mod/psu or Minimitter Mercury in FB condition only. Collect and air test or carriage extra at cost. G3ADZ, 3 Norris Gardens, Havant (1861) after 7 p.m. or weekend.

19 in. ENCLOSED RACK CABINET—5 ft. high, rear door, black crackle, bargain, written reply—GI3NVW, 42 The Mount, Belfast.

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DRAKE 2B Communications Receiver with matching Drake 2-B.Q. Q-Multiplier which has built-in speaker; original instruction manual supplied with unit; all in original mint condition, £100; buyer collects. 32 West Belvedere, Danbury, Near Chelmsford, Essex.

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500 yds of lead covered 3 core solid drawn ·01 core, equal to 7-044, with tracer colours. Offers—Thomason, Foxley Lodge, Higher Lane, Lymm, Cheshire. Phone Lymm 155.

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FOR SALE—contd.

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BC-348M RECEIVER, £12 10s. Top Band Transmitter phone/CW, TT11 Final, plate-screen Mod., £13. Pye Car Radio PC59CR, 12 volts, £10. Prefer buyer collect. Tunnah, 16 Louvaine Avenue, Bolton. (Phone 42660).

COSSOR type 89 D.B. tube £1, R1132A RX £1 10s., 12 volt rotary 355 volt 170 m/a 10s., variable resistor ·4 ohms 25 amp. 10s., CR100 workshop manual 10s., Command RX 1·5-3 megs £3 10s., 4 pairs amphenol 35 way plugs and sockets £2. pr, Desyn beam indicator 12-24 volt 15s. Please add postage. G3OUQ, 53 Watling Street, Nuneaton.

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INDEX TO ADVERTISERS

Radio Society of Great Britain

NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, LONDON, W.C.1

REPORT OF THE ACTING HONORARY TREASURER

AS Acting Honorary Treasurer it is my pleasure to submit the Balance Sheet of the Society at June 30, 1963, and the Income and Expenditure Account for the year to the same date.

I am glad to report that the Income and Expenditure Account shows a surplus of £3,952, compared with a surplus last year of £2,674. The increased revenue from subscriptions and further enhanced profit from the sales of publications has offset the increased expenditure of which the main item is the net cost of the BULLETIN.

The increase in this cost is partly due to the larger size of the BULLETIN but, as I warned you last year, also due to the continued rise in printing rates over which we have no control. It is considered however that the BULLETIN, which is the Journal of the Society, is worthy of its cost.

Another item of expenditure was the cost of sending delegates to the IARU Region I Conference at Malmo in Sweden; the benefits derived from the personal contacts made there and the presence of the delegates on their various committees were, it is felt, well justified.

I have always advocated the bringing in of Council and Committee members from the provinces whenever possible so that the views of members there can be expressed, and this policy has increased the travelling expenses of these members. I consider however that this has also been well justified.

A disappointing figure is the amount received from advertisers in the BULLETIN. I must stress once again the importance of members buying through the medium of the advertisements in our publication when they can and letting the advertisers know this. The competition for advertising is very fierce and unless an advertiser knows he is getting results from his expenditure he may well decide not to place advertisements in our publications.

Once again I would like to extend to all those who help to make the production of our publications possible our sincere thanks for their contributions of articles; without this continued effort we could not possibly show such a wonderful result of profit from sales of publications.

Again I would ask members to let me know beforehand any questions they would like me to answer in detail at the Annual General Meeting. In this way I can be certain to have available at the meeting all the information required.

NORMAN CAWS
Acting Honorary Treasurer

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)

New Ruskin House, Little Russell Street, London, W.C.1

INCOME AND EXPENDITURE ACCOUNT
for the year ended 30th June, 1963

£	1962 £	£		£	1963 £	£
			INCOME			
		15,736	Subscriptions (including proportion of Life Members' Subscriptions)			17,586
		3,833	Profit on Sales of Publications, etc.			7,133
		647	Interest on Investments (Gross Amount before deduction of Income Tax)			647
		41	Deposit Interest			96
		20,257	**Total Income**			25,462
			EXPENDITURE			
	928		Rent, General and Water Rates, Cleaning, Lighting and Heating		962	
	5,221		Salaries, National Insurance and Staff Pension Premiums		5,333	
	125		Telephone		106	
	547		General Postages		688	
	608		Printing and Stationery		731	
	140		Staff Luncheon Vouchers		156	
	66		Insurances		85	
	100		Bank Charges		100	
	27		Repairs and Maintenance		43	
	148		Legal Expenses		11	
	105		Audit Fee		105	
	154		Sundry Expenses		203	
	—		Purchase of Equipment written off		85	
	98		Membership Certificates and Badges		25	
	159		Awards, Trophies and Contests		106	
	10		Tape recorded Lectures		9	
	511		Cost of QSL Bureau		529	
	216		Contribution to I.A.R.U. Region I Division		215	
	66		*Headquarters Fund Printing*		—	
	92		Annual General Meeting (Cost of Printing and Hire of Hall)		107	
	246		Net cost of Exhibitions, etc. (Note 1)		310	
	—		I.A.R.U. Region I Conference at Malmö		334	
	—		Equipment for Technical Development		40	
	14		Wrotham Beacon Maintenance		21	
			Bulletin distributed free to Members—			
	10,949		Printing, Postages, etc.	13,135		
	4,440		*Less* Receipts from Advertising	3,657		
		6,509			9,478	
			Travelling, Entertaining and Meetings—			
	213		Council and Committee Meetings	354		
	716		Council Members	917		
	162		Regional and Club Meetings including net cost of various rallies and conventions	211		
	38		R.A.E.N. Committee Meetings and General	46		
	22		Representatives' Expenses	27		
	48		London Lectures	55		
	101		Sundries	118		
	193		*Regional Representatives' Conference*	—		
		1,493			1,728	
		17,583	**Total Expenditure**			21,510
		£2,674	**SURPLUS OF INCOME OVER EXPENDITURE FOR YEAR ENDED 30th JUNE, 1963**			£3,952

BALANCE SHEET 30th June, 1963

£	1962 £	£		£	1963 £	£
			CURRENT ASSETS			
		3,316	Cash at Bank and in Hand On Current Account and in Hand		2,413	
		2,041	On Deposit Account		6,041	
		5,357			8,454	
		2,188	Debtors		1,758	
		410	Payments in advance		196	
		2,164	Stock of Publications, etc. (as certified by the General Secretary)		5,082	
		10,119				15,490
			FIXED ASSETS			
		14,795	Investments at Cost Quoted at Stock Exchange (Note 2) Middle Value £13,429 (1962 = £12,153)		14,795	
		3,000	5 per cent. Defence Bonds		3,000	
		—	Luton Corporation—Loan on Mortgage		3,000	
		17,795			20,795	
		1	Furniture and Equipment Net Book Value at 1st October 1947		1	
		814	Additions (at Cost)		899	
		815			900	
		814	*Less* Amounts written off		899	
		1			1	
		17,796				20,796
		£27,915	**Total Assets**			£36,286
			BEVAN SWIFT MEMORIAL LECTURE FUND			
		90	Balance at 1st July 1962		85	
		5	*Less* Prize Awarded		5	
		85				80
		94	**LIFE MEMBERS' SUBSCRIPTIONS RESERVE ACCOUNT**			152
			CURRENT LIABILITIES			
		3,658	Sundry Creditors and Accrued Expenses		6,757	
		8,824	Subscriptions in advance		10,314	
		231	Taxation		752	
		12,713				17,823
		12,892	**Total Liabilities**			18,055
			ACCUMULATED FUND			
		12,768	Balance at 1st July 1962		15,023	
		2,674	Surplus of Income over Expenditure for the year ended 30th June 1963		3,952	
		419	*Less* Income Tax in respect thereof		744	
		2,255			3,208	
		15,023				18,231
		£27,915				£36,286

NORMAN CAWS, *President and Acting Honorary Treasurer*

JOHN CLARRICOATS, *General Secretary*

REPORT OF THE AUDITORS TO THE MEMBERS OF RADIO SOCIETY OF GREAT BRITAIN

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit. In our opinion proper Books of Account have been kept by the Society so far as appears from our examination of those Books. We have examined the above Balance Sheet and Income and Expenditure Account, which are in agreement with the Books of Account. In our opinion and to the best of our information and according to the explanations given us, the said Accounts in conjunction with the notes annexed hereto give the information required by the Companies Act, 1948, in the manner so required, and the Balance Sheet gives a true and fair view of the state of the Society's affairs as at 30th June, 1963, and the Income and Expenditure Account gives a true and fair view of the surplus of Income over Expenditure for the year ended on that date.

Thames House, Queen Street Place, London, E.C.4.
21st October 1963

EDWARD MOORE & SONS
Chartered Accountants

NOTES

(1) **Net Cost of Exhibitions, etc.**

Held in 1961 £		*Held in 1962* £
241	National Radio Show	279
5	International Radio Communications Exhibition	31
£246		£310

National Radio Show	Radio Hobbies Exhibition		National Radio Show	International Radio Communications Exhibition
231	432	Profit on Sales of Publications, etc.	337	561
103	128	Subscriptions of New Members enrolled	111	160
£334	£560		£448	£721

(2) **Investments**

Middle Value at 30th June 1962 £		Middle Value at 1st July 1963 £	Cost Price £
3,780	£*4,000* 3 per cent. Savings Bonds 1955/65	3,910	4,021
3,600	£*5,000* 3 per cent. Savings Bonds 1965/75	4,175	5,219
3,232	£*4,145 1s. 6d.* British Transport 4 per cent. Guaranteed Stock 1972/77	3,689	4,055
1,541	£*1,751 9s. 6d.* 3½ per cent. Conversion Loan 1969 ..	1,655	1,500
£12,153		£13,429	£14,795

THE PILOT OFFICER NORMAN KEITH ADAMS PRIZE TRUST FUND

BALANCE SHEET 30th JUNE, 1963

	£ s. d.		£ s. d.
TRUST FUND	150 0 0	**INVESTMENT**	
Creditor:		£*150* 3½ per cent. Defence Bonds ..	150 0 0
Prize to be awarded under the terms of the Trust Deed for year ended 30th June, 1963	5 5 0	**CASH AT BANK**	15 15 0
ACCUMULATED FUND			
Balance at 1st July, 1963	10 10 0		
	£165 15 0		£165 15 0

INCOME AND EXPENDITURE ACCOUNT for the year ended 30th June, 1963

	£ s. d.		£ s. d.
Provision for prize for the year ended 30th June, 1963	5 5 0	Interest on Investment for the year ..	5 5 0
	£5 5 0		£5 5 0

NORMAN CAWS *President and Acting Honorary Treasurer* — JOHN CLARRICOATS *General Secretary*

REPORT OF THE AUDITORS

We have audited the Balance Sheet and Income and Expenditure Account as set forth above and have obtained all the information and explanations we have required. In our opinion such Balance Sheet and Income and Expenditure Account are properly drawn up so as to exhibit a true and correct view of the state of affairs of the Prize Trust Fund as at 30th June, 1963, according to the best of the information and explanations given to us.

Thames House, Queen Street Place, London, E.C.4.
21st October, 1963.

EDWARD MOORE & SONS
Chartered Accountants

HEADQUARTERS' FUND ACCOUNT AT 30th JUNE 1963

	£ s. d.
BALANCE AT BANK:	
On Deposit Account	1,698 17 9
On Current Account	5 0 1
	£1,703 17 10

NORMAN CAWS *President and Acting Honorary Treasurer*

REPORT OF THE AUDITORS

We have examined the above Statement of Contributions to the Headquarters' Fund and report that it is in accordance with the records of receipts.

Thames House, Queen Street Place, London, E.C.4.
21st October, 1963.

EDWARD MOORE & SONS
Chartered Accountants

Radio Amateurs' Examination, November 1962

Questions* and Specimen Answers

Compiled by Alan Bayliss, B.Sc., G8PD

Part 1 (Compulsory Questions)

Q. 1 (*a*) *What is meant by:*
(*i*) *The main address;*
(*ii*) *The temporary alternative address or location and*
(*iii*) *The alternative address of an amateur radio station?*
(*b*) *What are the special conditions which the licensee must observe if he wishes to operate the station from* (*ii*) *or* (*iii*) *above?*
(*c*) *When and by whom may the station be inspected to ensure that the licence conditions are being observed?*
(*d*) *What is meant by the expression "Wireless Telegraphy" when it is used in relation to an Amateur* (*Sound*) *Licence?*

A. 1 (*a*) (*i*) The main address is that at which the station is normally located and which is stated in the licence.

(*ii*) The temporary alternative address or location is any address or location in the United Kingdom at which the station may be established for short separate periods, none of which exceeds four consecutive weeks.

(*iii*) The alternative address is any address in the United Kingdom, other than (*i*) above, at which the station may be established on a more permanent basis than (*ii*) above.

(*b*) When operating from the temporary alternative address (*ii*) no special notification to the Post Office is necessary but the suffix /A must be added to the call-sign and the alternative location must be clearly announced at intervals.

Before operating from an alternative address the Telephone Manager of the Post Office Telephone area in which the alternative address is situated must be notified in advance. No special call-sign suffix is needed.

(*c*) The station may be inspected by a duly authorized official of the Post Office at any reasonable and convenient time.

(*d*) The expression "Wireless Telegraphy" has the meaning assigned to it in the Wireless Telegraphy Act, 1949, and includes radio telephony.

Q. 2 (*a*) *Describe an oscillator circuit suitable for use in an amateur radio transmitter and explain features of its design which ensure frequency stability.*

(*b*) *Describe a method of accurately checking the frequency of a transmitter.*

A. 2 (*a*) **Fig. 1** shows the circuit diagram of a variable frequency oscillator suitable for use in an amateur transmitter. It is known as a Clapp oscillator. V is a low power radio frequency pentode, the screen grid of which is bypassed to earth for r.f. by the capacitor C4 and fed from the h.t. supply through the decoupling resistor R2. The anode circuit is untuned and consists of the r.f. choke RFC2 which is bypassed to earth for r.f. at its h.t. end by the capacitor C5 and fed from the h.t. supply via the decoupling resistor R3. Output is taken from the anode through the coupling capacitor C6.

Two capacitors, of about 470pF capacity, are connected between grid and cathode, and cathode and earth. A series

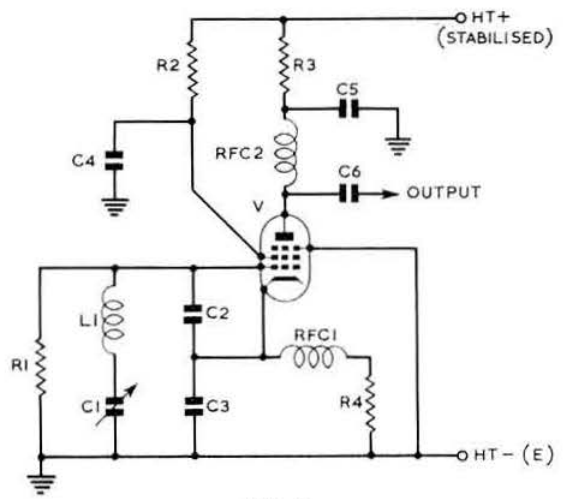

Fig. 1.

circuit of L1 and C1 is connected from grid to earth and this, together with C2 and C3 in series, determines the frequency at which oscillation takes place. R1 is a grid leak connected from grid to earth.

The cathode is connected to earth through the r.f. choke RFC1 and the bias resistor R4. The latter is included to limit the anode current to a safe value in the case of non-oscillation of the circuit.

The following points should be observed if high frequency stability is to be achieved:

(i) L1 should be a coil of high *Q* and good mechanical and electrical stability.

(ii) C1 should be a variable capacitor of good stability (around 25-50pF capacity). C2 and C3 should then be chosen as large as possible (usually 470-2000pF)

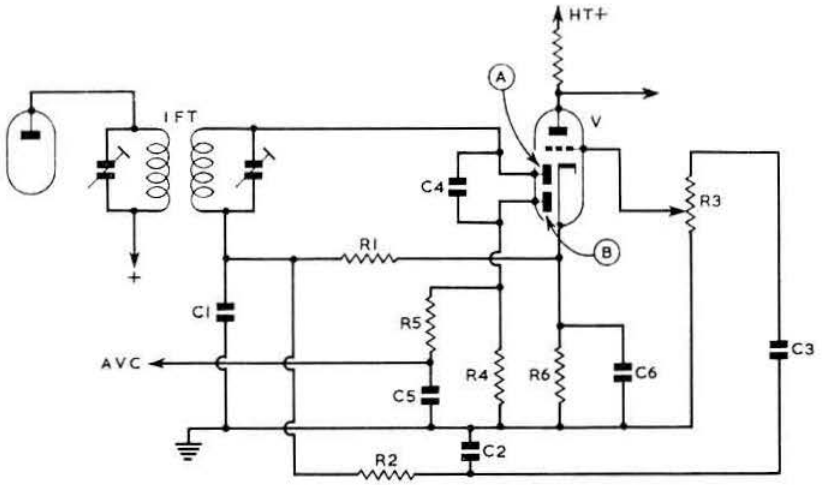

Fig. 2.

consistent with reliable oscillation. This has the effect of " tapping down " the valve on the tuned circuit so that the frequency of oscillation will be little affected by changes in valve capacity as it warms up.

(iii) L1, C1, C2 and C3 should be mounted sufficiently far away from the valve so that they are unaffected by heat generated by the valve.

(iv) The h.t. supply should be stabilized.

(v) The whole oscillator should be built in a solid mechanical fashion.

(vi) The output circuit should be untuned and coupled to the rest of the transmitter via a buffer amplifier.

(*b*) The frequency of a transmitter may be checked accurately in the following manner.

First, check that the output is in the correct band by means of an absorption wavemeter.

Second, check the exact frequency within that band by means of a receiver with a good logging scale by interpolation between known harmonics of an accurate 100 kc/s quartz crystal oscillator. Alternatively, a heterodyne frequency meter with 100 kc/s check points from an accurate crystal oscillator may be used.

Part 2 (Six questions to be attempted)

Q. 3 *With the aid of a circuit diagram explain the action of a typical superheterodyne detector/a.g.c. stage.*

A. 3 The circuit diagram of a typical superheterodyne second detector/a.g.c. stage is shown in **Fig. 2.**

The valve V is a double diode triode. The diode A acts as a detector and diode B as an a.g.c. rectifier. The triode section of the valve acts as an audio amplifier.

The signal detection circuit consists of the secondary of the intermediate frequency transformer IFT, the diode A, the load resistance R1 and the i.f. by-pass capacitor C1. The rectified (or detected) signal appears across the load resistor R1 from which it is fed to the grid of the triode for amplification, via an i.f. filter consisting of R2 and C2, an audio coupling capacitor C3 and a volume control R3.

The a.g.c. rectifier diode is also fed from the intermediate frequency transformer IFT via the capacitor C4 and a negative voltage, depending on the strength of the received signal, is developed across the load resistor R4. The a.g.c. reservoir capacitor C5 is charged up by this voltage through the resistor R5. The time constant of C5 and R5 is chosen to be long compared with the lowest audio frequency it is required to receive but short enough to follow fairly fast fading of the signal. Typical values of C5 and R5 are 0·05μF and 1 Megohm. The a.g.c. voltage across the capacitor C5 is fed away to control the gain of the i.f. and r.f. stages of the receiver.

The components C6 and R6 serve a double function. First, they provide ordinary cathode bias for the triode section of the valve. Second, because the cathode of the valve is positive (by an amount equal to the cathode bias) with respect to the a.g.c. diode anode B, a delayed a.g.c. action is provided. No a.g.c. voltage is developed until the signal level at the detector reaches a level sufficient to overcome the bias voltage. In this way a better a.g.c. characteristic is obtained than when no delay is used.

Q. 4 *Two equal resistors are joined in parallel and connected to a battery having an e.m.f. of 12 volts and 2 ohms internal resistance. The current taken from the battery is one milliampere. What is the value of each resistance?*

A. 4 The circuit diagram of the resistors connected to the battery is shown in **Fig. 3.**

Let each resistance have a value R ohms. The two in parallel will have an effective resistance of $\frac{R}{2}$ ohms.

Applying Ohm's Law to the circuit we have:

$$\text{Internal resistance} + \text{External resistance} = \frac{\text{e.m.f.}}{\text{current}}$$

i.e. $$2 + \frac{R}{2} = \frac{12}{1/1000}$$

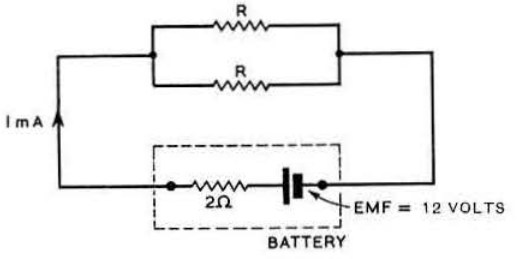

Fig. 3.

Solving for R, we get

$$R = 24{,}000 - 4$$

or $R = 23{,}996$ ohms

Each resistor has a value of 23,996 ohms.

Q. 5 *Describe the construction of a small receiver type r.f. pentode valve. Explain the function of each electrode. What is meant by the amplification factor of a valve?*

A. 5 The construction of a small receiver r.f. pentode valve is shown in **Fig. 4.**

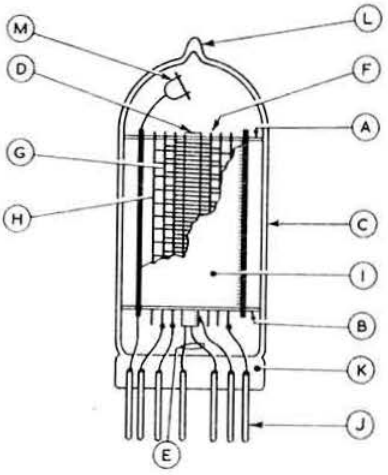

Fig. 4.

The electrode assembly is mounted between two mica discs *A* and *B* which will fit inside the tubular glass bulb *C*. The centre cathode electrode *D* consists of a nickel tube coated with barium oxide and has the property of emitting electrons when heated to red heat by means of a heater element *E*. The heater is inside the cathode tube and is insulated from it.

The next electrode around the cathode is the control grid *F*. It is in the form of a fine wire helix wound on vertical support wires as shown. Two further grids of similar general construction surround the control grid; the inner one *G* is called the screen grid, the outer one *H* the suppressor grid.

The grids are surrounded by a cylindrical metal electrode *I* called the anode. It is shown partly cut away in the diagram to expose the grids and cathode to view.

During manufacture the electrodes are first assembled between the micas and they are then connected to lead out wires and pins *J* on a glass button base *K*. The assembly is pushed into the glass bulb *C* which is then sealed to the button base.

The bulb is evacuated through a narrow glass tube *L* at the top of the bulb and it is then sealed off when evacuation is complete. A " getter " *M* is included which ensures that a very high degree of vacuum is maintained throughout the life of the valve. During manufacture the getter deposits a thin film of barium metal on the inside of the top of the bulb and this has a great affinity for traces of gas left in the bulb after evacuation or which may emerge from the electrodes during life.

The functions of the electrodes are as follows:

1. *Heater* To heat the cathode to a red heat.
2. *Cathode* To serve as a source of free electrons when heated to red heat.
3. *Control Grid* An electrode which has a very sensitive control of the flow of current from the cathode to the anode. It is the electrode to which the input signal is applied.
4. *Screen Grid* An electrode which reduces the direct capacity from control grid to anode to a negligible value.
5. *Suppressor Grid* An electrode which eliminates undesirable effects on the valve's characteristics due to the secondary emission of electrons at the anode.
6. *Anode* An electrode to which electrons flow from the cathode. It is the electrode from which the output signal is usually taken.

The amplification factor of a valve, μ, can be defined as the ratio of the change in anode voltage, δV_a, required to cause a small change in anode current to the change in grid voltage, δV_g, which would cause the same change in anode current.

$$\text{Thus } \mu = \frac{\delta V_a}{\delta V_g}$$

Q. 6 *With the aid of a circuit diagram describe a simple tuned radio frequency receiver. Explain the function of each stage.*

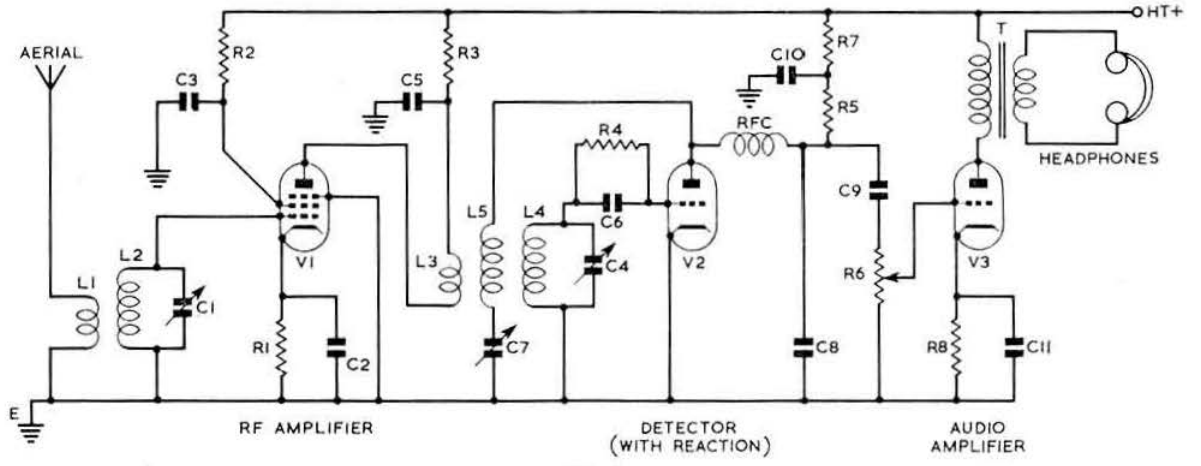

Fig. 5.

A. 6 The circuit diagram of a simple t.r.f. receiver is shown in **Fig. 5.**

The aerial is connected via a primary winding L1 to a r.f. tuned circuit L2, C1, which is set to the desired incoming frequency. Output from the tuned circuit is fed to the control grid of the r.f. amplifier valve V1. R1 and C2 provide cathode bias. The screen grid is bypassed to earth for r.f. by the capacitor C3, and is fed from h.t. via the decoupling resistor R2.

Output from the r.f. amplifier stage is fed to the detector circuit via the primary winding L3 to the second r.f. tuned circuit L4, C4, which is connected to the grid of the detector valve V2 via the grid capacitor C6 and grid leak R4. Reaction is obtained by feeding back a certain amount of the r.f. signal from the anode of V2 through the tertiary coil L5 and thence to the grid circuit of V2. The amount of reaction is controlled by means of the variable reaction capacitor C7.

The r.f. filter RFC and C8 stops r.f. from reaching the audio amplifier stage. The detected audio signal appearing across the detector anode load resistor R5 is fed through a coupling capacitor C9 and a volume control R6 to the grid of the audio amplifier valve V3. R7 and C10 are decoupling components in the h.t. feed to the detector V2.

Cathode bias for the audio stage is provided by R8 bypassed by C11. Audio output is fed from V3 to a pair of headphones via the output transformer T.

The radio frequency amplifier stage:

(i) Provides r.f. gain.
(ii) Provides selectivity.
(iii) Provides isolation of the aerial from the detector which
  (*a*) Stops the oscillations produced in the detector from reaching and being radiated from the aerial.
  (*b*) Isolates the aerial from the detector which helps to give smooth reaction control over a wide tuning range and with aerials of varying characteristics.

The Detector Stage:

(i) Recovers the audio intelligence from an amplitude modulated radio signal.
(ii) When the reaction is advanced so that the detector is oscillating it provides a beat note for c.w. reception.
(iii) Provides selectivity and sensitivity.

The Audio Stage:

Amplifies the low level audio signal from the detector to a power level suitable for operating headphones (or a loudspeaker).

Q. 7 (*a*) *What is meant by the Q-factor of a coil in a tuned circuit?*

(*b*) *What is the Q-factor of a coil having an inductance of 50 microhenries and 10 ohms resistance at a frequency of 2 Mc/s?*

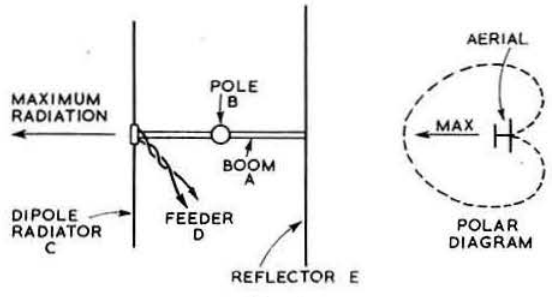

Fig. 6.

A. 7 The Q-factor of a coil is the ratio of the reactance of the coil to its resistance at a specified frequency.

If f is the frequency in c/s
L is the inductance in Henrys
R is the effective resistance in ohms

$$\text{Then } Q = \frac{2\pi fL}{R}$$

If $f = 2$ Mc/s $= 2 \times 10^6$ c/s
$L = 50\mu$H $= 50 \times 10^{-6}$ H
$R = 10$ ohms

$$\text{Then } Q = \frac{2 \times 3{\cdot}14 \times 2 \times 10^6 \times 50 \times 10^{-6}}{10}$$
$$= 2 \times 3{\cdot}14 \times 2 \times 5$$
$$= 20 \times 3{\cdot}14$$
$$= 62{\cdot}8$$

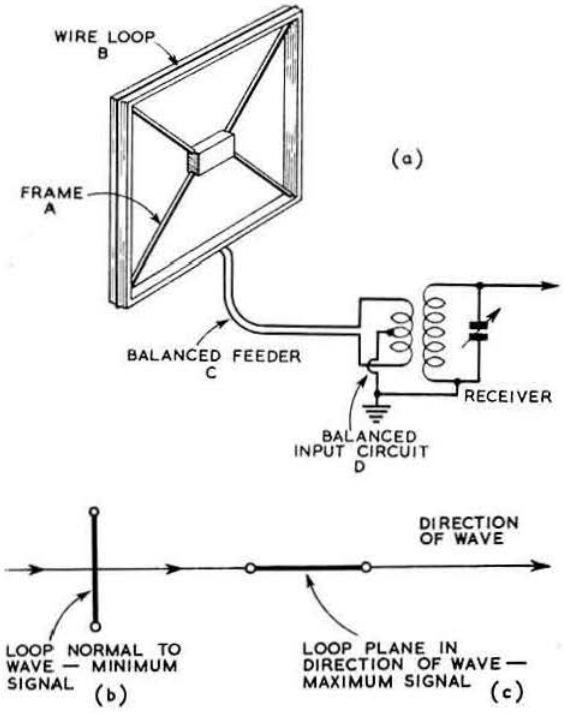

Fig. 7.

Q. 8 (*a*) *Describe either* (*i*) *a directional aerial for transmission on 28 Mc/s or* (*ii*) *one for reception on 2 Mc/s.*

(*b*) *Explain the directional properties.*

A. 8 (*a*) (*i*) A directional aerial suitable for transmission on 28 Mc/s is shown in **Fig. 6,** which is a plan view.

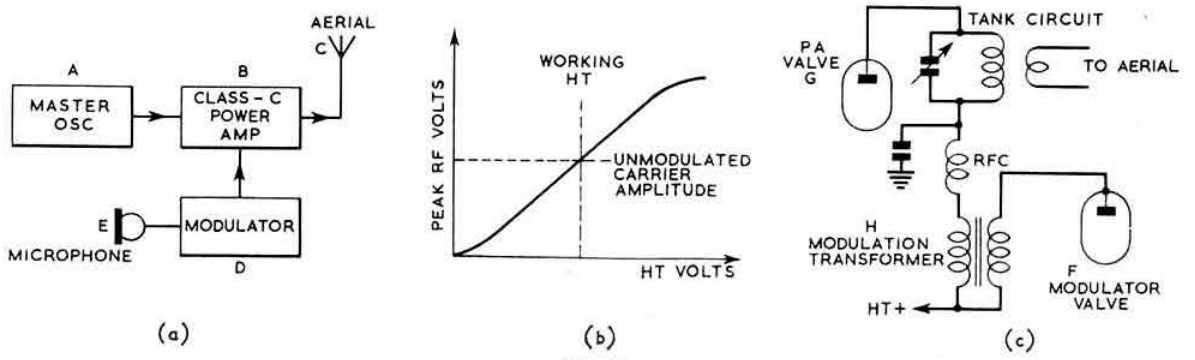

Fig. 8.

The aerial consists of a boom *A* mounted on a pole *B*. The boom carries a dipole radiator *C* at one end, fed at its centre by a low impedance feeder *D*, and a reflector element *E* at the other end.

The radiator dipole is of a length to resonate at 28 Mc/s, i.e. slightly under half a wavelength at that frequency. The reflector is rather more than half a wavelength in length and the spacing between the reflector is about one quarter of a wavelength.

In practice the aerial is often made from aluminium tubing. It has the directional property of giving maximum radiation in the direction shown in **Fig. 6** and very little in the opposite direction.

(*b*) (*i*) The directional properties may be explained as follows:

Radio frequency current in the radiator dipole will induce a current in the reflector element. The signal at any point will be made up of a contribution radiated from the dipole and one from the reflector. If the length of the reflector and the spacing from the dipole are suitably chosen the effect is for the contributions to add in the direction of maximum radiation indicated in **Fig. 6** and to cancel out in the opposite direction. The directional property of the aerial is illustrated by the polar diagram (dotted curve) in Fig. 6.

(*a*) (*ii*) **Fig. 7(a)** shows a directional aerial suitable for reception on 2 Mc/s, and called a loop aerial.

The aerial consists of an insulating frame *A* on which a coil or loop *B* of a few turns is wound.

Typically the shape of the coil would be a square of 18 in. to 24 in. sides.

The loop aerial is connected via a balanced feeder, *C*, to the balanced input circuit *D* of a receiver as shown.

(*b*) (*ii*) The loop aerial derives its directional properties as follows:

Assume that the loop is placed so as to intercept a vertically polarized radio wave. The latter will induce e.m.f.'s in each of the vertical sides of the square loop.

If the plane of the loop is normal to the direction of propagation of the radio wave, equal e.m.f.'s of the same phase will be induced in each vertical side so that the net e.m.f. from the loop (applied to the receiver input) will be zero—see **Fig. 7(b).**

If the plane of the loop is in the direction of propagation of the wave there will be a maximum phase difference between the e.m.f.'s induced in the two vertical sides and the net e.m.f. fed to the receiver will be a maximum—see **Fig. 7(c).**

The polar diagram of a loop aerial is shaped like a figure eight, as shown in **Fig. 7(d).**

Q. 9 *Describe, with a block diagram, an amplitude modulated radio telephony transmitter. Explain, with the aid of a diagram, the method of modulation used.*

A. 9 The block diagram of an amplitude modulated telephony transmitter is shown in **Fig. 8(a).**

The master oscillator *A* serves to determine accurately the frequency of the carrier wave and provides drive to a class C power amplifier stage *B* which amplifies the carrier and feeds the r.f. power to the aerial *C*. A modulator *D* impresses speech signals from a microphone *E* upon the carrier wave in such a way as to vary, or modulate, its amplitude in sympathy with the speech signal.

Fig. 8(b) shows the input-output characteristics of a class C r.f. amplifier as the h.t. feed voltage is varied. It will be seen that over a wide range the peak r.f. output

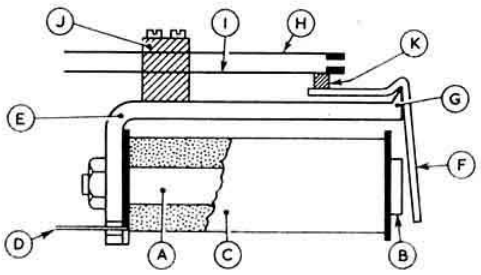

Fig. 9.

voltage varies linearly with the h.t. voltage. This characteristic of a class C r.f. amplifier is made use of to modulate the carrier wave with speech. This method is known as anode modulation.

Fig. 8(c) shows in skeleton form the arrangement of the circuit for anode modulation of a class C r.f. amplifier. The audio signal from the modulator valve *F* is introduced in series with the h.t. supply to the r.f. power amplifier *G* by means of the modulation transformer *H*. The speech signal will thus add to, and subtract from, the steady h.t. supply voltage and the amplitude of the r.f. output signal from the r.f. power amplifier will vary exactly in sympathy with the speech signal.

Q. 10 *Describe the construction and action of* one *of the following:*

(*a*) *A magnetic relay*
(*b*) *A pair of headphones*
or (*c*) *A microphone.*

A. 10 (*a*) The construction of a simple magnetic relay is

shown in **Fig. 9.** It consists of a soft iron core *A* with a pole piece *B* at one end. The core is surrounded by a coil of many turns of wire *C*, the ends of which are brought out to connecting tags *D*.

The core is bolted to a soft iron yoke *E* which carries at its open end an armature *F* pivoted on a knife edge *G*.

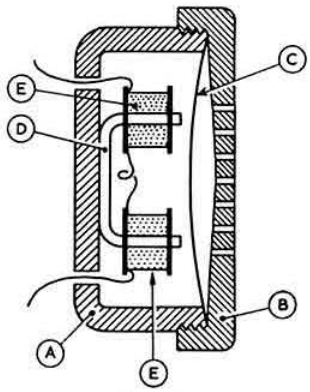

Fig. 10.

The armature operates a pair of spring contacts *H* and *I* which are mounted on and insulated from the yoke and the armature by insulation shown at *J* and *K*.

When a current of electricity flows through the coil the core becomes magnetized and the armature is attracted towards the pole piece. This movement of the armature causes the lower spring contact to move upwards and make contact with the upper one. Removal of the current through the coil causes the magnetization to disappear and the armature releases and the contacts part. In practice silver, platinum or tungsten are used as contact materials on the ends of the contact springs.

A. 10 (*b*) The construction of an earphone is shown, in simplified form, in **Fig. 10.** In practice, a pair of headphones consists of two such devices connected in series arranged to fit over each ear and held in place by means of a headband.

The earphone consists of an insulating case *A* with a perforated cover *B*. Clamped between the cover and the case is a circular iron diaphragm *C* which is pulled down slightly towards a U-shaped permanent magnet *D* mounted in the case.

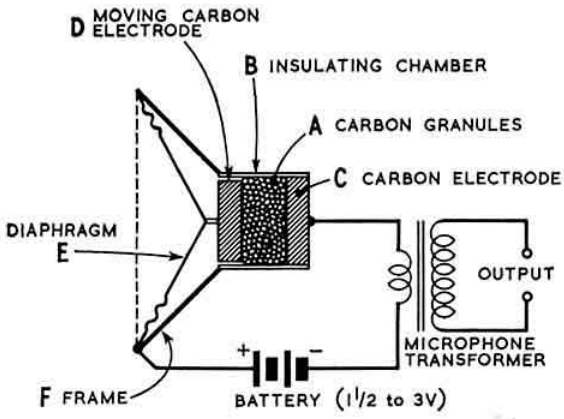

Fig. 11.

Round the poles of the permanent magnet are coils *E* consisting of many turns of fine copper wire. The coils are connected in series in such a way that an electric current through the coils of one polarity enhances the effect of the permanent magnet and attracts the diaphragm further towards the poles of the magnet. A current of the opposite polarity reduces the effective strength of the permanent magnet so that the diaphragm moves away from the poles of the magnet.

An alternating, or speech current, flowing through the coils will cause the diaphragm to vibrate in sympathy with the wave-form of that current and set up sound waves which pass through the perforations in the cap into the ear.

A. 10 (*c*) The carbon microphone, **Fig. 11,** consists of a quantity of small particles of carbon *A*, called carbon granules, packed in an insulated chamber, *B*, between a fixed carbon electrode, *C*, and a movable electrode, *D*. The movable electrode is attached to the centre of a light aluminium diaphragm, *E*, which is fixed round its edge to a frame, *F*. There is an electrical connection between the movable carbon electrode, *D*, and the frame, *F*, via the diaphragm.

The carbon microphone is connected into a circuit as shown in **Fig. 11,** current flowing from the battery through the carbon granules and back through the primary winding of a transformer.

When sound waves fall upon the diaphragm of the microphone it will move backwards and forwards in sympathy with the successive compressions and rarefactions of the sound wave. Compression of the carbon granules will lower their resistance and the current through the circuit will increase. Conversely decompression of the granules will increase their resistance and the current will decrease. It follows that the current through the circuit will fluctuate in sympathy with the sound waves falling upon the diaphragm.

RSGB Slow Morse Practice Transmissions

The following Slow Morse Practice transmissions are sponsored by the RSGB. Alterations and additions to this list should be sent to the Honorary Organiser, M. McBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Time	Call-sign	kc/s	Town
Sundays			
08.00	G3KLT	1827	Birmingham
09.30	G3KZZ	1920	South Shields, Co. Durham
10.15	G3CGD	1875	Cheltenham
10.30	G3NCZ	1920	Blackburn, Lancs.
10.30	GI3JEX	1860	Belfast
11.00	G2FXA	1900	Stockton-on-Tees
12.00	GM3HBY	1903	Glasgow
12.00 †	G3HVI / G3OGD	1890	Stoke-on-Trent
19.00	G3SEP	1980	Gt. Yarmouth
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.
21.15	G3JKY	1920	Beckenham
21.30	G3NQR	1875	Harrow Weald, Middx.
Mondays			
18.30	G3NC	1825	Swindon
18.30	G3NCZ	1920	Blackburn, Lancs.
19.00	G3MXS	1875	Birkenhead
19.00	G8RQ	1920	Chesterfield, Derbys.
20.00	G3HJG	1825	Manchester
20.00	G3IBJ	1910	Southampton, Hants.
20.00	G3OGE	1910	Beckenham, Kent
20.00	G3SFG	1930	London N.22
21.00 †	G3IRM / G3MWO / G3PHW	1981	Bury St. Edmunds
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.
21.30	G2BSW	1865	Studley, Worcs.
Tuesdays			
19.00	G8RQ	1920	Chesterfield, Derbys.
20.00	G3RZO	1865	Redditch, Worcs.
20.00	G3PJI	1910	Southampton
20.30	G3NKX	1915	Loughton
20.30	G3RQT	1980	Basildon, Essex
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.
21.30	G3HZG	1865	Redditch, Worcs.
22.00	G3LLM	1820	Bath
22.00	G3AWL	1980	Wingate, Co. Durham
22.00	G3HZM	1925	Manchester
Wednesdays			
18.30	G2FXA	1900	Stockton on Tees
19.00	G3GBS	1865	Moseley
19.00	G8RQ	1920	Chesterfield
Wednesdays			
19.30	G2BSQ	1930	Ashstead, Surrey
20.00	G3KFE / G3SAD/A	1980	Stevenage, Herts.
20.30	G3KGU	1920	Theydon Bois, Essex
20.30	G3AGN	1875	Felixstowe
21.00 †	G3HVI / G3OGD	1890	Stoke-on-Trent
21.00	G3LKT / G3PLQ / G3POU	1892	Salisbury, Wilts.
21.00	G3KAD / G3SFO	1850	Doncaster, Yorks.
Thursdays			
18.30	G3NC	1825	Swindon
19.00	G3NUT	1875	Wallasey
19.00	G8RQ	1920	Chesterfield, Derbys.
20.00	G3NHR	1900	Hounslow
20.00	G5XB	1838	Reading
21.00 †	G3IRM / G3MWO / G3PHW	1981	Bury St. Edmunds
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.
21.30	G3EVT	1865	Redditch, Worcs.
22.00	G3AWL	1980	Wingate, Co. Durham
Fridays			
18.30	G3NCZ	1920	Blackburn, Lancs.
19.00	G3LLM	1820	Bath
19.00	G8RQ	1920	Chesterfield, Derbys.
19.30	G3PWU	1850	Reading, Berks.
20.30	G3PED	1920	Goodmayes, Essex
21.00	G3LLM	1820	Bath
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.
21.30	G3RZI	1865	Redditch, Worcs.
21.30 †	G3RPW / G3KSS	1900	Pudsey, Yorks. Bradford
23.00	GM3HBY	1903	Glasgow
Saturdays			
13.00	G2FXA	1900	Stockton-on-Tees
14.00	GI3JEX	1860	Belfast
14.30	G3NQA	1925	Birmingham
20.00	G3KPO	1980	Peterborough
21.00	G3LKT / G3PLQ	1892	Salisbury, Wilts.

† *Alternately*

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

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