

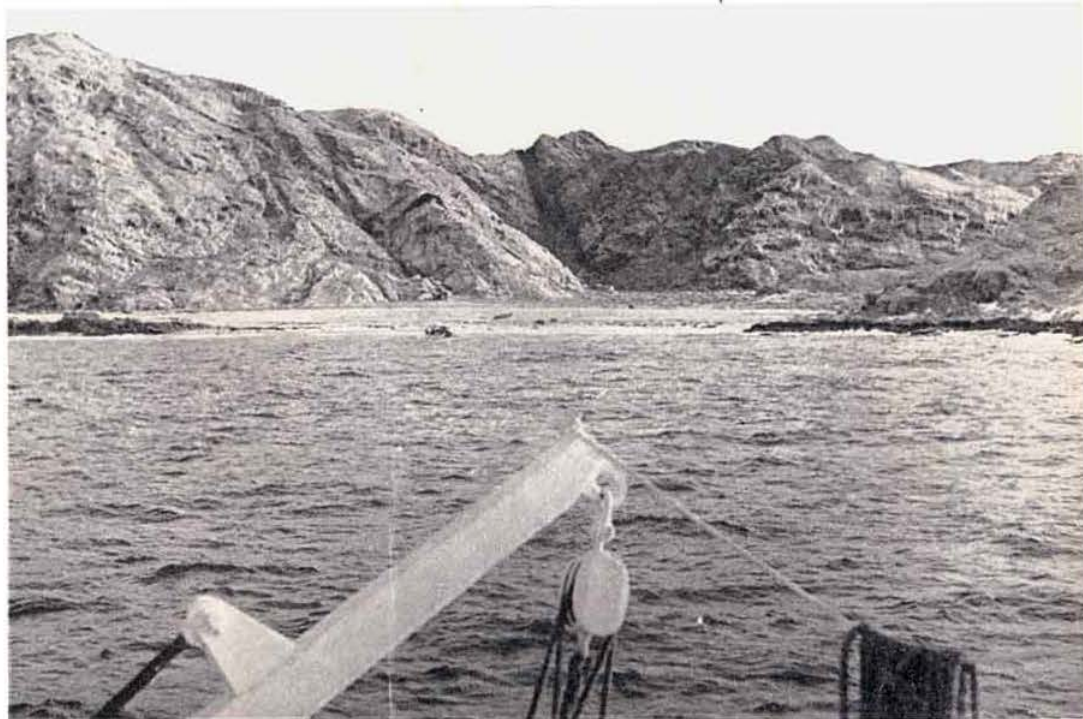
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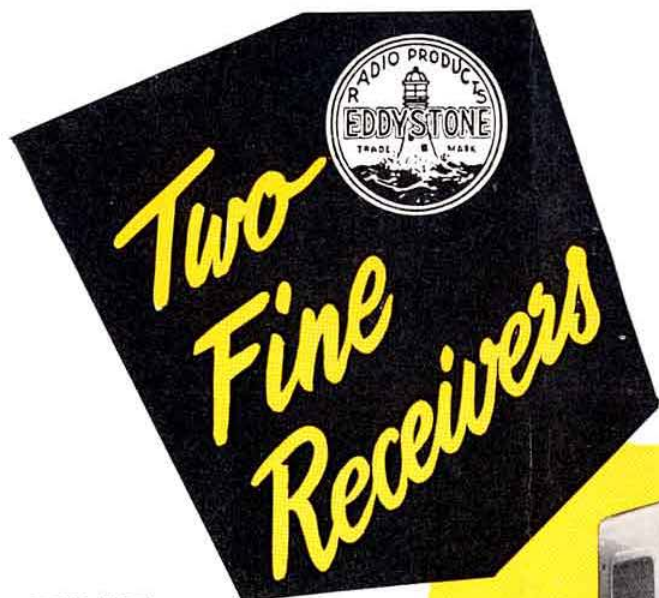
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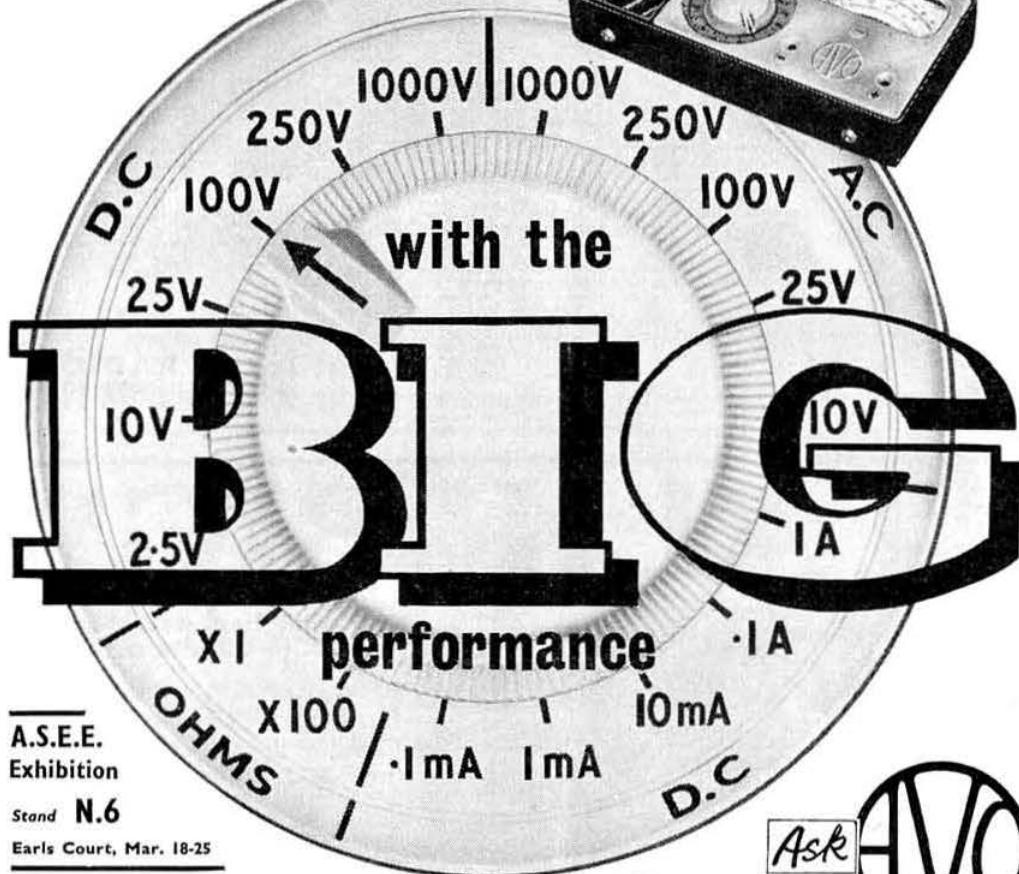
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February 1964

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John A. Rouse, G2AHL

EDITORIAL ASSISTANTS:

*R. E. Molland, G3CNC
T. R. Preece, A.2921*

EDITORIAL OFFICE:

*RSGB Headquarters, 28 Little
Russell Street, London, W.C.1
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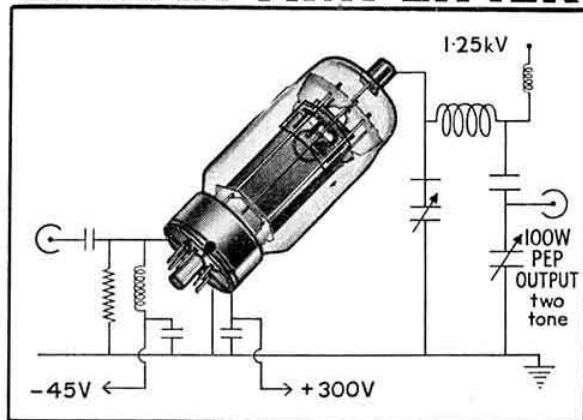
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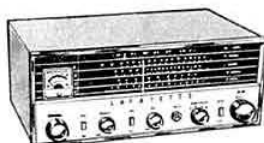


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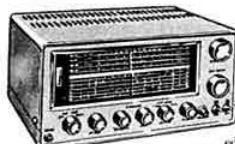
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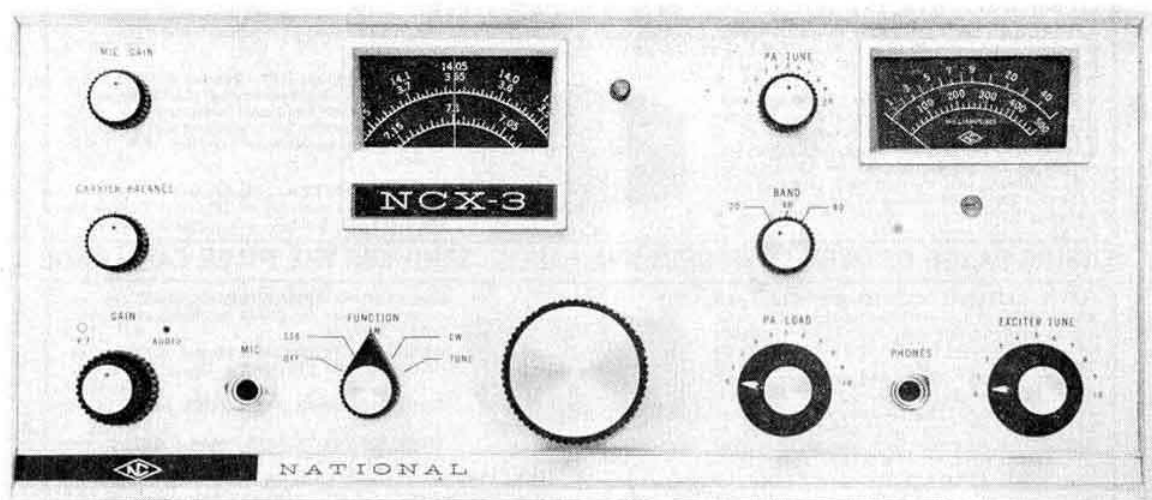
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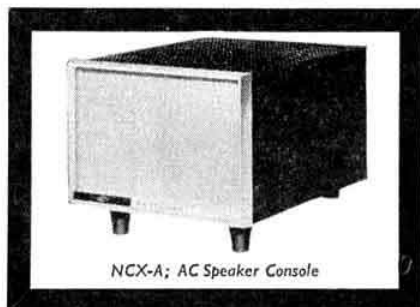
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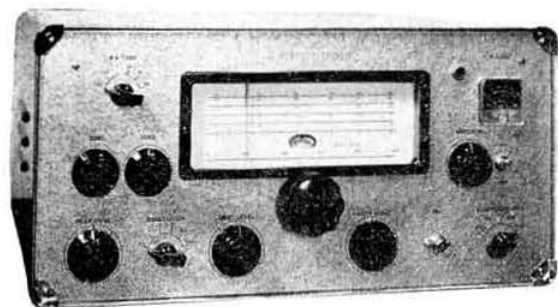
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A Simple Speech Clipper

By B. PRIESTLEY, B.Sc., G3JGO*

SEVERAL years' work on modulation has convinced the writer that some form of limiter or compressor is essential if over-modulation is to be avoided and yet a good average level of modulation maintained. Unfortunately, the limiting is often done by overmodulation on peaks, encouraged by well-meaning reports of "undermodulation" from distant stations.

It is also desirable to limit the audio bandwidth of modulation, since the average audio amplifier will still produce appreciable gain at 10-15 kc/s and some deaf-aid microphones—often used by amateurs—seem to have a peak response in this region. However, filtering by capacitance across grid resistors does not lead to a very rapid cut-off unless several stages are so treated, so that to get any appre-

is most important that the a.f. response of the transformer(s) following is adequate to preserve the waveforms, otherwise overmodulation on low frequencies will still be produced. The reason for this will be clear from the effect of poor l.f. response on a square wave (Fig. 2). Thus a following l.f. response down to say 50 c/s is highly desirable, even though the preceding amplifier may well have its l.f. response cut to say 250 c/s by judicious choice of coupling capacitors.

Results

An oscilloscope was set up to view the modulation pattern and the post clipper gain (VR2) set so that the modulation depth was limited to 90 per cent or so. (An audio signal generator was used at 1 kc/s for this test.) The pre-clipper

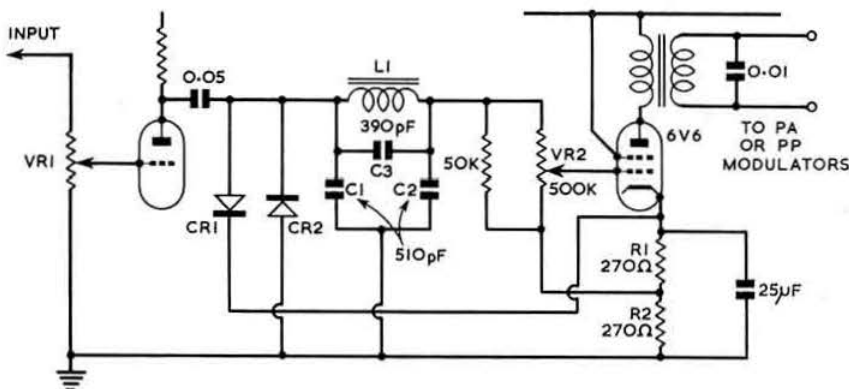


Fig. 1. L1, 3-1H (ex-BC453 series receivers); C1, C2, 510 pF; C3, 390 pF; CR1, CR2, OA202, ZS30 or similar silicon diodes; R1, normal cathode bias resistor; R2, equal to R1.

ciable h.f. loss, some loss of desired frequencies must be accepted, with a consequential "woolly" quality.

General Description

It was to satisfy the above requirement that the clipper/filter circuit shown in Fig. 1 was devised. It was designed round available components, and it would be a simple matter to scale the impedance values to use components available in the "junk box." The use of silicon diodes is to be preferred as most germanium ones have too low a reverse resistance. A EB91 or 6H6 could, of course, be substituted, but as suitable silicon diodes are available at 1s. each, the additional wiring and risk of hum does not seem justified.

The size of the coupling capacitor must not be reduced to give low frequency cut, since this would allow the d.c. level at the clipper to ride up and down giving asymmetrical waveforms. The capacitor across the modulation transformer is still necessary, since in this simple form of filter, a sharp cut-off is obtained at the expense of a slight reduction in attenuation at higher frequencies. Although the clipper/filter is shown in use with a 6V6 modulating a 10W transmitter, it could also be used on a similar valve acting as driver to a pair of 807s in push-pull for a 150W transmitter.

One word of caution: having clipped the audio down to size, and carefully filtered off any distortion products, it

gain (VR1) was set at maximum to prevent overloading. The oscilloscope pattern was a textbook picture of 90 per cent modulation. The signal generator was now flipped up 20db in output, i.e. 10 times voltage, but the picture stayed much the same, and so to be really brutal, the output was increased another 20db, with the same result! Possibly some distortion products were present, but they were not detectable either on the oscilloscope or on a receiver, and there was no increase in the peak level of modulation. On the air tests proved equally gratifying. G3HJK, distant 150 yards or so, reported an overall bandwidth of ± 4 kc/s, rather less than some stations much further away!

Setting-up

An oscilloscope is highly desirable when setting up but is not essential. (Whilst the latest Tektronix would be nice, the writer finds a lash-up consisting of a VCR97, a 250-0-250V transformer with turns removed from the 5V rectifier

(Continued on page 77)

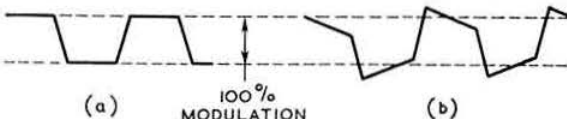


Fig. 2. Effect of inadequate low frequency response on clipper waveform: (a) normal, (b) passed through poor l.f. response.

*64 Westwood Road, Heald Green, Cheadle, Cheshire.

A Grounded Semi-vertical Aerial for the L.F. Bands

By JOHN D. HEYS, G3BDQ*

DURING the autumn of 1963 the writer decided to try his hand at working some of the 80m s.s.b. DX which was reputed to be available between 07.00 and 08.00 G.M.T. almost daily. Using a horizontal 130 ft. end-fed general purpose aerial proved disappointing and it was most frustrating to give and receive S3 reports or worse when several other British operators with similar transmitting equipment were having S8 and S9 contacts with ZL and VE stations. It did not take long to discover that these successful stations were using quarter-wave vertical aerials. Realizing the limitations of a small urban garden and having a shack on the top floor of a tall Victorian house, G3BDQ almost abandoned the quest for 80m DX.

It was then decided to try a sloping wire quarter-wave suspended from the top of the house, but the problem of feeding the aerial remained. Conventional bottom feeding (Fig. 1(a)) would have required about 80 ft. of coax and the running of this feeder up to the shack almost parallel with the radiator did not seem to be a good idea. The notion of inverting the aerial (Fig. 1(b)) next occurred but had to be discarded, for such a configuration would certainly not behave as a ground plane and would no doubt just produce high angle radiation. Eventually the idea of top "Zepp" feeding the quarter-wave and earthing its base (Fig. 1(c)) was hit upon. A careful search through the aerial books did not shed any light upon this unorthodox method of feeding a quarter-wave aerial, but it was decided to go ahead and try it.

Construction

Fig. 2(a) shows how the aerial is arranged, the top being suspended from a flexible length of bamboo to keep the wire away from the brickwork. The bottom end of the wire is connected to an old galvanized water tank which is buried in the garden and also to four quarter-wave radials which are laid out in the form of a swastika along the edges of paths and fences. These are buried a few inches wherever there is any danger of exposed wires tripping up the unwary.

The aerial length L in feet may be calculated from the formula $234/\text{Freq.}$ where the frequency is in Megacycles.

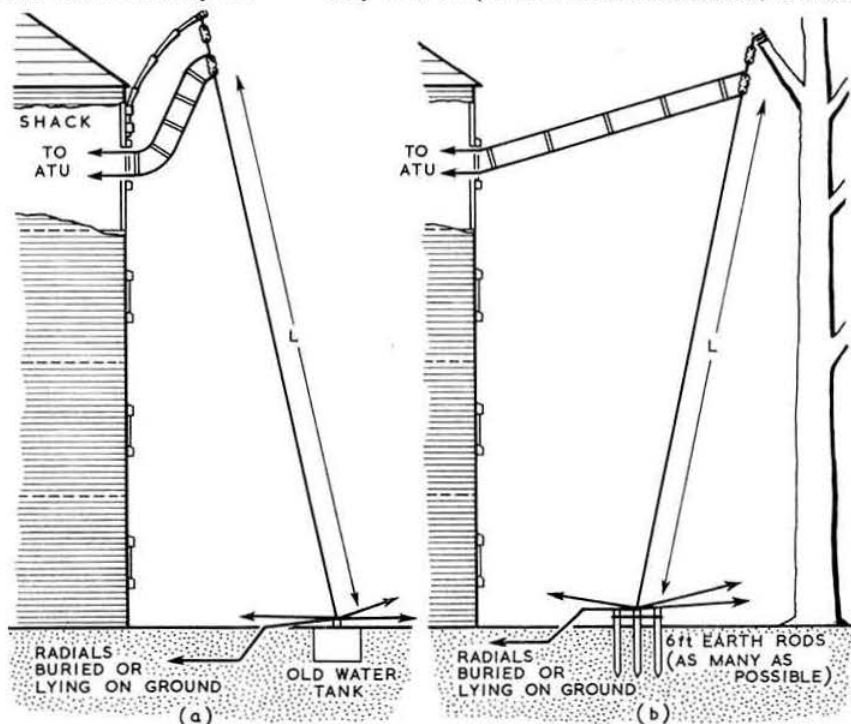


Fig. 2. (a) Simple sketch showing the writer's arrangement of his aerial. (b) Alternative system using a tree or other high object to support the aerial in which case the aerial can be some considerable distance from the operating position.

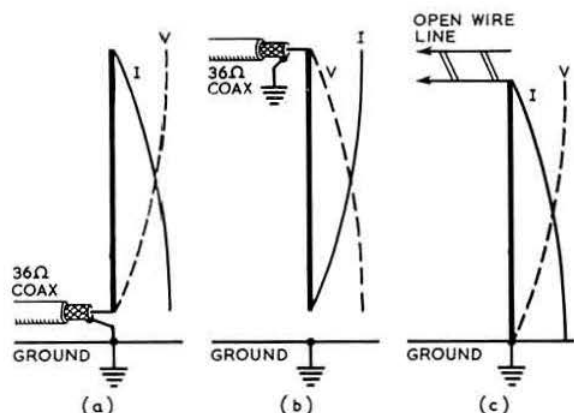


Fig. 1. (a) Conventional quarter-wave aerial and feed system. (b) Unsatisfactory inversion of the aerial. (c) Top feeding made possible by earthing the base of the aerial, the feed point now being high impedance.

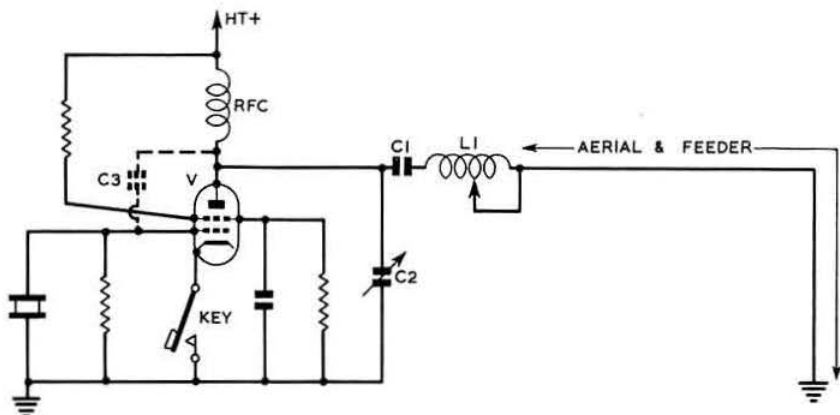
Most of the 80m s.s.b. DX working takes place at the top end of the band and for this reason a design frequency of 3.8 Mc/s was chosen.

The radials are each 63 ft. long and for a different design frequency their length can be found from the formula $240/\text{Freq. (Mc/s)}$. The earthing arrangements are perhaps the most important factor in this and any quarter-wave aerial system, and the greater the number of earthing rods and radials used the better will the aerial perform.

Only 15 ft. of open wire feed line was needed, for the top

* 201 London Road, St. Leonards-on-Sea, Sussex.

Fig. 3. Circuit diagram of a simple crystal oscillator used for testing the aerial on 160m. Suggested values: C1, 5000pF; C2, 47pF; C3, twisted wire "gimmick" capacitor to increase feedback, L1, 40 turns close wound on 1½ in. dia. former; V, any small output tetrode, 6AQ5, 6V6 or similar.



of the aerial came to just above the shack window. With a short length of line there is a high impedance at the a.t.u. end, but should the alternative layout in Fig. 2(b) be used the longer feeder line could result in a lower impedance and some form of series tuning at the a.t.u.

The radiator and the radials were made from 16 s.w.g. bare copper which is obtainable from most builders' merchants. The feeder used 18 s.w.g. enamelled wires spaced 2 in. Spacers were placed every 18 in. The polythene "Comba Roll" hair rollers obtainable from Woolworths make excellent feeder spacers, for they are light in weight and are of open geodetic construction.

Results

As soon as the finished aerial was connected up its advantages became apparent. It became possible to work DX stations that could not be heard on the half-wave horizontal wire. The best reports during a month's operation have been S9 from VE3 and VO1, and S7 from ZL although the morning paths to these stations go right through the house with its conglomeration of electrical wiring and plumbing. For G working and contacts up to 400 miles the grounded semi-vertical is inferior to the old half-wave aerial with its high vertical radiation angles. Between 400 and 1000 miles the two aeriels give similar results, for contacts with stations in excess of 2000 miles the semi-vertical has an advantage of at least two S points. Of course the stations in good locations with properly matched quarter-wave towers and extensive radial systems still lead the race, but there are not more than half a dozen such stations active in the British Isles, and the simple aerial described enables G3BDQ to work his fair share of the DX.

Top Band

Just before the preparation of this article it was thought that perhaps the aerial could be made to work on Top Band. A transmitter was not available so a simple crystal oscillator was wired up (Fig. 3) using the aerial as part of the anode tuned circuit. The ends of the feed line were joined together and a coil L1 was connected to the oscillator anode via C1, a blocking capacitor.

The total length of the aerial and its feeder is about an eighth of a wavelength on 160m and the inductance of L1 in series with it brings the system to quarter-wave resonance. Fine tuning is performed by C2, a much smaller capacitor than is usual in Top Band tank circuits. In theory the greatest radiation from an aerial takes place at the point of maximum aerial current, so the inclusion of the inductance L1 should not cause much loss in efficiency; the current loop or anti-node being at the earthed end of the aerial.

With an input of 5 watts to the crystal oscillator, contacts were made with many stations including an OK. Operation was restricted to a few hours, but the reports received were as good as or better than those obtained with a quarter-wave horizontal aerial tuned against ground and 10 watts input.

It is hoped that this article will be a ray of hope for flat dwellers, lighthouse keepers, and all those who inhabit upper floors of tall buildings, who previously despaired the likelihood of getting up an efficient aerial system for the l.f. bands!

A Simple Speech Clipper (Continued from Page 75)

winding to run the heater, two J50 selenium rectifier stacks and a few capacitors, resistors and potentiometers using 50 c/s a.c. as a timebase is equally informative.)

Feed in a tone about 1 kc/s (whistle!) and with adequate gain reduce the level of post clipper gain until overmodulation just does not occur, i.e. about 90 per cent. The pre-clipper gain should then be adjusted till normal speech yields a reasonable average level of modulation, bearing in mind that too much gain will bring up hum and room noises. As heavy clipping, although it improves the potency of the signal in interference, results in some distortion, it may be desirable to reduce the gain for local contacts.

Design Details

As the same type of choke may not be available (although in the receiver it probably serves no useful purpose and may be removed without qualms), it is suggested that the inductance of an available choke be measured, and if the resulting Z_0 is reasonable (say 50 K ohms to 1 Megohm) the capacitors should be scaled down by the same factor as the L and Z_0 are scaled up, using the nearest preferred values of capacitance. The design details of the original, for anyone wishing to alter the frequency characteristics or m value are:—

$$f_c = 3.8 \text{ kc/s} \quad f_a = 4.8 \text{ kc/s} \quad \text{i.e. } m = 0.62$$

$$Z_0 = 48.5 \text{ K ohms.}$$

The query may be raised as to why a potentiometer and a resistor are used in parallel to make up the terminating resistor when a 50 K ohm potentiometer would do. The reason for this is that potentiometers may have a much wider tolerance than resistors.

Conclusion

This is a simple, cheap and effective clipper/filter which will reduce the likelihood of splatter, and possible BCI and TVI, and also improve the "talk power" of a transmitter. The filter alone would also be useful in a receiver.

Supplementary Report of the Council*

THE Council has pleasure in submitting a brief supplementary Report covering some of the more important events and happenings that have taken place since June 30, 1963.

Golden Jubilee

The Society celebrated its Golden Jubilee during the week July 1 to July 5, 1963, when about 500 members and their friends attended functions arranged on behalf of the Council by the Golden Jubilee Celebrations Committee. Technical visits during the early part of the week were followed on Wednesday, July 3, 1963, by a Golden Jubilee Week luncheon organized by the London Members' Luncheon Club. The luncheon was attended by more than 100 members and friends. During the evening of the same day a reception was held at the London Planetarium, when the highlight of the occasion was a special presentation by the Technical Director (Dr. H. C. King).

A river trip to Hampton Court, especially for the benefit of overseas visitors, took place on Thursday, July 4. On Golden Jubilee Day (July 5) a dinner, attended by more than 400 members and friends, was held in the Connaught Rooms, London, when the guest speaker was the Rt. Hon. The Lord Brabazon of Tara, G.B.E., M.C., P.C. Also present were representatives of the Post Office, the IEE, the BBC, the ITA and many other bodies with whom the Society maintains a close relationship. Presidents and members of a number of European National Amateur Radio Societies were also in attendance together with the Canadian Director, Mr. Noel Eaton, VE3CJ, of the American Radio Relay League.

An account of the Golden Jubilee Week celebrations was published in the August 1963 issue of the Society's Journal.

Radio Communications Exhibition

The Golden Jubilee Year Radio Communications Exhibition sponsored by the Society and organized by Mr. P. A. Thorogood, G4KD, was held at Seymour Hall, London, from October 30 to November 2, 1963. The Exhibition was opened by Mr. F. C. McLean, C.B.E. (Director of Engineering, BBC), in the presence of a distinguished gathering representing the Services, the Post Office and Industry.

During the period of the Exhibition an Amateur Radio station was operated from the Seymour Hall using special call-signs issued to the Society.

The organization of the Society's stands was undertaken by the Exhibition Committee (Chairman—Mr. E. W. Yeomanston, G3IIR) and the Stand Manager was Mr. F. F. Ruth, G2BRH.

Attendances were considerably higher than in recent years.

During the period of the Exhibition 123 new members were enrolled. Income was about £160 less than in 1962 due largely to the fact that, with the exception of the 1964 edition of the *Call Book*, the Society had no new publications to offer.

Official Regional Meetings

Official Regional Meetings were held at Cardiff (Region 10) on September 14, 1963, at Folkestone (Region 8), on October 20, 1963, and at Stockport (Regions 1 and 2) on October 27, 1963.

The Council records its thanks to those members who were responsible for organizing these meetings.

*Read to the members present at the Annual General Meeting of the Society held in London on December 20, 1963

Space Radio Communications Conference

An Extraordinary Administrative Radio Conference to allocate frequency bands for Space Radio Communication purposes was held in Geneva from October 7, 1963, to November 9, 1963. The General Secretary (Mr. John Clarricoats, O.B.E., G6CL) was given leave of absence to attend the first part of the Conference as an observer, in his capacity as Secretary of the IARU Region I Division. Later Mr. Arthur Milne, G2MI, joined the team of IARU observers.

The presence of a strong team of IARU observers at the Conference was favourably commented upon by Government delegates who were able to enlist the help of the observers when matters concerning the Amateur Service came up for discussion at the Conference.

The Conference decided to adopt a United Kingdom proposal that Artificial Earth Satellites may be used by the Amateur Service in the band 144-146 Mc/s.

RSGB Publications

The 1964 edition of the *RSGB Amateur Radio Call Book* was published on the opening day of the Radio Communications Exhibition. This edition, which contained more than 2,600 additions and amendments to the previous edition, was once again prepared as a voluntary task by the General Secretary and Miss May Gadsden.

Regional Representatives' Conference

A Conference between the Society's Regional Representatives and the members of Council took place on November 23, 1963, in Birmingham when consideration was given to a number of matters of mutual interest. In addition the Regional Representatives were invited to give their views on proposals made by the Council for amending the current Articles of Association.

London Lecture Meeting

The first London Lecture Meeting of the 1963-64 season took place at the Institution of Electrical Engineers on November 8, 1963, when Mr. W. E. Sutton, G3FWI, discussed Television Sound Production. An attendance of about 25 was recorded.

North West V.H.F. Convention

The President of the RSGB (Mr. Norman Caws) was the guest of honour and the chair was taken at short notice by the Executive Vice-President (Mr. G. M. C. Stone) at a highly successful V.H.F. Convention held in Manchester on October 5, 1963, and organized by the North West V.H.F. Group.

National Mobile Rally

A National Mobile Rally organized by the Society's Mobile Committee (Chairman, Mr. C. L. Fenton, G3ABB) was held at Woburn Abbey, Bedfordshire, on September 22.

National Field Day 1963

Port Talbot Group were the winners of the 1963 National Field Day event with Cardiff Group in second place. Ayrshire Group led the Scottish entries and Basildon and District Amateur Radio Society won the Bristol Trophy awarded to the single station entry with the highest score. In the overseas section the Famagusta Group of the Cyprus Amateur Radio Society, 5B4OS/P, contributed the most

(continued on page 108)

THE QUICKSTARTER

A Basic Converter for 144 Mc/s

By JACK HUM, G5UM*

BEFORE we address our attention to the second instalment of "The Quickstarter Story" it is well to remind readers of something that was said in Part 1; that if you have ever built a 2m converter, don't read on! But if you haven't, then this article is for you.

Part 1 described how any v.h.f. converter is essentially a two-armed device. Its right arm is the local oscillator chain and its left the r.f. front-end. Just as the human frame has between its two arms a most essential organ called the heart, so a v.h.f. converter, too, contains a central element the correct functioning of which governs the operation of the whole. It is the mixer.

And what does it mix? Why, radio frequency signals at 144 Mc/s coming in at the "left hand" front-end with that local oscillator voltage coming in at the right. If this local oscillator input is at, say, 140 Mc/s and the signal at 144 Mc/s the mixer extracts the difference between the two frequencies and produces an intermediate frequency of 4 Mc/s. It "converts" v.h.f. into h.f. When the main station receiver is used as an i.f. strip 4 Mc/s represents a frequency of 144 Mc/s. And if you tune your main receiver to 6 Mc/s you will be listening on 146 Mc/s.

Of course you don't have to use this particular intermediate frequency, but as it happens to be one of the most convenient there is—one at which the average station receiver has a pretty high gain, it is recommended that constructors of "The Quickstarter" should settle for it.

Cascode for Ease and Simplicity

Before we come to the "heart of the matter"—that mixer valve—we need to examine the left-hand part of the circuit in some detail. Its purpose is to furnish the mixer grid with the maximum signal possible, bearing in mind the limitations of your location for v.h.f. reception, and the limitations of whatever type of 2m aerial you happen to be using.

Site and aerial are outside the scope of this article. The story begins at the 80 ohm co-axial input socket into which you plug the feeder from your aerial. Between that point and the mixer grid will be interposed a radio frequency amplifier capable of offering a worthwhile workable signal to the mixer.

Constructors of "The Quickstarter" are advised to ignore the diversity of r.f. amplifier circuits that are available and to concentrate on one of the easiest to get going and capable of providing a very considerable gain, the cascode r.f. amplifying device which is effectively two stages in one glass envelope. The first of these stages is a straightforward grounded cathode amplifier coupled in a rather special way to the second stage, a grounded grid amplifier. In all samples of "The Quickstarter" which have been made this valve has been a Mullard E88CC.

To start right at the beginning, let us look first at the input inductor L1—a portentous sounding description of what need be no more than five turns of wire wound on your pencil. Most coils have a hot end, which is the end nearer to the operating electrode, and a cold end, which is the end nearer to earth, connected either directly to chassis or via a capacitor. In the case of L1 the hot end is the grid

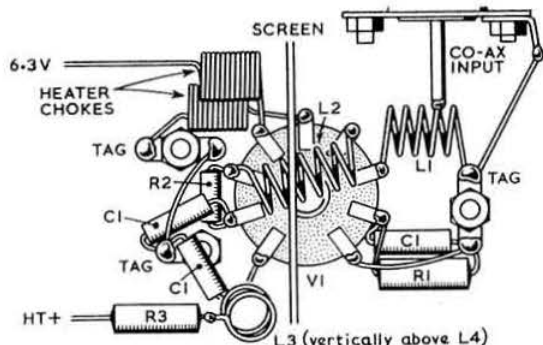


Fig. 1. The "no leads at v.h.f." technique for wiring up the E88CC cascode stage of "The Quickstarter." The grounded cathode section must go to pins 6, 7 and 8 of the valve, and the grounded grid section to pins 1, 2 and 3. The heaters should be fed through quarter-wave chokes consisting of 18 in. of 18 s.w.g. enam. wire close-wound using a pencil as a form. The screen is a safety factor against instability: the neutralizing coil L2 may pass through a hole in it.

end, representing a fairly high impedance. The cold end, connected to chassis, represents to all intents and purposes zero impedance.

What you need to do, then, to match your incoming 80 ohm co-axial feeder into this coil is to tap it just a little way up from the earthy end. To achieve an exact match with 80 ohms is exceedingly difficult under kitchen-table-and-gimlet conditions, but you will come remarkably near to it by tapping a five turn coil no more than one turn up from the bottom.

In one design we saw developed the 80 ohm point happened to be the solder tag to which the earthy end of the coil was secured! We ourselves preferred to tap up a bit higher than that: it was just the way we felt.

Now, while on the subject of solder tags let us pay earnest heed to the first maxim of v.h.f. construction: USE NO LEADS! Quite short lengths of connecting wire by resonating at 144 Mc/s may drop you into the murky pool of instability.

So connect that cathode bias resistor R1 and its associated bypass capacitor C1 direct from the valve pin to one solder tag, and the cold end of L1 to the same solder tag. If you connect it to a separate tag the distance between the Tags in Fig. 1 will add to the length of your coil L1—and you don't want to have part of the chassis pretending it is coil.

In any ordinary circuit the next inductor, L2, would be an output coil coupled in some way to a following stage. This one isn't quite that: certainly it is the coupling medium between the first half of the E88CC and the second. But if you omit it you will probably find that the circuit doesn't mind a bit, and continues to chug happily away without it. The pundits will tell you that this neutralizing coil improves in some way the noise factor of a cascode stage, but if you own test equipment capable of telling you this, then you should not be building "The Quickstarter." Only if you are a very experienced v.h.f. experimentalist are you likely to take a converter's noise factor seriously. The newcomer should avoid growing ulcers worrying about it.

"What, no h.t. on V1a?" Well may the question be asked. The two halves of the cascode valve are in series; h.t. current flows through them both, via that neutralising coil L2. The second half of the E88CC, the grounded grid stage, has its grid held securely to the chassis by the capacitor C1. However, note that we have traced certain converter troubles to nothing more than a screw-down feed-through making poor contact with an aluminium chassis—'tis remarkable how poor a conductor "ally" can be! Make sure the connections are really good.

And so finally to the output end of our cascode, an

* "Wylde," Burnham Green Lane, Bulls Green, Knebworth, Herts.

inductor to couple in to the mixer grid. Two methods suggest themselves:

Fig. 2 (a) shows the simpler. The output coil of the r.f. amplifier is the input coil of the mixer, the latter being tapped about halfway down it to effect as good a match as maybe. The system is peaked to the middle of the 2m band by means of C3. The arrangement works well and is convenient mechanically.

Fig. 2 (b) shows a preferred alternative that is productive of more gain but is a little less convenient mechanically through the need to close-wind L3 and L4 on a common former, with the local oscillator link coil L5 at the cold end of L4.

To offset this minor disadvantage is the major one that Fig. 2 (b) uses no variable capacitors at all.

The Heart of the Matter

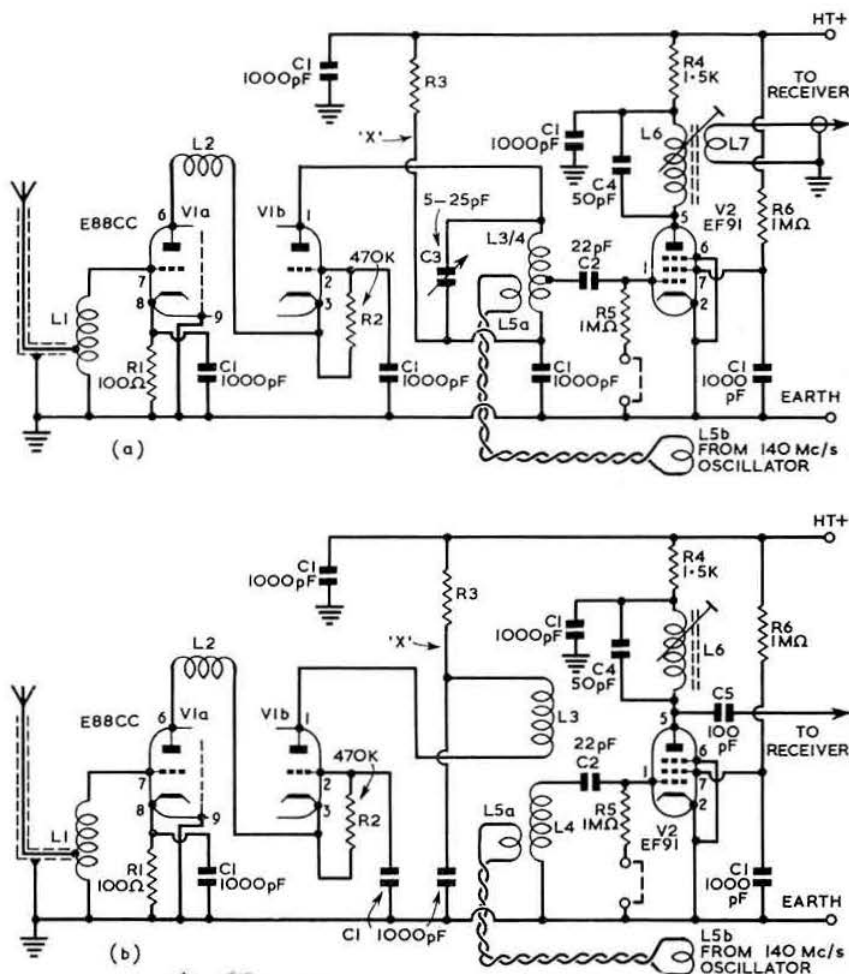
By now our incoming 144 Mc/s r.f. voltage, much amplified by the cascade, has arrived at what we called earlier the heart of the v.h.f. converter, which is the mixer. Unlike the human heart it is not a complicated organ: nothing more or less than that very basic device, a leaky grid detector. (In the earliest days of superheterodyne receivers it was indeed called the first detector).

We must now beat against that 145 Mc/s voltage on the mixer grid the local oscillator voltage from the chain described in Part 1. This process may be effected in two ways: inject via a tiny capacitor, say, 2-2 pF straight on to the grid of V2; or link couple. The latter method is in every way to be preferred. It permits the oscillator section to be isolated, if desired, and by its inherent selectivity it favours the wanted local oscillator frequency against other frequencies that exist in the system.

Mechanically, the link is the easiest thing in the world to construct. Assuming that by now you have completed the oscillator section of the converter, measure the distance between its output coil (the one which resonates on 140 Mc/s) and the grid coil of the mixer valve. Cut off a length of thin plastic wire a little more than twice this distance. Solder the two ends together. Bind a little insulating tape around the soldered joint. Stretch this endless length of wire between the fingers of two hands and begin to twist. Soon you will have fashioned what looks like a length of flex. Form a little loop at each end of it and there's your 80 ohm link line from oscillator to mixer!

One of the little loops is secured to the cold end of the oscillator coil. The other is included in the coil assembly carrying the inductors L3 and L4, positioned at the cold end

Fig. 2. (a) The simpler of the two methods of coupling a cascade amplifier to a mixer grid. (b) Preferred method of interstage coupling, realizing more gain.
L1, 5 turns tapped 1 turn from cold end, $\frac{1}{2}$ in. diam.
L2, 6 turns, $\frac{1}{2}$ in. diam.
L3/4, 4 turns, $\frac{1}{2}$ in. diam., or—
L3, 7 turns, $\frac{1}{2}$ in. diam., close coupled to L4.
L4, $4\frac{1}{2}$ turns on same former as L3.
L5a, 1 turn at cold end of L4.
L5b, 1 turn coupled to cold end of final oscillator coil.
L6, 60 turns, 30 s.w.g., d.c.c., $\frac{1}{2}$ in. diam.
L7, 4 turns close wound at cold end of L6.
R1, 6, $\frac{1}{2}$ watt; R2, R5, $\frac{1}{2}$ watt; R4, 2 watts; R3, a value should be selected such that with the h.t. used the potential at point X does not exceed 100 volts.



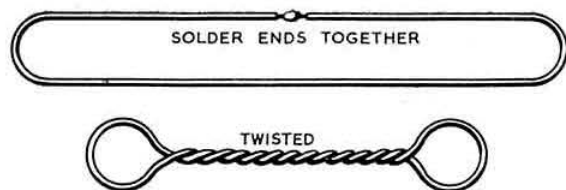


Fig. 4. How to construct the link that couples the oscillator output coil to the mixer grid coil. Use 32 s.w.g. plastic covered multistrand wire.

of the mixer grid coil. If you wind L3 and L4 on a low loss former include the loop at the remote (cold) end of L4. If L3 and L4 are self supporting thrust the loop between the last two turns (nearest chassis) of L4 and secure with plastic cord.

Link coupling permits great flexibility in the construction of the converter. The oscillator section can be as near or as far away from the r.f. front-end as you wish—within reason of course.

Be it whispered in passing that if you have your local oscillator valve physically close to the mixer you can often achieve enough injection to dispense with any form of mechanical coupling at all! But do not count on this "proximity" coupling: the charm of link coupling is that it gives you *guaranteed* injection.

Pentode for Preference

At this point readers by the dozen must be simply itching to ask: "But surely at v.h.f. it is preferable to use a triode mixer, and if this be so, why is a pentode specified?"

Answer: because it is virtually a "sure fire" device that demands little or no persuasion to operate as a frequency changer.

Anticipating the second part of the question, that a pentode mixer is inherently more noisy than a triode, the answer is that it need not be. By using a high value screen dropping resistor as shown in Fig. 2 with a consequent low potential on the screen grid, partition noise is very materially reduced while at the same time the considerable conversion gain of which a pentode is capable is not impaired.

End Product

There remains just one final design point to consider—the method of selecting the intermediate frequency in the anode of mixer valve V2.

Two frequencies are present at this point, the signal frequency at 145 Mc/s and the local oscillator frequency at 140 Mc/s. Neither of them will do us any good at this stage; what we are after is their difference, 5 Mc/s, which will represent 145 Mc/s when tuned on the main station receiver.

Anyone can see that if an inductor resonant at this frequency is placed in the anode circuit of V2 it will furnish the i.f. voltage we are seeking. A $\frac{3}{8}$ in. diameter former close wound with quite light gauge wire—say 32 s.w.g.—requires no more than 60 turns and five minutes work to construct. Shunted by a 50 pF capacitor it will resonate within the band 4-6 Mc/s, which is the tuning range on the main receiver corresponding to 144-146 Mc/s. An iron-dust core slug within the coil will permit the i.f. to be peaked at approximately mid-band.

All nice and easy, no doubt: but we have not yet succeeded in conveying this i.f. voltage from the mixer anode L6 coil to the input of the main station receiver, maintaining it sensibly even over the whole of the 2 Mc/s range. A low impedance link of four turns wound close to the cold end of the i.f. coil is all that is required. This link is L7 in the diagrams. The end nearer to L6 is connected to chassis, and the end remote from L6 to the centre-pin of a co-axial socket mounted as close to L6 as possible.

Now plug a length of co-ax into this socket and terminate the other end in the low impedance input to the main station receiver. Rotate the receiver aerial alignment trimmer for maximum "steam" and peak up the slug in the i.f. coil at mid-band (5 Mc/s). If you are within range of an RSGB beacon station peak everything up on its signal. Almost certainly you will notice that the converter appears to fall off in liveliness at the extreme edges.

There happens to be a simpler if cruder way of achieving the same objective and that is not to use a low impedance link at all. Instead, take the output of V2 direct from the "hot" end of the coil straight to the co-ax socket via a 100 pF capacitor. Of course a mismatch occurs if you attempt to take output from a high impedance point and feed it through a low impedance line, yet in practice no discernible loss of signal has been evident in the various samples of "The Quickstarter" that utilized this method of output coupling. What was discernible was the remarkably even response achieved over the whole of the 2 Mc/s coverage.

Newcomers to converter construction are frequently embarrassed by i.f. breakthrough—the presence of signals transmitted within the 4 to 6 Mc/s region riding through the converter to the receiver input. Of course, any length of wire connected to the input socket of a communications receiver will produce strong signals, and a length of co-axial cable can prove to be a disconcertingly efficient aerial unless it is firmly grounded both at the converter end and at the receiver end.

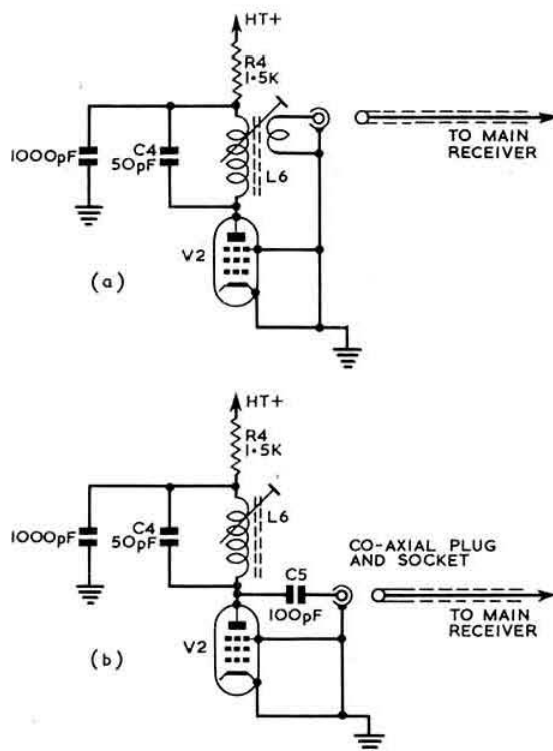


Fig. 3. Two methods of coupling the i.f. output of the "Quickstarter" mixer valve into the main station receiver. (a) A low impedance link wound close to the cold end of the i.f. inductor transfers the i.f. output to an 80 ohm line. (b) With this arrangement, there is little evident loss of performance, but gain is maintained over the whole 2 Mc/s sweep of the receiver tuning range of 4 to 6 Mc/s.

The coils for the r.f. section of "The Quickstarter" v.h.f. converter can be wound in a few minutes, as were those shown in this illustration. Left to right: the aerial input inductor, the cascode neutralizing coil, the cascade output coil coupled to—finally—the mixer grid input coil. The link coupling, fashioned as a twisted pair from thin plastic covered multi-strand wire, is also shown twisted together with the $\frac{1}{4}$ in. rod on which the coils were formed.

Co-axial sockets provided both at the converter output end and the receiver input end are imperative if i.f. breakthrough is to be abated. Both terminations of the inter-linking co-axial feed must be provided with suitable co-ax plugs. Adequate filtering should be provided to all supply leads. Both the l.t. and the h.t. inputs must be grounded to chassis through 1000 pF capacitors.

Screening of the complete converter chassis works wonders in reducing the amplitude of i.f. breakthrough, and bonding the converter chassis to the main receiver through a short length of copper braid nearly always finally scotches it.

"On the Nose"

Our v.h.f. converter is now completed, but a major job remains to be done. Alignment! In the previous sections we blithely recommended tuning up the i.f. coil with the aid of the nearest beacon station, quite failing to mention that the front-end coils must be peaked up, too. This was intentional: get your i.f. showing signs of life first. Then proceed to the signal frequency stages. Without question, these operations are most effectively completed with the aid of a local signal either from a nearby v.h.f. transmitter or from a v.h.f. signal generator loaned from a local retail service establishment.

Yet even if these amenities are lacking the fact that the mixer is mixing may be detected by lifting the cold end of its grid leak and inserting a milliammeter to determine the presence of grid current. Adjust the final 140 Mc/s oscillator coil until maximum current is indicated. Then the mixer section at least is "on the nose."

Remembering that the final 140 Mc/s coil in the oscillator section has no trimmer across it you will peak it up in this manner:

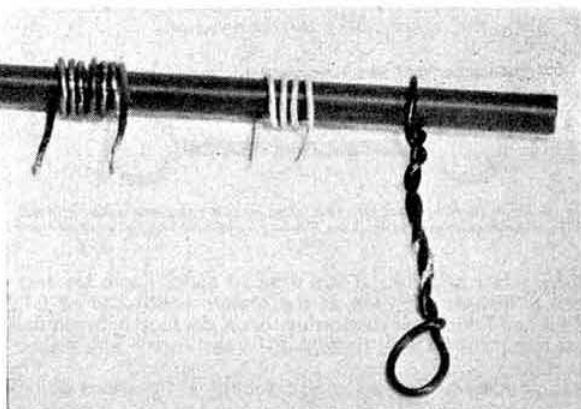
Insert an iron dust slug into the coil. If the mixer grid current rises the coil is too small and the turns should be squeezed closer together. If the mixer current falls the oscillator coil is too large and the turns should be spaced further apart.

Inserting the iron core increases the inductance of the coil. Insert a copper core—the copper bit of a soldering iron has been known to work!—and you will *reduce* the coil's inductance.

Using these phenomena you are now in a position to align the signal frequency coils from the mixer back to the aerial, with probably the following effect:

- L4 fairly sharp.
- L3 very sharp.
- L2 flat.
- L1 extremely flat.

Insert the iron-dust core into each inductor in the above order. If the local signal increases in strength when you do so the coil needs more inductance. Compress its turns. If the signal decreases, space the turns more widely. Then check the results "in reverse" with the copper slug. *Special Note:* cores used for these alignment operations should be secured to the end of a piece of paxolin rod or similar non-



conducting material. The proximity of your hand to an inductor by feeding additional signal to it may align the converter for you willy-nilly. Keep fingers away! Even the compressing or "decompressing" of coil turns should be done by means of two lengths of insulating rod.

As a final check that all inductors are resonant at around 145 Mc/s, bring into service one of those sucking devices (an absorption wavemeter) described in Part 1. Hold its coil two or three inches away from each inductor in turn, and in the same plane. Rotate its capacitor to 145 Mc/s. If your local signal is not smartly attenuated your coil has probably missed 145 Mc/s—an unlikely event if it has been wound with "immoveable wire" to the specification given.

You now have before you a 2m converter at once simple yet exceedingly effective. The last sample constructed gave S-meter readings on GB3VHF identical with those provided by a converter using a Nuvistor operating alongside—though maybe that was because each "Quickstarter" built turned out better than the one before, as experience was gained.

To build "The Quickstarter" will be to open up a whole new world of radio communication to those who have never essayed the delights of v.h.f. And if later it is decided to build a companion 2m transmitter to go with it, much of the circuitry and alignment technique already described will be found to apply to the "giving" end as well as to the "getting."

If finally there should be some dismay that no precise working layout is provided one should re-emphasize that "The Quickstarter" is designed to be built largely from the contents of the spares box. You use what you have. In fact every one of the numerous models so far constructed differed from its predecessor. However, a layout which may be used as a basis is shown at Fig. 5.

(A correction to Part 1 appears on page 108.)

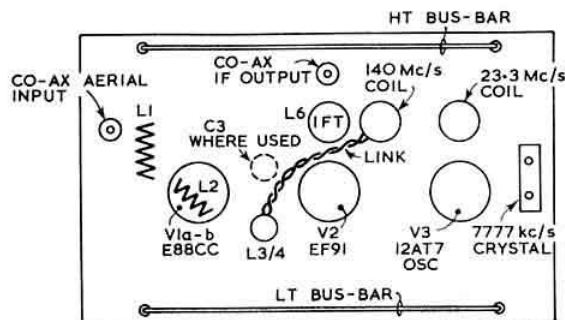


Fig. 5. A suggested mechanical layout for "The Quickstarter."

TECHNICAL TOPICS By PAT HAWKER, G3VA

Faultfinding · Intermittents · Checking Transistors · Multi-conversion Receivers

H.F. Crystal Filter · Q-Multiplier · R.F. pre-amplifier · Transistor VFOs

Mini-Monitor · Orthograph-Eximaniacs · Transistor Transmitters

FAULT-FINDING on Amateur Radio equipment can be one of the most satisfying—or most infuriating— aspects of our hobby. To bring back a piece of dead equipment to full life after logically tracking down a dud component can give as big a kick to the ego as the most juicy morsel of DX. On the other hand, few things can be so maddening as the elusive fault which defies all efforts to pin it down.

Everyone who has ever used a test prod recognizes that the easiest fault to locate is one which causes complete failure of the unit—conversely, the difficult ones are those which are either intermittent or which cause only a moderate deterioration in performance; or worse still a combination of the two. Such faults can elude even a persistent fault-tracer almost indefinitely and have driven many despairing amateurs into almost a complete rebuild, component by component.

There is unfortunately no easy road to coping with these intermittents. Patience and good powers of deducing where the fault could be from the fleeting symptoms are still the best aids. But there are some dodges that have gained wide acceptance. For example, careful poking with an insulated prod is one of the best ways to track down those common faults which arise from mechanical short-circuits, for instance of a single strand of multi-strand wire or cable or where the outer insulation of a piece of wire or ceramic capacitor may have been scraped bare or burnt through. The prod can also help in locating high resistance joints or poor valve pin contacts.

Then again some intermittent faults occur only when the components concerned are hot (and indeed may not occur at all when the chassis is out of its cabinet): to locate such faults some service engineers place great faith in the use of a hot stream of air from an ordinary hair dryer directed in turn to possible components to induce the fault to order. A similar effect can sometimes be achieved by bringing one of the larger soldering irons close to the suspected components.

Joints, sockets and switches still give their full quota of troubles, although modern equipment is gradually being improved by better materials. Not all trends are in the right direction—for example, the miniature B7G and B9A valve pins and sockets seem to give considerably more trouble than the older octal and earlier bases.

The high voltages in transmitters seek out weaknesses in insulation; though it never fails to puzzle one why a capacitor which has withstood all strains for years, suddenly decides to give up the effort at the most inconvenient times.

In this respect, however, one still sees—even in published designs—examples of under-rating in capacitor specifications especially where they are called upon to withstand a.c. mains voltages. Unless a capacitor is specifically rated for say 300 volts a.c., we consider that nothing less than 750-volt and preferably 1000-volt d.c.-rated capacitors should be expected to stand up to the strain for long.

Similarly, combinations of a.c. and d.c. voltages (for example in coupling capacitors in a.f. and r.f. power ampli-

fying stages) should always be generously rated. Always remember, for example, that h.t. lines can rise appreciably when there is no load across them. Fortunately, most components are conservatively rated—otherwise there would be more breakdowns than at present.

For general purpose fault-tracing and adjustment of c.w. and a.m. transmitters—s.s.b. rigs pose some additional problems—few aids can beat the traditional neon bulb as an r.f. voltage indicator, low consumption torch bulbs in a single turn loop as r.f. power indicator, and the standard electric light bulb as a rough and ready power output indicator.

A tribute to the effectiveness of these simple aids was paid recently by W1ICP in one of his helpful “novice” articles (*QST*, October, 1963) which also pointed out some other ways in which neon bulbs can be pressed into service.

These aids—plus preferably a standard volt-ohm-milliammeter testmeter, and a grid dip meter—can generally be relied upon to hunt down any normal fault or to set up a newly built transmitter.

This, of course, is not to decry the value of signal generators, valve voltmeters, wobblers and oscilloscopes and all the paraphernalia of the electronics laboratory—but rather to reassure any newcomer that even complex receivers and transmitters can be built and maintained without them.

And those who steadfastly dislike servicing in any form may perhaps take heart from the latest trend in electronics equipment (see “New Thinking,” *Electronics Weekly*, January 15): this is the “throw-away” module or sub-unit. If it fails, it is consigned directly to the dustbin with no attempt to trace the faulty component. This, it is stated, is one way of combating the fact that some services equipment costs about ten times as much to maintain as the original outlay.

Transistor Testing

Fault-finding on transistor equipment presents a number of new problems compared with valve equipment, and care is needed to avoid inadvertently damaging low-voltage capacitors and especially the transistors (see *TT*, December, 1960).

Although transistors have proved reliable in practice, doubts often arise as to whether they are all functioning correctly. Fortunately special transistor testers can usually be replaced by a standard sensitive multi-range testmeter. Such a meter can be used to give a fairly definite indication whether a transistor is good or bad, and even to provide a rough indication of its gain. The following notes on a suitable procedure are based on some which we prepared for a recent volume of *Newnes Radio and Television Servicing*.

Before using any ohmmeter for transistor tests, it is essential to make certain that voltages and currents across the test prods are within safe limits. Generally, it can be assumed that no damage will result from using a meter with not more than a 1.5 volt internal battery and where the maximum current that can flow from the prods is of the

order of 1 mA. In some testmeters such conditions may be found only on medium resistance ranges. It is usually safe to use a 20,000 ohms/volt meter, and 10,000 ohms/volt types are unlikely to cause any damage.

The most straightforward series of tests—but sufficient to indicate an open- or short-circuited junction—consists of measuring the forward and reverse resistances between base/collector and base/emitter. In making these tests we are treating the transistor as two series connected diodes and these two diode junctions can be checked in the same way as a crystal diode by comparing the forward and reverse resistances. Measured in one direction (reverse) the resistance should be much higher than that in the other (forward) direction. A suspect transistor which fails to give such indications can immediately be assumed to be defective.

The actual resistance values will depend upon the type of transistor and also on the current flowing between the test prods of the particular meter. But typical figures for a small-signal type and a power type of *p-n-p* transistor would be roughly as follows:

Test	Meter Connections	Small-signal Transistor	Power Transistor
1	Base-collector, reverse	More than 50K ohms	About 30K ohms
2	Base-collector, forward	About 120 ohms	About 50 ohms
3	Base-emitter, reverse	More than 50K ohms	About 50K ohms
4	Base-emitter, forward	About 140 ohms	About 50 ohms

From these figures it will be noted that the forward resistance of the base-emitter junction tends to be a little higher than that of the base-collector junction. Also, as the power rating of the transistor increases, the resistances tend to fall.

All the above readings have been given with meter connections shown in reverse or forward position rather than in terms of the polarity of the meter prods; this is because the "red" and "black" prods of an ohmmeter are not always connected in the same sense to the internal battery; however, this does not matter since the difference in readings is considerable, and it will be clear which reading is being made.

By connecting the prods across the collector and emitter leads, with the base connection left floating, we can obtain the forward and reverse resistances for the two junctions in series. The forward figure (Test 5) for a small signal type could be expected to be about 6K ohms falling to about 100 ohms for a power type. Reverse figures (Test 6) would be roughly 50K ohms (small signal) down to about 5K ohms (power type).

Further useful tests can be made by observing the effect on the emitter-collector forward resistance when the base is biased. Three tests can be made, each with the meter connected as in Test 5 above. First the resistance can be measured with the base connected to the emitter (Test 7) placing the transistor in "cut-off" condition; secondly the resistance can be measured with the base connected to the collector (Test 8) putting the transistor into "saturated" condition (for this test the transistor resistance should be very low, making it essential that the current from the prods is limited to a safe value); finally, a test can be made approximating normal operating conditions by connecting the base to collector via a fixed 100K ohms resistor for small-signal types down to about 1K ohms for a power transistor.

Typical results of these tests would be:

Test	Base Connection	Small-signal Transistor	Power Transistor
7	Shorted to emitter	About 50K ohms	About 5K ohms
8	Shorted to collector	About 100 ohms	About 7 ohms
9	To emitter via resistor	About 2K ohms	About 10 ohms

Tests 7 and 8 give a rough indication of the beta gain of the transistor, since the greater the difference between the readings the greater the gain. This can be useful when selecting between a number of transistors.

It will be appreciated that in such tests as these the actual resistance values will vary according to transistor type and meter, and are thus unlikely to correspond with the sample values shown. However, the general pattern of reading should be the same, and any transistor which conforms to such a pattern is most unlikely to be defective, although it is possible that its characteristics might have changed sufficiently to render it unsuitable for the particular application.

Such tests can be carried out most accurately with the transistor out of the equipment, but quite useful indications can often be obtained with the transistor left in circuit provided that the equipment is switched off and the effect of circuit resistances are taken into account.

Multi-conversion Receivers

A National advertisement in the December *QST* draws attention to what is said to be "one of the most popular misconceptions" about communications receivers. It attacks the common idea that the more frequency conversions in a receiver, the better it is likely to be. This idea is perhaps not so widely held over here, but even so one frequently sees the merits of a final low i.f. of 50-100 kc/s advanced, with little mention of the accompanying disadvantages of multiple conversion.

The only real advantage of a low i.f. is that it permits good selectivity to be obtained with conventional tuned circuits; but against this must be put the difficulty of avoiding "birdies" and other types of spurious response as well as susceptibility to cross-modulation unless steps are taken to reduce these problems.

Certainly, any receiver not containing either a mechanical or a crystal filter and with a final i.f. of 450 kc/s or more cannot be expected to provide the degree of selectivity needed today. But a great deal has been learnt in recent years about the design of symmetrical and single sideband filters so that there is no fundamental reason now for a low final i.f. except that of economy.

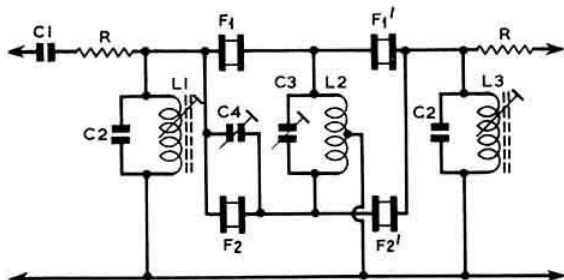


Fig. 1. VK2AVA's h.f. crystal filter using four FT243 crystals between 5 and 6.5 Mc/s. $F1 = F1'$; $F2 = F2' = F1 + 1500$ to 2500 c/s; $C1$, 2000 pF; $C2$, 47 pF; $C3$, 3-30 pF; $C4$, 8-10 pF. $L1$ and $L3$ to resonate at filter frequency with $C2$. $L2$ to resonate with about 15 pF setting of $C3$. R , 2000 ohms.

Indeed the trend is towards higher intermediate frequencies now that crystal block filters are becoming available with good shape factors. Several useful articles have appeared in the BULLETIN already on the design of h.f. crystal filters both for receivers and for s.s.b. exciters (for instance those by G3MAZ, January-February, 1962).

An h.f. filter design which has been attracting interest recently is that by VK2AVA which originally appeared in *Amateur Radio*, February-April, 1963. Fig. 1 shows the circuit as reproduced in *DL-QTC* (December, 1963) using four FT243 crystals between 5 and 6.5 Mc/s.

Q Multiplier without Coils

The influence of s.s.b. on receivers has been to provide flat-top response curves about 2.5 kc/s wide at the "nose," sometimes in conjunction with a *Q* multiplier notch filter.

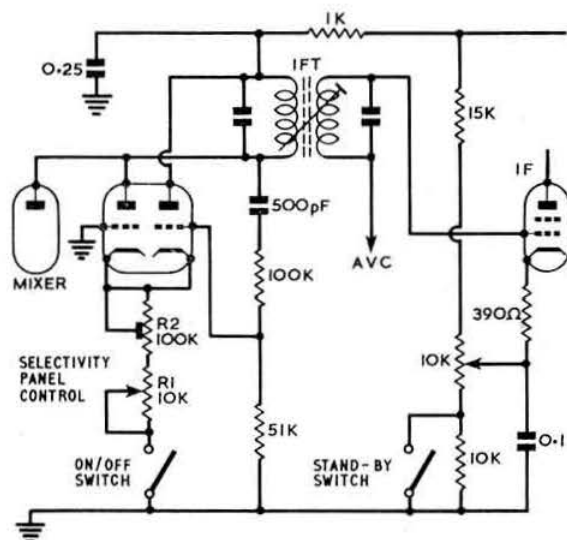


Fig. 2. *Q*-multiplier without additional coils. The valve is a 12AT7 or equivalent.

This is certainly not ideal for c.w. operation, though few can run to including two different filters. There are several solutions, such as the inclusion in the following stage of a conventional single-crystal filter for peaking the response. But one of the popular techniques is the use of a peaking type *Q* multiplier.

A circuit for a *Q* multiplier for peaking only (i.e. with no notch facilities) but which does not require any additional or high *Q* coils (a particular advantage where the set has a non-standard i.f.) is one of a number of devices described in W3FYG/2's "Up-grading Inexpensive Receivers" (*CQ*, November, 1963).

This uses an extra double-triode valve in a form of cathode-coupled multivibrator using the existing i.f. transformer as the tuned circuit and is intended primarily for sharpening up the response curves of sets without any type of filter. The circuit is shown in Fig. 2 which is largely self-explanatory, although W3FYG points out that one difficulty which can arise is a tendency for the subsequent i.f. stage to go into oscillation. This is overcome, as shown, by the removal of the bypass capacitor from this valve's cathode-bias resistor, thus introducing degenerative feedback, the slight loss of gain being more than overcome, it is stated, by the effect of the *Q* multiplier.

Coarse (R2) and fine (R1) controls are fitted for the

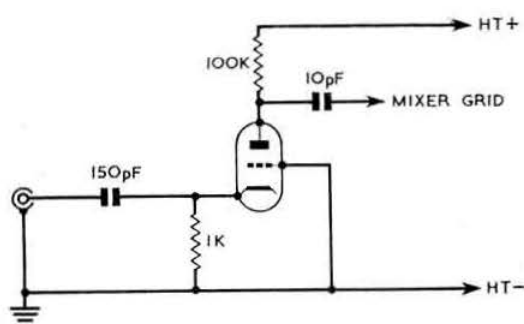


Fig. 3. Simple untuned r.f. pre-amplifier for reducing image response on simple superhet receivers. The valve can be one half of a 12AT7, a 6AB4 or similar.

control of cathode coupling and hence regeneration. Initially R1 is set to minimum resistance and R2 adjusted until the valve just goes into oscillation, then R1 is backed off and used as the panel control. Remember that the additional capacitance connected across the i.f. transformer will require slight re-alignment of this winding after installation.

Simplest R.F. Pre-amplifier

Another circuit in the same article is that of a simple untuned r.f. pre-amplifier (Fig. 3) intended for use on inexpensive communications receivers having no r.f. stage. This does not provide much additional gain but since it reduces aerial loading on the first tuned circuit, it is claimed that it can usefully increase image rejection.

Transistor V.F.O.'s

In *TT* (December, 1963) we gave details of a high stability v.f.o. by W3JHR and mentioned a form of instability commonly found in transistor oscillators. This provoked an informative letter from Mr. Hamish Robertson who considers that such troubles are often due to insufficient decoupling of the supply line. While developing a transistor

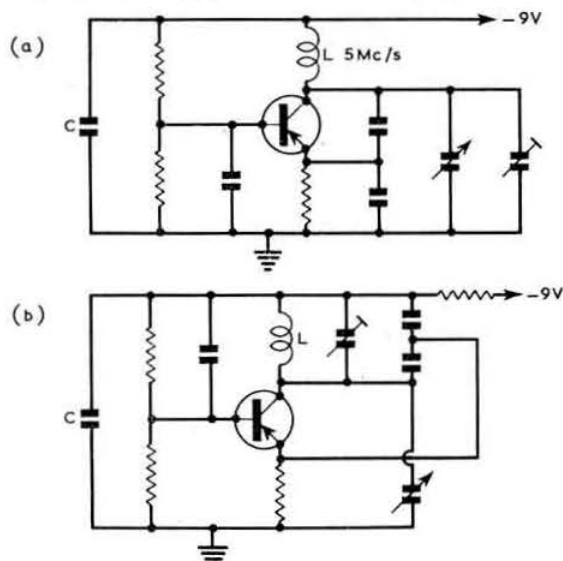


Fig. 4. (a) Conventional transistor oscillator with inefficient decoupling of the supply line. (b) Circuit rearranged to improve decoupling.

oscillator using the circuit of Fig. 4(a), powered from a mains unit, he found that the frequency could be shifted as much as 500 c/s simply by disconnecting a table lamp in the next room (not even turned on). The change in line capacitance was enough to do it.

The trouble, he believes, was that the very high tank currents must flow through the decoupling capacitor and the entire power supply tends to become part of the tank circuit. Altogether he found the note extremely poor, full of low frequency burbles, hum and f.m. No amount of capacitance across the line would solve the problem, since most large capacitors have sufficient inductance or resistance to offset their otherwise low reactance.

He found the answer to be either to insert a resistor in the line or better still to redesign the oscillator as shown in Fig. 4(b). This circuit gave a note which he says would have done justice to a crystal oscillator. He considers that so long as no large h.f. currents have to flow through the decoupling capacitor, transistor v.f.o.'s can give excellent results and believes that the W3JHR circuit comes into this category.

Der Mini-Monitor

While scanning overseas magazines in search of items for *TT*, it is interesting to note how some circuits make a round of each country in turn—a certain indication that they have

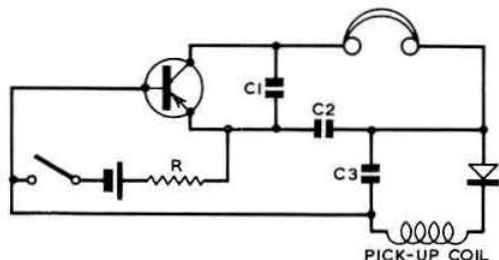


Fig. 5. "Der Mini-Monitor." Transistor OC72, 2N188A or similar. Diode OA85, 1N38B or similar. C1, 0.01 μ F; C2, 0.022 μ F; C3, 0.055 μ F; R, 25K ohms (Values non-critical). L, 6 turns 2 in. diameter. Ear-phones about 5K ohms impedance. Battery, 1.5V.

proved useful. One recent example of this is a small transistor c.w. monitor using rectified r.f. pick-up assisted by a 1.5 volt cell. This monitor provides a check on the functioning of a c.w. transmitter and also provides a side tone for those who like to listen to their own sending.

This circuit was described by WB2AAI in *CQ* (January, 1963) and turned up again as "Der Mini-Monitor" in *DL-QTC* (December, 1963) and now again in Fig. 5.

The transistor forms an a.f. oscillator with its frequency determined by C1, C2 and the high impedance headphones, but component values and transistor type are reasonably non-critical. While it is possible to operate such a device entirely by rectified r.f. pick-up, the degree of coupling to the transmitter/aerial tuning unit or aerial can be reduced by the use of the assisting battery. Should the stage oscillate with only the battery, then a resistor should be connected in series with the battery until the unit goes out of oscillation until the voltage is boosted by r.f. pick-up. Remember that the diode must be connected with the correct polarity.

Orthograph-Eximaniacs

Just occasionally, we get an enquiry from a member regretting that fuller constructional details had not been included of some item mentioned in *TT*. Most members, however, realize that this would greatly reduce the number of items which can be included and would also give rise to

considerable difficulties since components differ from country to country as well as presenting problems of translation and copyright. We have always felt that our aim must primarily be to present sufficient information to explain a new technique or circuit while leaving it to members to decide how best to convert these into practical equipment designs.

This difference between "wire-by-wire" constructional articles and those intended to provoke amateurs into thinking out their own designs is well explained in a note on "The New Breed" by Byron Goodman, W1DX, a QST staff-man, in the December issue. He even has a new name for those who like every detail down to the last nut and bolt to be given—"orthograph-eximaniacs" or "exaggerated love for spelling it out." W1DX sadly reports that this new breed has increased rapidly in recent years in the United States, and has even attacked the publication of such valuable articles as those by W2PUL (see *TT*, December, 1963).

While no one questions that the full constructional article has an honoured and important place in amateur literature, it will, as W1DX says, be a bad day when every new idea has to be reduced to the level of a kit instructional manual before it is acceptable to the majority.

Transistor Transmitters

The question of fully-transistorized transmitters of appreciable power output is still governed largely by the cost of h.f. and v.h.f. power transistors. For example, the very impressive range of types made by Pacific Semiconductors (available in the UK through M.C.P. Electronics Ltd., Station Wharf Works, Alpertons, Middlesex) now includes types providing r.f. outputs of 50 watts up to 30 Mc/s (2N1899, 2N1900, 2N1901) and 5 watts up to 250 Mc/s (PT2600), but despite considerable price reductions announced recently a single PT2600 would set one back over £40.

Also seen recently was a 20 watt, 50 Mc/s transmitter using three Ferranti ZT2876 transistors, but here again the cost of this type is about £36 each.

However, some interesting circuits for transistor transmitters appear regularly in professional communications publications and applications reports. For instance, Fig. 6 shows a transistorized linear amplifier for s.s.b. operation, providing 8 watts p.e.p. up to 30 Mc/s to a single *n-p-n* silicon transistor (Motorola 2N2947); this appeared in *Electronics* (December 6, 1963) and is more fully described in "A 50 Mc/s transmitter using the 2N2947," Appli-

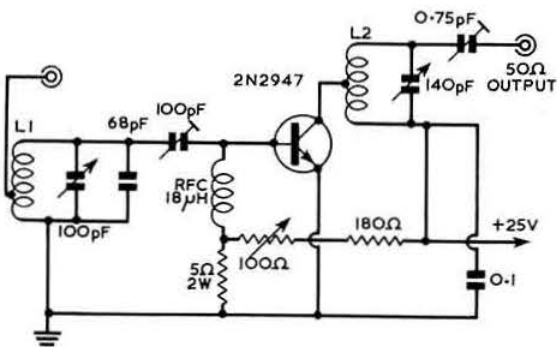


Fig. 6. A 30 Mc/s transistor power amplifier providing 8 watts p.e.p. output and illustrating bias arrangements for linear operation with an *n-p-n* transistor (Motorola 2N2947). L1, 3½ turns 18 s.w.g. t.c. wire ½ in. diameter, ½ in. long, tapped ½ turn from cold end. L2, 4 turns ½ in. copper tubing, ½ in. diameter, 1½ in. long, tapped 1½ turns from cold end. No signal collector current 20 mA rising to 350 mA with signal.

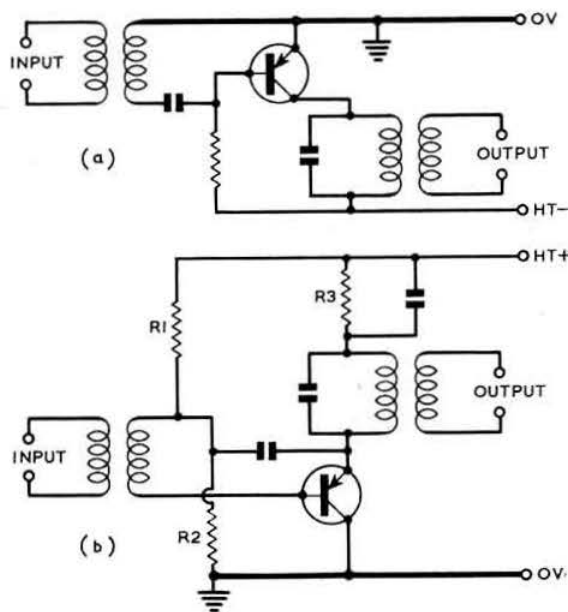


Fig. 7. (a) Conventional common-emitter tuned amplifier. (b) Amplifier with earthed collector. Additional stability is provided by the damping effect of R_1 and R_2 . R_1 , R_2 and R_3 define the d.c. operating point of the stage.

cations Report 99, Motorola Semiconductor Products Inc., Phoenix, Arizona, USA. For linear operation, a small positive d.c. bias is applied to the base, whereas for class C operation this is not required.

The active components of transistors designed for v.h.f./h.f. operation are extremely small; some makers have improved the power dissipation capabilities by mounting the wafer of semiconductor material directly on the metal of the transistor casing. This, of course, results in the collector and case (and heat sink if any) being in direct electrical contact.

This has led to the development of circuits with collectors earthed (see, for example, Fig. 10 of "Using H.F. Crystal Oscillators," BULLETIN, March, 1963). A useful "Application Note No. 2" on this technique has been published by Texas Instruments, Ltd., Manton Lane, Bedford. Figs. 7 (a) and (b) show the basic difference between conventional earthed-emitter and earthed-collector circuits.

In Brief

Two publications by American valve manufacturers which have been the source of many useful ideas for amateurs have undergone changes recently. *GE Ham News*, unfortunately, appears to have been discontinued, at least for the time being. *RCA Ham Tips*, formerly distributed direct from the United States, is now being circulated in the UK by RCA Great Britain Ltd.; applications to be included on the circulation list should be sent to Mr. B. S. Rayner, Sales Division, RCA Great Britain Ltd., Lincoln Way, Windmill Road, Sunbury-on-Thames, Middlesex.

Held Over

Due to pressure on space, a number of technical and topical features, *Current Comment*, *Silent Keys*, *Letters to the Editor*, and photographs taken at the AGM in December have been held over to the March issue.

CONTESTS DIARY

- February 8-9 - ARRL DX Contest (Phone) (see page 49, January, 1964.)
 February 15-16 - BERU.
 (For rules, see page 261, October, 1963.)
 February 15-16 - QCWA Party.
 February 22-23 - ARRL DX Contest (C.w.) (see page 49, January, 1964.)
 February 29 -
 March 1 - REF (Phone).
 *March 7-8 - 144 Mc/s Open and Listeners' V.H.F. Contests (see pages 115 and 116.)
 March 14-15 - First 1.8 Mc/s Contest (see page 50, January, 1964.)
 March 14-15 - ARRL DX Contest (Phone) (see page 49, January, 1964.)
 March 28-29 - ARRL DX Contest (C.w.) (see page 49, January, 1964.)
 April 4-5 - PZK (C.w.).
 April 4-5 - Helvetia 22 Contest.
 April 5 - Low Power Contest.
 April 11-12 - CQ WW DX SSB Contest.
 April 12 - D/F Qualifying Event (Rugby).
 April 18-19 - PZK (Phone).
 April 18-19 - REF (Phone).
 April 19 - D/F Qualifying Event.
 April 25-26 - PACC (C.w. and 'phone).
 April 26 - D/F Qualifying Event (Newbury or Oxford).
 *May 2-3 - First 144 Mc/s Portable Contest.
 May 2-3 - PACC (Phone).
 May 2-3 - USSR DX Contest (C.w.).
 May 9-10 - OZ CCA (C.w.).
 May 10 - D/F Qualifying Event (Manchester).
 May 16-17 - OZ CCA (Phone).
 May 30-31 - CHC/HTH Party.
 *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 Field Day.
 September 19-20 - Low Power Field Day.
 October 3-4 - RAEN Rally.
 October 17-18 - 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 I IARU Contests.

Modifications to GPO Rugby V.L.F. Transmitter

Automatic tuning and phase correction has now replaced the manually controlled variometer in the 400 kW very low frequency transmitter (GBR) at the GPO Rugby Radio Station. Rugby has been in service for nearly 40 years and continues to carry mainly Morse telegraph traffic but also transmits precise time signals four times each day. The 16 kc/s carrier frequency is derived from a 100 kc/s Essen ring quartz crystal oscillator, which is stable within a few parts in 10^{10} each day. These signals are observed by many organizations concerned with the measurement of time, and in particular the carrier is used for the inter-comparison of national frequency standards.

Can You Help?

● John Langan, B.R.S.25301, 92 Liverpool Road, Birkdale, Southport, Lancashire, who requires the circuit diagram and any other relevant details of the ex-R.N. APW2698 type B29 v.h.f. receiver?

Single Sideband

By G. R. B. THORNLEY, G2DAF*

WHETHER the requirement be a sideband filter for transmitter or receiver, the use of a mechanical filter has a number of advantages:

(i) Crystal manipulation and tedious alignment is avoided.

(ii) The rated unwanted sideband attenuation is known, and this figure will be obtained in practice.

(iii) The long term stability of the filter passband characteristics is very high and is not affected by drift in associated LC coupling transformers.

(iv) As the filter is physically small it has obvious advantages as a means of improving the selectivity of an existing receiver.

(v) With the correct choice of carrier frequency the speech quality is natural, without coloration, and very acceptable.

At the present market price the Kokusai mechanical filter has become very popular. Not surprisingly a number of letters have been received asking for advice in connection with the choice of correct carrier crystal frequency for this filter. It would appear that the less experienced sideband operators are confused by the Japanese method of quoting the filter characteristics and that a few notes on this subject may be of value.

Kokusai Filter Characteristics

These filters are made on a nominal centre passband frequency of 455.0 kc/s, but because of manufacturing tolerances the actual centre frequency may vary plus or minus 0.8 kc/s. Because of this, each filter is packed with a data sheet giving the filter serial number and the measured bandwidth at the 6db, 30db and 60db points for that individual filter. Each bandwidth is given as plus or minus X kc/s relative to the design centre frequency of 455.0 kc/s—not relative to the actual filter centre frequency.

To illustrate this more clearly, an example of the data sheet issued by the manufacturer is shown in Fig. 1. It will be noted that the total passband width at the 6db point is 3.2 kc/s but that this is quoted as two frequencies—each plus or minus relative to 455.0 kc/s and above this is a figure (in this case +0.4 kc/s) indicating that the actual passband centre frequency is 455.0 kc/s + 0.4 kc/s = 455.4 kc/s. At the bottom of the Table the bandwidth is given at the 60db points—again as two frequencies relative to 455.0 kc/s: these two figures added together give the total passband width at 60db down. The ratio of the total bandwidth at 6db to the total bandwidth at 60db is the shape factor of the filter. In this case, it is $5.9/3.2 = 1.9$ (approximately).

From the 6db and 60db frequencies given, the filter passband could be plotted on squared paper: however the graph would not be quite correct because in practice the two skirts are not straight lines—they are in fact slightly concave. To avoid this error the manufacturer also gives the two passband frequencies at the 30db points. The procedure then is to get a sheet of one tenth of an inch squared paper and divide this vertically at 10db per inch starting from the top at 0db and horizontally at 1.0 kc/s per inch arranging that the 455.0 kc/s point is in the centre of the graph paper—this is then indicated clearly by a dotted centre-line. From the data sheet the 6db and 60db figures are plotted, the + (plus) figures to the right of the centre-line and the - (minus) figures to the left. By reference to the horizontal frequency

KOKUSAI ELECTRIC CO., LTD.

MECHANICAL FILTER Characteristics	Made by	Checked by	Approvals
	<i>S. G.</i>	<i>M. M.</i>	<i>G. Y.</i>
Type MF455-15K	Series No. CCK 0665	Date JUL. 19. 1962	Temp. 26°C.
Centre Frequency	+ 0.4 kc/s	Gain per stage	24.0 dB
Bandwidth at 6db attenuation	+ 2.0 kc/s - 1.2 kc/s	Insulation (More than DC 500V 200Mohm)	O.K.
30dB attenuation (SSB)		457.42 kc/s 453.29 kc/s	
Bandwidth at 60dB attenuation	+ 3.3 kc/s - 2.6 kc/s		

Fig. 1. Example of the data sheet packed with each Kokusai mechanical filter.

scale, the two 30db figures are marked on the graph at the 30db down position. The 60db, 30db and 6db points on each side of the centre-line are then joined together with a shallow curve and this is the correct passband for the filter. A complete plot of the filter characteristics already given is shown in Fig. 2.

In the interests of acceptable voice quality the filter should pass frequencies down to 300 c/s, i.e. 300 c/s should be at the 6db point. From this it follows that the carrier frequency must be 300 c/s away from this position. A vertical line is therefore drawn on the graph 0.3 kc/s outside the 6db point and where this line cuts the passband curve is the correct position for the carrier crystal—on the graph shown

(Continued on page 92)

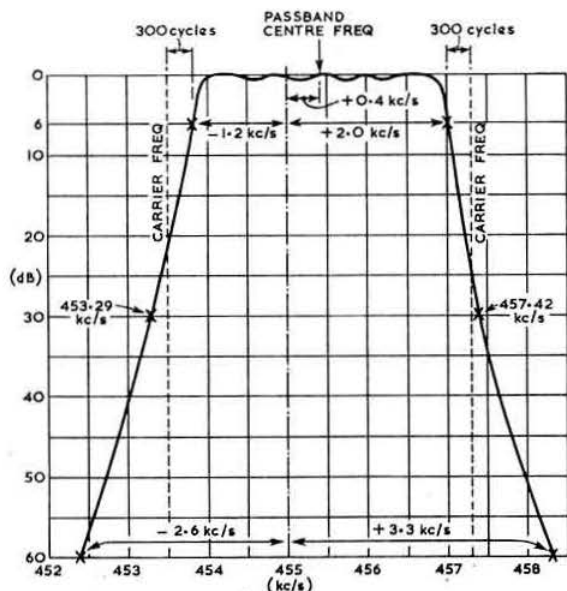


Fig. 2. Method of plotting the passband curve for a Kokusai mechanical filter from characteristics given on the data sheet supplied and from this determining the required carrier crystal frequencies.

* 5 Janice Drive, Fulwood, Preston, Lancashire.

Practical designs for

HIGH STABILITY VARIABLE FREQUENCY OSCILLATORS

Part I—Considerations affecting Performance and Survey of Types

BY PAUL HARRIS, G3GFN *

THE performance of modern variable frequency transmitters is in, no small way, dependent on the inherent stability of the initial frequency control oscillator. Ideally a variable frequency master oscillator should possess the following principal features:

- (a) Have a short preliminary temperature/time stabilizing period;
- (b) Maintain its calibration to a high order of accuracy over reasonable temperature excursions;
- (c) Retain its initial calibration closely after replacing valves;
- (d) Be acceptably insensitive to nominal variations in both h.t. and l.t. voltages;
- (e) Give high output;
- (f) Have low harmonic content; and
- (g) Key well.

While the foregoing features may appear obvious, nevertheless, detailed examination of them when related to design and practical considerations will be found worthwhile.

In so far as the initial temperature/time stabilizing period is concerned, even if the major frequency change does occur within a relatively short time from switching on, a v.f.o. which exhibits a continual and slow drift is unacceptable. In c.w. and s.s.b. operation, involving highly selective receivers or precise carrier reinsertion, such frequency shift is intolerable.

Definition of Stability

As all simple oscillators exhibit some drift, it is useful to define the amount which must not be exceeded when in the stable state. For amateur purposes a v.f.o. may be considered to have stabilized when the frequency change rate does not exceed 15 parts in 10^6 per hour, i.e. 15 c/s per Mc/s per hour.

The layout and quality of components have a considerable bearing on the initial and long-term frequency shift of a variable frequency oscillator, and indeed it is enlightening to quantitatively assess the performance of two theoretically identical oscillators compounded from different quality components and constructed in alternative ways. However, at this stage we are not so concerned with drift attributable to components and layout, but rather, the inherent stability of a particular configuration. There are considerable differences between oscillator circuits in respect of the amount of the initial shift, stabilizing period and long-term drift.

Effect of Cross-modulation

A particular effect, believed to be due to cross-modulation between the basic oscillator frequency and its harmonics, and the harmonics themselves, produces currents at the fundamental frequency which can be out of phase, and varying in phase angle with the original fundamental frequency currents. These currents tend to shift the frequency of oscillation

depending on their amplitude and phase, and it can be shown that, as excitation is reduced, the magnitude of these currents also decreases and, consequently, the drift also reduces [1]. It follows therefore that the lighter the coupling needed to sustain oscillation, then the higher the stability of the oscillator, particularly initially when changes within the valve will have less reflected effect on the frequency determining circuits.

Classes of Operation

Experiments have indicated that the class of operation of an oscillator has a direct bearing on the initial and long-term stability, and these experiments verify, to a large extent, the cross-modulation theory. The impulses—feedback—applied to the tuned circuit can be such that the feedback current ranges between less than 180° and 360° of the cycle. Depending on the period, the oscillator may be classed as "A," "B" or "C" but in all cases grid current flows for part of the input cycle. Class A oscillators have the lowest harmonic content, shortest stabilizing period and excellent long-term characteristics. Class C oscillators on the other hand can exhibit considerable variations in respect of long- and short-term stability, and moreover, have high harmonic content.

Changes in Temperature

In any apparatus there can be no guarantee that the internal temperature will remain constant over a given period or from day to day. Changes in ambient temperature coupled with variations in dissipated heat are bound to produce differences in internal temperature. It is essential therefore that the v.f.o. is able to accommodate variations above and below the mean level without undue frequency shift and resultant calibration error.

Aside from considerations of rapid stabilization and long-term stability, it is important to evaluate the effect of changing the oscillator valve on calibration accuracy. Even if a compensating control is fitted it is tiresome to have to adjust this to restore calibration after replacing the oscillator valve. In general, circuits having tight coupling between valve and frequency determining components show the greatest shift. Perhaps a good example of this is the Pierce 100 kc/s crystal controlled sub-standard. Changing the valve inevitably requires adjustment of the compensating control to secure zero beat against a Standard Frequency Transmission such as MSF.

Voltage Variations

With the rapid short-term changes which can take place in mains voltages, not only is the h.t. likely to follow, but the heater supply as well. Highly accurate stabilization is both expensive and complicated, but nominal stabilization of the h.t. can be accomplished by relatively simple means through the use of a VR105/30 or VR150/30 or similar gas filled regulator valve. It is important therefore to evaluate the performance of a v.f.o. against variations in h.t. and heater voltage.

* "Seaview," 94 Aldwick Road, Bognor Regis, Sussex.

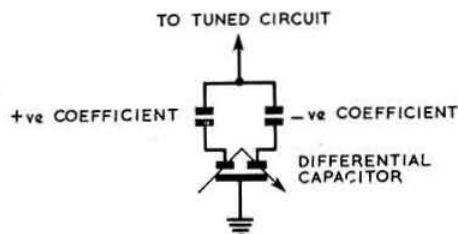


Fig. 1. Temperature compensating circuit employed in Hallcrafters HT32 transmitter v.f.o.

Undesired Outputs

At the present time, the transmitting amateur is confronted with a formidable list of frequencies which must be avoided. By this is meant frequencies which are incidentally produced—harmonics—or inadvertently chosen—in multipliers—and which are likely to cause interference to other services. It is only too well known that television receivers are particularly prone to interference from amateur transmitters, and, with the greatly increased sensitivities of modern receivers, the very wide bandwidth of front-end tuners, poor image rejection and high susceptibility to cross-modulation and blocking, harmonics and intermediate multiplier frequencies must have the closest attention. Much can be done by filtering and screening, but if the offending frequencies can be avoided, or at the very least substantially reduced, then so much the better. Many v.f.o. circuits are not only vigorous oscillators, but also, for reasons already discussed, produce a string of potent harmonics. Such oscillators should be avoided.

The price of using a v.f.o. with a low harmonic content is that the frequency multipliers must operate efficiently in their chosen mode having the stipulated drive, element voltages and tank circuit Q . Many so called multipliers rely to a fair extent on the harmonic content of the drive to produce the required output and are not inherently efficient multiplier circuits as such. While the factors affecting multipliers are not pertinent to this paper, suffice it to say that certain valves are more suitable than others for this type of service, but many other types can, under suitable conditions, provide satisfactory performance. Whenever possible reference should be made to the valve manufacturers' application report on the type being considered.

Keying

While it is accepted as bad practice to key any v.f.o. directly, under certain conditions—such as π keying for example—it is desirable to d.c. switch the oscillator in some manner, unless frequency shift keying is incorporated. If there is a frequency change during the initial current flow within the oscillator circuit, then this will give rise to chirp. An oscillator which meets all other requirements may well show chirp when d.c. switched. Care must be taken when assessing chirp as r.f. circulating currents due to badly disposed earth points, or reactive decoupling capacitors can produce this effect. Nevertheless different oscillator configurations have their own individual chirp characteristics.

Output Capability

Finally, a variable frequency oscillator should have a high output capability, always provided that this is not at the expense of other more desirable features, especially in respect of harmonic content. The object of having a high output from the v.f.o. is not simply to use all this output and trim down on the following stages, but rather to be able to load the v.f.o. lightly and so work it well within its power capabilities. Heavily loaded v.f.o.'s always show frequency shift as the

subsequent stages of the transmitter are tuned up, or as the transmitter is loaded. The frequency differences which occur between stations, allegedly on the same channel, are usually due to pulling of the v.f.o. frequency due to loading effects, rather than inaccurate "netting."

Choice of Components

Having dealt at some length with the main features expected of a v.f.o. circuit, and, *inter alia*, the reasons for them, it now seems prudent to examine the requirements in respect of components.

No matter how excellent the probable performance of any v.f.o. circuit, stability and drift are still at the mercy of the components employed, not so much in terms of their initial values—which can always be adjusted—but rather in respect of the actual *stability* of the components themselves and their ability to retain their original values through temperature excursions. Often negative coefficient capacitors are employed to compensate for changes which occur in values of frequency determining components due to heat. While it is acknowledged that, correctly applied, this can be highly satisfactory, it should be kept in mind that, in theory, perfect compensation can only be achieved at one specific frequency, and the greater the amount of compensation applied, the more frequency selective it will become. The usual problem encountered is that the exact value of negative coefficient capacitor is not available, or the one that has an incorrect temperature/capacity gradient. Under these circumstances the final result is a compromise between perfection and minimum obtainable drift. Hallcrafters have solved this problem very neatly in their HT32 s.s.b. transmitter. In this circuit, which is shown in Fig. 1, a differential capacitor is used in such a manner that varying the differential varies the amount of correction "seen" by the tuned circuit. With this arrangement practically perfect temperature compensation can be achieved.

For most amateur purposes, high quality components, attention to mechanical stability and component layout can, with a suitable circuit, produce an oscillator which is satisfactory even under critical operating conditions.

With regard to the frequency determining circuit in particular, the coil should be wound under as much tension as the gauge of the wire will allow, taking care when working with fine gauges not to stretch the wire. High grade non-porous formers are essential, and when winding has been completed and adjusted, it should be heavily doped. The use of a former having an iron dust core has much to commend it, as not only are inductance variations simply made by adjustment of the core, but also the physical size of the coil

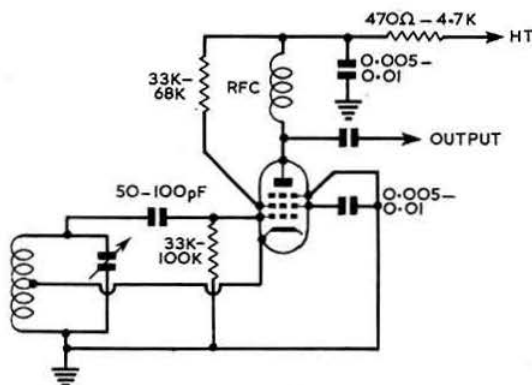


Fig. 2. Basic Electron-coupled Hartley oscillator.

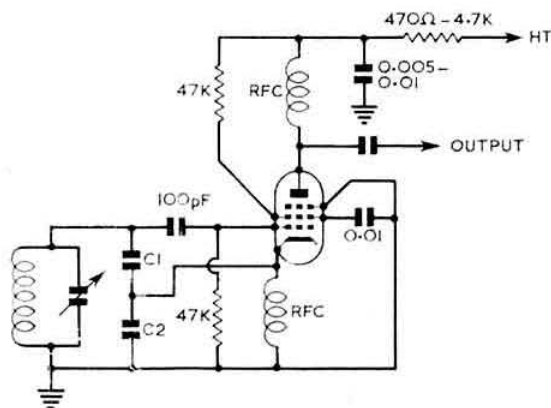


Fig. 3. Basic electron-coupled Colpitts oscillator.

can be reduced. Caution is required in circuits where ferrite cored coils are employed for, with high power, saturation may take place. However, this is unlikely in most circuits used in the low level stages of amateur transmitters and certainly will not occur in any of the v.f.o. circuits to be described in detail.

Tuning capacitors should for preference be double spaced so that the effects of expansion, and consequent variation in capacity are held to a minimum. General mechanical rigidity is important, as is the method of securing connection to the rotor plates. The quality of the insulation supporting the fixed vanes must be absolutely above reproach as otherwise the tuned circuit may well contain an unstable element.

The resistor which acts as the grid leak is normally effectively in parallel with the tuned circuit, or at least one element of the tuned circuit. For this reason it requires as much care in its selection as do the frequency determining components themselves. Not only must it be highly stable in its d.c. resistance, but also in respect of any self capacity or inductance. It should be well overrated in terms of wattage so that any changes which do take place are as a result of environment—which can be controlled—rather than the actual current flow through it.

The valveholder requires special attention. Only first grade insulate mouldings with silver plated contacts should be used.

In considering the foregoing comments, it should be

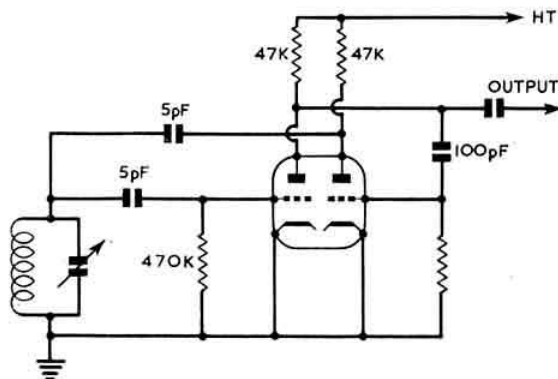


Fig. 4. Basic Franklin oscillator.

borne in mind that we are concerned with *highly stable* oscillators. Much licence can be, and often is, taken where the application is not critical, the frequency low, or automatic frequency correction circuits employed.

Comments which apply to transmitter master oscillators are equally applicable to receiver local oscillators, and for that matter to secondary injection oscillators such as b.f.o.'s and carrier reinjection oscillators. Despite the general advance in receiver design, only in the Racal RA17, Drake 2B and Collins 75A does any serious attempt seem to have been made to match local oscillator performance to other improvements. All too often "domestic" type receiver oscillators are still to be found. In fairness to other manufacturers, there does now seem to be an awareness that these departments have been too long without attention. The increasing use of s.s.b. has undoubtedly shown the very real need for this revision in view of its particularly high demand on stability.

Survey of Types

In the immediate post-war period, v.f.o. circuits were usually of the Hartley (Fig. 2), Colpitts (Fig. 3) or Franklin

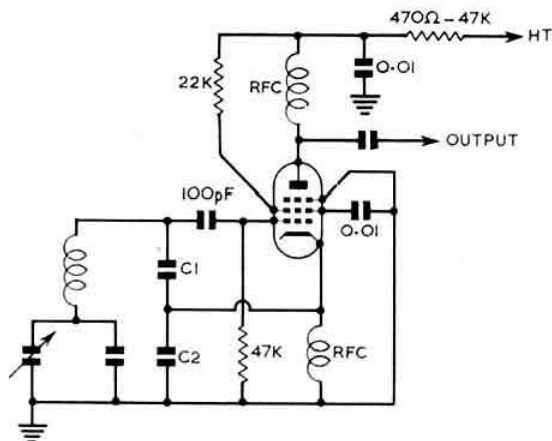


Fig. 5. Basic Clapp oscillator.

(Fig. 4) types. With care and attention both the Hartley and Colpitts could be made sufficiently stable for the receivers in use at that time, but invariably they required considerable individual treatment. Some were excellent, some were passable but others could claim no polite label. All tended to be fussy as they ran in modes varying between class B and class C with tight coupling between valve and tuned circuit. They were excellent for multiband transmitters as their output contained substantially high levels of close order harmonics. This particular attribute proved to be disaster to many amateur stations as television spread throughout the country.

Of the three oscillator types mentioned, the Franklin has an inherently high stability characteristic, but as this oscillator requires either two triodes, or a twin valve, and has low output, it did not find the favour which it deserved. In respect of this oscillator, it is interesting to note that one manufacturer is employing it in a receiver of advanced design.

In the late 1940s the Clapp oscillator (Fig. 5) came to the attention of the radio amateur and received great acclaim.

The Clapp oscillator—originally developed by G. G. Gouret of the BBC—represented a major advance in variable frequency oscillator design as it substantially divorced valve capacities, and changes therein, from the

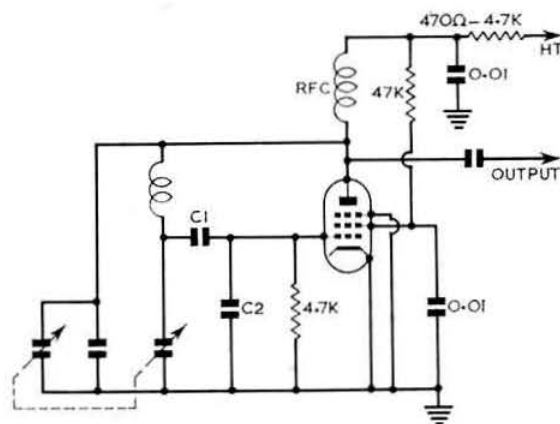


Fig. 6. Basic Vackar/Tesla oscillator.

frequency determining circuit, and in so doing, removed the major cause of frequency drift.

There is a family resemblance between the Clapp and Colpitts oscillators as examination of Figs. 3 and 5 will show. In the Clapp oscillator the frequency control circuit is arranged for series tuning, and as a result C1 and C2 form part of this circuit as well as being a capacity divider for feedback purposes. In the Colpitts configuration, C1 and C2 are in no way associated with the tuned circuit but are a capacity divider pure and simple, other than from the point of view that the effective capacity of C1 and C2 in series is in parallel with the tuned circuit. In the Clapp oscillator, high values at C1 and C2 effectively swamp valve capacities so that any changes therein are very small with respect to these capacitors.

While achieving a high order of stability the Clapp oscillator has two disadvantages. First, the output drops rapidly if worked over a frequency range in excess of about 1:2:1. Second, while the Clapp can be designed to work at frequencies in excess of 10 Mc/s, as the frequency increases, the values of C1 and C2 decrease rather rapidly with the result that they no longer effectively swamp valve capacities, and so the principal advantage of this configuration becomes lost.

The Clapp oscillator was the subject of further development by Vackar of the Tesla organization with results that do not appear to have been appreciated in the same way as was the original Clapp design. This development was reported in the BULLETIN in some detail [2]. What Vackar did to the Clapp pretty near equals what Gouriet did to the Colpitts. The result is an oscillator that fulfils almost perfectly the requirements stipulated in the second paragraph of this paper.

The Vackar—sometimes called the Tesla—oscillator (Fig. 6) operates over a wide frequency range, 2.5:1, before there is any serious reduction in output, and over the range of 2:1 the output remains sensibly constant. Given due care and attention, the Vackar can be used on a fundamental frequency of 72 Mc/s where it shows an order of stability which is quite outstanding. Although its output is high, harmonic content is low as it operates substantially in class A.

References

- [1] *Theory and Design of Valve Oscillators*, H. A. Thomas. Chapman and Hall, London.
- [2] RSGB BULLETIN, March, 1956.

To be continued

Single Sideband (Continued from page 88)

this is a frequency of 457.3 kc/s. If two carrier crystals are required (i.e. sideband switching in a receiver) the second frequency is plotted in exactly the same way—but at the other side of the passband. If the carrier crystal on the lower side of the passband is in use, the filter will pass the higher sideband. If the carrier crystal on the higher side of the passband is in use, the filter will pass the lower sideband. In the G2DAF transmitter it is quite immaterial which one of the two carrier frequencies is chosen, because the required sideband is obtained by a second heterodyning process that takes place after the signal has passed through the filter.

Ordering Crystals

When ordering crystals remember that every crystal can be made to oscillate on either its series or parallel resonant frequency and these are not the same (at frequencies around 455 kc/s the difference may be 200 c/s or more). It is not sufficient to quote only the required frequency; the manufacturer must know whether operation is required on the parallel or the series resonance, and this must be stated. Additionally as the parallel resonance is affected by the shunt circuit capacity, this capacity should be stated. (Normally in the United Kingdom 30 pF is taken as a preferred standard value and the manufacturer will grind the crystal to oscillate at parallel resonance at the stated frequency with this capacity, unless otherwise instructed.)

For amateur use it is not necessary to go into involved calculations in an attempt to determine circuit capacity—the value of 30 pF can be quoted and is quite near enough in practice. The manufacturer also has to know (i) the type of holder, i.e. 10XJ ($\frac{1}{2}$ in. pin spacing) or B7G; (ii) frequency tolerance (this is normally plus or minus 100 p.p.m. or 0.01%); (iii) operating temperature range (it would be sufficient here to quote "normal room temperature" or "amateur equipment").

Carrier crystals are normally used in either Pierce, Colpitts or Miller oscillator circuits and in all these the crystal is excited at its fundamental parallel resonant frequency.

High frequency crystals will normally be ordered for use in some other part of the equipment and in this case the manufacturer will have to know whether the mode of operation is fundamental or overtone. Overtone oscillators always operate at series resonance and as this is not affected by shunt circuit capacity it is unnecessary to state this. Often, final conversion crystals are operated on their overtone to avoid generating spurious birdies or tweets—this applies particularly to a double conversion amateur band receiver. The mode of operation can be readily identified by reference to the type of oscillator circuit—this will be a Butler, Squier or Robert Dollar in which the crystal is used as a series coupling of low impedance to the required oscillatory r.f. current.

Remember that in an harmonic oscillator—as distinct from an overtone oscillator—the crystal oscillates at its fundamental parallel resonant frequency. The harmonic generation is obtained by the non-linearity of the associated valve, the valve output circuit being tuned to resonance at the required harmonic frequency. This type of oscillator normally uses the Colpitts, Miller or electron-coupled circuit.

The subject of crystals and crystal oscillator modes of operation is dealt with in detail in the RSGB *Amateur Radio Handbook* to which constructors requiring further information are referred.

The 1963 Royal Air Force Amateur Radio Society Expedition to the Kurja Muria Islands

By Flight Lieutenant J. M. Hern, RAF, VS9AAA*

IN October, 1961, the Royal Air Force Amateur Radio Society mounted an amateur radio expedition to the island of Kamaran in the Red Sea. This proved so successful that it was decided to try and organize an official RAFARS expedition every year. As Kamaran was a new country for DXCC purposes, it was also decided to try and make the next expedition another new country if one could be found. This proved to be rather a difficult proposition. After several different possibilities had been suggested and discarded for a variety of reasons, the islands of Kurja Muria were selected. Unfortunately, the plans to launch the 1962 expedition to the Kurja Muria islands failed at an advanced stage, which meant that there was no 1962 RAFARS expedition. The following documentary outlines the problems met and overcome, and describes the results of the 1963 expedition.

The islands of Kurja Muria are shown on the Admiralty chart as being 17° 32' N, and 56° 05' E. The chart is annotated with additional information that the islands may be 2½ miles from their shown position. There are four islands in the group, the main one being Hallaniya. This island is the largest, and is about 8½ miles long by 4½ miles wide. It is the only inhabited island. Sheikh Said Bin Muhammad rules over a total population of about 60 British subjects. The islands were ceded to Queen Victoria in 1854 by the Sultan of Muscat and Oman. They are mainly composed of limestone and granite and there is practically no vegetation. The main life on the island seemed to be crabs and flies with numerous large and small fish just off the island. The local fisherman caught, in fact, a manta ray about 12 ft. across just off shore from the bathing beach, and one of the operators nearly shot a shark with a speargun by mistake.

The principal problem was to get on to the island with all the supplies, remain there, and get off again. The island can only be approached safely between September and April, and, furthermore, although the chart showed two wells on the island, water still had to be carried. The beach was likely to have surf at times, and therefore all technical equipment had to be packed and waterproofed. At first, the plan had been to charter a dhow from Masirah (VS9O), but there was the problem that with the state of the wind and tide, it would take many weeks to return without a motor. Although we could have been landed downwind at Salalah (both Masirah and Salalah are airfields), the total charter time of the dhow would mean an outlay of £1,000. A further complication was the time that each operator could be away from work. If chartering the dhow was possible, then the plan was to fly six persons to Masirah from Aden. Apart from the operators there would also have to be a fluent Arabic interpreter. It was felt that the time element was too great, and consequently further ways of getting to the islands were explored. It was finally decided to approach the local shipping company which was known to have a boat that sailed monthly to and from Masirah. It was slow travelling against the tide, but fairly fast on the return journey. For the sum of £100, we were given permission to go on the boat, provided we did our own cooking. It was then possible to take a supporting



VS9AAA operating the Collins s.s.b. equipment.

(Photo by VS9AAA)

party in order to utilize to the full the operators and equipment. The party then consisted of 12 members, including a doctor.

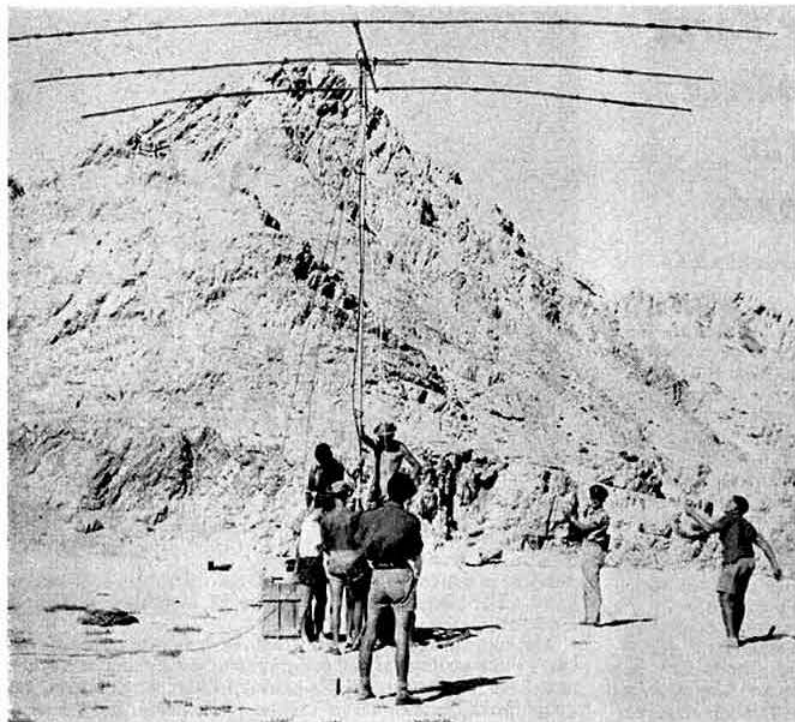
The supporting party comprised two separate units, one to carry out a geological and geographical survey, and the other as a base support group. Squadron Leader A. Silvester, the geographical expert, was in charge of the party, and the plan was to try and chart the salient points of the island. The supporting party meant a large increase in the amount of basic equipment necessary to ensure survival.

The equipment required for the task was slowly gathered together in Aden. The shipping company had told us that the M.V. *Seiyun* would leave Aden on or about November 2, 1963, and on November 9 we were asked to load the boat with equipment. This required three loads of a 3 ton lorry and much hard work. At the end of November 9 all the gear was on the deck of the boat. It remained there that night and on the afternoon of November 10 the whole party embarked for the first stage of the expedition.

Meanwhile, behind the scenes, much work was going on. Permission had to be obtained through the political adviser in Bahrain to land on the island. Permission had already been obtained from the Postmaster General in Aden to operate on the island. As VS9K had already been issued for Kamaran VS9H was suggested for Hallaniyah and duly authorized. Radio links on service channels had to be arranged, and Royal Air Force flights already scheduled to pass near the islands on their way to Masirah were re-routed slightly in order to pass over the main island. Finally, the estimated time of arrival and commencement of operations had to be passed over the air from Aden to as many DX operators as possible. Special permission had been obtained from the Postmaster General in Aden for Gus M. Browning, W4BPD, to operate from the Kurja Muria and also Aden if he used my call-sign when I was there. Gus flew down from Afghanistan via India in time to join the party on October 25. He did, of course, stay longer in Aden than calculated but managed to keep VS9AAA very active on the band. I did not get on the air at all during that time as I was very busy making the final arrangements in Aden. Ken Smethurst arrived from Kenya also on the 25th, and passed the time in Aden by fishing. Ross Kelly was already in Aden with his own call VS9ARK.

After six and a half days of leisurely cruising up from Aden, the M.V. *Seiyun* approached the island of Hallaniyah

* 114 MU, BFPO 69.



Erecting the Mosley multiband aerial.

(Photo by VS9AAA)

well indeed on 20m, in the directions the beam did not cover. These two aerials were fed to a co-axial switch and then went to the KWM 2. To the south west of the operating tent was a small valley, and in this were placed two Hy-Gain 14 AVS verticals for 40/20/15/10m. These were fed in phase by very carefully measured 50 and 75 ohm co-axial links, and acted as a Hy-Gain vertical beam on all bands used. We were unable to switch the phasing so it was beamed to the south east. The wisdom of this was soon proved when the band was open to the States. The transmitter on the vertical aerial was working a W6 pile up and no east coast stations, whilst the transmitter on the beam was working the east but not the west coast, both these being on 20m. The operators kept a two hour watch for the first 48 hours, in order to analyze the conditions. After that it was finalized into three-hour watches, with the midnight to 3 and 3 to 6 a.m. local watch being combined. The operators were then able to snatch at least six hours sleep every 48 hours. It proved impossible to sleep during the day owing to the flies and the heat. Lessons learnt on the 1961 expedition were remembered and the two stations were operating 24 hours a day for a period of eight days. To persons listening to a VS9H calling CQ and not receiving a reply this may have seemed pointless. However, we went there to give a new country to as many

just before mid-day on November 16. To pass the time on the way, several members of the party carried out practice in sextant work, and the radio party, less Gus, started up a bridge school. Bridge for 12 hours a day certainly kept us occupied! Most of the party slept out on the deck amongst crates of oranges, drums of aviation fuel and other sundry items. The ship's complement was completed with the addition of one dog and two pigeons.

Unloading our equipment into a pitching ship's boat took about four years off the lives of the owners of the radio equipment. All went well, however, and after five trips all equipment and expedition members were safely on the island, even if a little soaked in sea water. There were then four hours remaining until darkness. The first job was to ensure that the local population were certain that we were not going to invade them or to attack their village. As only the Sheikh spoke Arabic, our interpreter was kept fully occupied. The tents then went up on the sites selected and the radio equipment was set up. Before leaving Aden a considerable amount of thought had gone into the aerials required, and also to their positioning. Seventy per cent of the active radio world could be contacted, either by short or long path, via the north west. We also had to have an aerial for Masirah, plus, of course, a system that would create as little QRM as possible between the two stations. We originally had planned for three stations but the third generator failed to materialize at the last moment.

We were on a small beach with cliffs on all sides. The aerials used were as follows: On the north east side was a Mosley TA33JR beamed north west and fixed at a height of 30 ft. Running parallel to the beach to another 30 ft. mast was a Hy-Gain 20 and 40m trap dipole. The co-axial feed to this had been cut to a length of 109 ft., so it also worked very

as possible. If in fact we made 10 QSOs in four hours on a nearly dead band—well, that was what we went there for. Actually, some of the rarer countries contacted came in during the quiet hours.

Conditions on the bands were relatively poor, and few massive pile-ups were encountered. The European s.s.b. net on 3-798 Mc/s will probably be surprised to know that on our last night, November 23, they were 59 in VS9H, but were working Ws and not listening on their own frequencies. With 600 watts of s.s.b. to the dipole, one station only was worked on 80m s.s.b. That was DL11N, a very good DXer indeed. The CQ DX contest in our last weekend was very useful and our number of contacts per hour went up. Unfortunately, on the Sunday at about 09.00 I saw a boat on the horizon. It proved to be the *Seiyun*, so we went off the air in a hurry!

Needless to say the camp was struck very rapidly indeed. The radio equipment was packed and then the fun began. A large sea was running and the ship's boat kept about ten yards off shore in a depth of water that alternated between four and nine feet deep! At least one box was lost in the sea and most of the others were completely soaked. The cases containing the two Collins stations were carried out on four shoulders. The weight of each of the two boxes was about 120 lb. I am 5 ft. 8 in. tall and was in front of one case just before it was put into the boat. The water completely covered my head and rose halfway up the box. When the box fell off our shoulders into the boat I came up swimming! Finally, all the gear was aboard and we started on our trip home. Everybody was exhausted but happy after a good expedition.

(Continued on page 100)

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS, G2BVN *

It is hoped that a number of h.f. band operators will take part in the activity during the IQSY. As already outlined in the article by G3FZL entitled: *The International Years of the Quiet Sun* which appeared in the December, 1963 issue of the BULLETIN, h.f. operators can make a valuable contribution by reporting instances of auroral propagation on the 28 and 21 Mc/s bands, with the emphasis on the former allocation. DL0AR is already operating on 29,000 kc/s, and it is hoped that GB3LER will soon commence operation on 29,010 kc/s from a site near the Lerwick Observatory. Both of these stations will have beam aerials aligned in a northerly direction to allow their signals to be reflected from the auroral zone whenever this is present. It is anticipated that auroral propagation will be a comparatively rare event and every report will be of value. C.w. signals received by auroral reflection will have a very poor tonal quality compared with the usual T9 notes from signals arriving by sporadic E propagation. To effect a QSO by auroral reflection both stations, irrespective of their location, should turn their beams to the north. An IQSY leaflet giving fuller details of the Society's programme and log sheets can be obtained when writing to either Headquarters or G2BVN.

Turning the full circle from something that is very worthwhile to a practice that is useless and infuriating, the writer makes no excuse for again referring to the increasingly prevalent habit of breaking in on existing QSOs every time one of the participants signs over. To announce one's call-sign and then standing by on the frequency is a reasonable thing to do, but the incessant parrot-like cry of "break, break" causes unnecessary QRM and clearly identifies the owner of the call as someone to be avoided. It seems a pity that single sideband, which can do so much to relieve the QRM on the 'phone sections of the bands is probably the prime cause of this undesirable habit, and it is suggested that habitual offenders might be cured by the refusal of DX stations to send a QSL.

Comments have been made to the writer that, in many cases, UK stations working in the 14,100 to 14,125 kc/s segment and listening for North American stations above 14,250 kc/s, often cause unwitting QRM to DX stations operating in the lower portion of this band. It would seem that this state of affairs could be alleviated by the UK station first listening on the transmitting frequency before calling, and also by extending the area of operation up towards 14,140 or 14,150 kc/s instead of concentrating in the lower 20 kc/s above 14,100 kc/s.

New from Overseas

Galapagos Island is to have permanent representation on the amateur bands under the call HC8FN. The LIDXA report that a Drake TR-3 and accessories are now in Ecuador

* Please send all items to RSGB Headquarters to arrive not later than February 7 for the March issue and March 6 for the April issue.

waiting shipment to the island where the TA33 beam is already in position having been left by WA2WUV/HC8CA after his stay earlier this year. For the present QSLs are being dealt with by WA2WUV at Box 296, Massapequa, Long Island, and self addressed envelopes and IRC would be appreciated.

After a short stay on South Georgia Is. which accounted for about 500 QSOs, VP8GQ is now at Port Stanley in the Falkland Islands where he will be based until he returns to the UK, probably in May of this year. It is certain that Peter will be in great demand particularly on 1.8 Mc/s and when using s.s.b. on the h.f. bands.

HB9YG/4W and HB9AET/4W are both located at a hospital in N. Yemen and have been well heard in the UK when using s.s.b. on 14 Mc/s. QSLs should be routed via the Swiss Bureau and will be dealt with on their return in about ten months.

VU2GG will be active between 3890 and 3900 kc/s and will listen for European stations between 3500 and 3520 kc/s. It is believed that the best time for QSOs on this band between the UK and India is around 19.00 and VU2GG will make an effort to be on the band at this time. (G3IFB).

VQ1GDW has apparently run out of QSLs and any seeker of a confirmation from Box 84, Zanzibar, should enclose a suitable card for him to complete. For direct reply a s.a.s.e. should complete the offering.

YK1AA advises that at the present time c.w. is not allowed but that he will be active on d.s.b. and a.m. on frequencies



ITIAGA of Palermo, Sicily, has made nearly 33,000 QSOs since March, 1952, and is the holder of 224 operating awards. His transmitter runs 60 watts input and the aerial is a Windom.

in the higher portion of the 14 Mc/s band. It is suggested that Friday is the day on which he is most likely to be found on the band. QSLs should go to Box 35, Damascus, Syria.

The **QRP Amateur Radio Club** was founded in 1961 by K6JSS for the purpose of joining together the large number of amateurs who both run, and enjoy running, low power. Power limits for membership are set at 100 watts input or 200 watts p.e.p. for s.s.b. operation. Applications for membership should be made to J. R. Perry, K4WUX, 2691 56th Street North, St. Petersburg, Florida, USA. On this subject of QRP G2PL/P has accumulated a quantity of very worthwhile DX whilst running between 20 and 30 watts input from a location near Frinton, Essex. The aerial used was a ground plane or inverted dipole and stations worked included: JA5FQ, KR6BQ, JT1CA, KC6BO, AC7A, together with W6s, 9M2 and most of the USSR republics. As G2PL says "a spell of QRP is very good for the soul—it teaches one to be a little humble!"

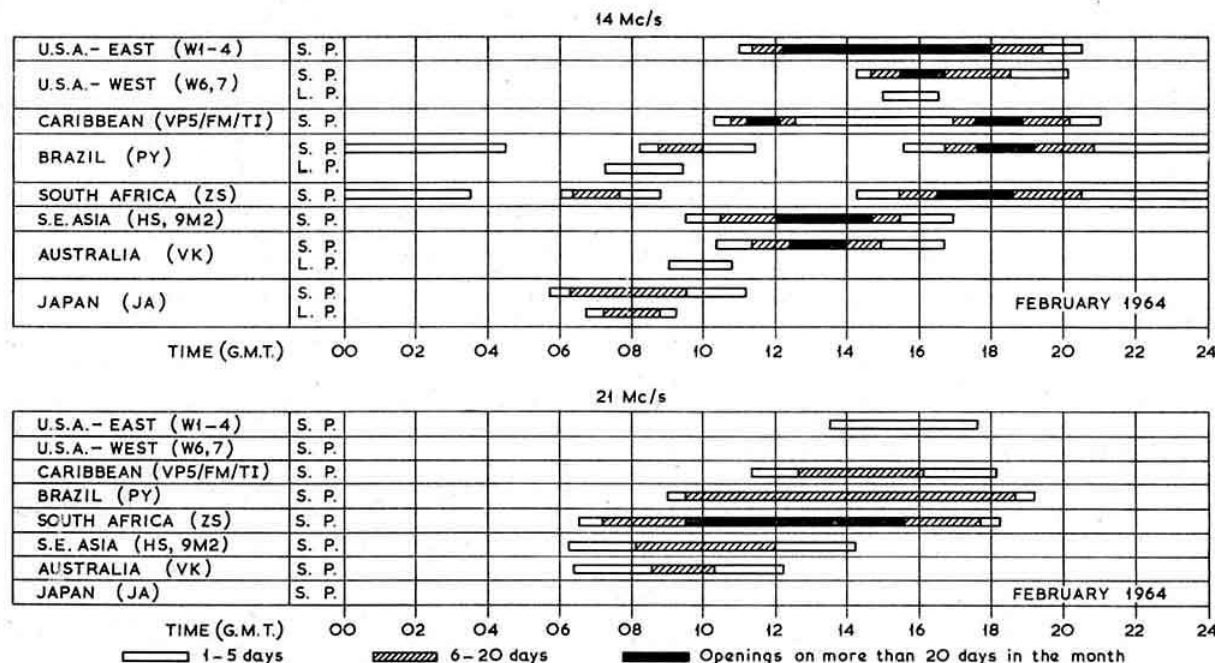
Expeditions

If all goes according to plan the attraction during the

coming month should be the visit of **VQ9HB**, Harvey Brain, to Chagos, Rodriguez, and Agalega or St. Brandon. Departure date from the Seychelles for Chagos is February 28 and the call will be **VQ8BFA**. Operation will probably be confined to 21 and 14 Mc/s and there will be no 7 or 3.5 Mc/s activity. On sideband **VQ8BFA** will transmit on 14,115 kc/s and listen between 14,250 and 14,260 kc/s, and when using the 21 Mc/s band the transmitting frequency will be 21,400 kc/s listening for replies between 21,405 and 21,450 kc/s. **G8KS** will be handling the QSLs and it will be appreciated if requests are accompanied by self addressed envelopes and return postage. This will help to speed the reply cards.

After a relatively short stay in East Pakistan as **AP5GB**, **W4BPD** proceeded to AP2 and thence hoped to once more activate **AC3PT**. The delay in returning to Sikkim was caused by the death of the reigning monarch and the subsequent court mourning period of six weeks. At the time of writing **W4ECI** and his helpers have attacked the QSL chores with a vengeance and all cards except those for the Kuria Muria operation have been despatched. A large number of QSLs for **AC3**, **AC4**, **AC5**, **AC7**, **4W1**, **9N1** and

PROPAGATION PREDICTIONS



After the temporary increase in solar activity during the autumn of last year, the following months have shown a rapid decline. This has led to a deterioration in DX conditions on the h.f. bands 28 and 21 Mc/s. Only in exceptional cases therefore will the path to Africa open on 28 Mc/s and on these occasions the best time will be between 10.00 and 15.30. Opportunities for contacts with South America between 13.00 and 16.00 will be even more rare than those for Africa. The lessening in solar activity also greatly affects 21 Mc/s and only Africa will yield contacts with any degree of certainty. The East Coast of North America will only be heard on days with exceptionally high F2 m.u.f., and conditions for the forthcoming ARRL DX Contest are not encouraging. On days of strong geomagnetic disturbance there will be opportunities of European contacts on 28 and 21 Mc/s by reflection from the auroral zone, and all such contacts should be reported to G2BVN for inclusion in the IQSY records maintained by the RSGB. The 14 Mc/s band will show an improvement over the previous months especially towards the end of February as the lengthening days will allow the band to remain open for some hours after sunset. However, it is not anticipated that the band will remain open for the whole night until after May. With the

approach of the period of equal day and night, which occurs during March and September, there will be fewer opportunities for DX contacts on 14 Mc/s via the long path.

In the forthcoming DX contests the stations located in the southern portion of the continent of Europe will have much better chances of success than those stations situated in the northern portion, and only on isolated occasions will there be an opportunity to contact Hawaii over the long path between 17.00 and 18.00. In the present conditions of low atmospheric noise the 7 Mc/s band will be regularly open for DX contacts, and after about 21.00 the whole of the east of North America should be workable, QRM permitting. The 3.5 Mc/s band will also occasionally yield good DX conditions, but the trans-Atlantic path on both these bands may be interrupted during the latter half of the night by a fall in the m.u.f.

The provisional sunspot number for December 1963 was 11.8, the lowest yet recorded during the current cycle. The period of greatest solar activity lay during the first 12 days of the month. From December 27 to 31 the solar activity figure was zero. The predicted figures for April, May and June, are 16, 15 and 14 respectively.

YAIA have been recently received and should now be in the eager hands of the owners.

The latest rumour regarding the stay of VP8HF on Candlemas Is. of the S. Sandwich group is that arrangements have been made for him to receive s.s.b. equipment which will enable him to use the 14 Mc/s band. Bearing in mind the uncertainty of operation in the Antarctica area further developments are awaited with interest.

To the great disappointment of VK0VK his proposed call at Heard Island did not materialise. One would imagine that his particular section of Antarctica tended to melt when this piece of news was received.

Angus Murray-Stone, HZ2AMS, has visited the Neutral Zone (9K3) but had no success radiowise. He plans a further visit in the near future and this will undoubtedly be without any warning beforehand. Angus advises that there is no possibility of operation from Jordan or Syria for at least 18 months.

HB9TL has Liechtenstein intentions for February 14 to 16 when he will sign HB0TL; QSLs should go to WA2QNW.

During his second weekend at TJ8, 5N2RSB encountered poor conditions, but was well heard in the UK around 15.00 on 14,120 kc/s.

The DXpedition calendar now reads:

February. AC3PT by W4BPD.

Early February. CE0Z, Juan Fernandez by CE3XB/K4LKD.

February, second week. TY2 by 5N2RSB.

February 14-16. Liechtenstein by HB0TL.

February 21. VQ8BFA leaves for Chagos.

March. VP8HF from S. Sandwich Is.

April. Andaman Is. by VSILS.

DXCC News

Official announcements from ARRL give information on the addition of two new countries, firstly Kuria Muria Islands (VS9H), for which DXCC credit will be given commencing March 1, 1964. International Telecommunications Union Headquarters at Geneva (4U1ITU) has also been accorded separate country status, and confirmations may be submitted for credit after April 1, 1964.

Contests

The CQ World Wide SSB DX Contest will take place between 12.00 Saturday, April 11, 1964 and 24.00 Sunday, April 12. This year the rest period of 12 hours may be taken in two periods, but these periods must be clearly shown in the log. Multi-operator stations are not required to show a rest period and can operate the full 36 hour contest period. All bands between 3.5 and 30 Mc/s may be used and operation is confined to two way s.s.b. only. The following types of entry may be submitted: Single Operator: (a) All band; (b) Single band. Multi-Operator: (a) All band only. It should be noted that multi-transmitter operation is not allowed. Points: contacts between stations on different continents will count three points: contacts between stations in the same continent but not in the same country will count one point: contacts between stations in the same country will be permitted for the purpose of obtaining a prefix multiplier, but will not count for QSO points. Multipliers: the multipliers will be determined by the number of prefixes worked. A "prefix" is considered to be the two or three letter/numeral combination which forms the first part of an amateur station call. Each prefix may be counted once during the contest irrespective of the band. Scoring: the score for an entry (single band or all band) will be the total number of QSO points multiplied by the total number of prefixes worked. Logs: (1) indicate a prefix only the first time that it is worked; (2) use a separate

BERU CONTEST

FEBRUARY 15-16, 1964

For rules, see page 261, October, 1963

sheet for each band; (3) all times must be in GMT and the 12 hour rest period must be clearly indicated; (4) a prefix check list is highly desirable and should be sent in with the entry. (5) the official log forms are 8½ in. by 11 in. with 40 contacts to the page, and may be obtained from CQ Magazine by sending a large self addressed envelope with return postage. Deadline: all logs must be postmarked no later than April 30, 1964, and sent to CQ Magazine, 300 West 43rd Street, New York, 36, N.Y. 10036, marked "WW SSB Contest."

The above represents a summary of the important rules governing the CQ WW SSB Contest, but a complete set of the rules may be obtained by sending a foolscap s.a.s.e. to G2BVN. A specimen log sheet may also be requested but bulk supplies are not available.

The following claimed scores have been made in the C.w. Section of the RSGB 7 Mc/s DX Contest: G5DQ, 2475 points; GW3JI, 2265; G8PB, 2115; G2DC, 1980; G3HQT, 1910; GW3CW, 1810; G2QT, 1755; G3KSH, 1655; G3FM, 1635; G3EYN, 1630. In the Phone Section of the same Contest high claimed scores are: G3KSH, 590 points; G3NLY, 520; G3MTB, 425; PA0LV, 410; F2YS, 400; ON4PG, 375; SM4ATA, 370; UB5KCA, 325. In the Receiving Section high scores are claimed by B.R.S.24775, E. Hawell, 1715 points; B.R.S.6604, E. Sherlock, 1490; B.R.S.21008, W. Pinnell, 1270; A.2122, A. Davison, 1110; B.R.S.18461, F. Powell, 1050. The C.w. Section attracted an entry in the region of 160, the Phone Section 25 entrants, and the Receiving Section also 25.

The following claimed scores have been made in the RSGB 21/28 Mc/s Telephony Contest:

British Isles. Single Entry

G5HZ 2635 points
G3HCU 2405 points
G3KFT 2135 points
G2QT 1885 points
G3HS 1455 points
G3LHJ 1405 points

Multi-Operator

G3CIO 1605 points
G3LHZ 1495 points

Overseas. Single Entry

ZB1BX 2385 points
UB5FG 2120 points
ZB1CR 1745 points
5N2JKO 1710 points
OH5SM 1400 points
5H3IW 1295 points

Multi-Operator

UB5KCA 1055 points
LZ1KSP 435 points

Receiving Contests.

British Isles

D. S. Kendall 2075 points
D. Gray 2035 points
A. Withers 2020 points
M. Harrison 1870 points
A. Hewitt 1760 points

Overseas

G. Ostman (SM) 925 points
F. A. Weidema (PA) 455 points
M. Caracas (YO) 330 points
R. Kramer (DL) 115 points
P. Drew (VK) 85 points

In the 1964 PACC Contest separate weekends for c.w. and telephony will no longer be used. The contest period is 12.00 April 25 to 18.00 April 26. All bands between 1.8 and 30 Mc/s may be used. It should be noted that Netherlands stations are only licensed to use the segment 1825 to 1835 kc/s and by mutual agreement c.w. only will be used in this small sub-band. Cross band and cross mode contacts are

not permitted. For stations outside PA0 the eleven provinces give one point per band for the multiplier, thus the maximum obtainable is 66. Logs must be postmarked not later than June 15, 1964 and should be sent to P.v.d. Berg, PA0VB, Contest Manager, VERON, Keizerstraat 54, Gouda, Holland, with a signed statement that the participant has observed the contest rules as well as the amateur radio regulations in the operator's country.

Awards

The **Directory of Certificates and Awards** is published quarterly from January 1 and single copies cost 18s. 6d. This amount covers the *Directory* only and the revision service is no longer available. A three-ring binder, if required, is available at an additional 7s. 6d. The **Extra News Letter** combines the former news letter and the *DX-QSL-NL*, containing the information on thousands of QSL managers and world bureaux. This publication is available quarterly at a cost of 15s. Both the *Directory* and the *News Letter* are produced by K6BX as a non-profit service and may be ordered direct from the USA or from G2BVN at the figures given above. In order to avoid the accumulation of stocks of out of date books all publications are despatched direct from K6BX to the subscriber.

Following the discontinuance of the Sideband feature formerly edited by K2MGE and K2HEA, in *CQ Magazine*, the listing of the **Sideband Certificates** has been taken over by W2DEC, the DX Editor of *CQ Magazine*. It is anticipated that the Worked 50 and Worked 75 certificates will be now discontinued, but cards for the Worked 100, 200 and 300 certificates may be sent, as before, to G2BVN for checking. The Honor Roll listing in *CQ* will be resumed in the near future.

QTH Corner

AP5GB	via W4EC1, 3101 Fourth Avenue So., Birmingham 5, Alabama, USA.
CE0AC	via CE3HL, V. Pascual, PO Box 5050, Santiago, Chile.
CR6FW	Box 156, Benguela, Angola.
CR7GF	Box 812, Lourenco Marques, Mozambique.
CR8AD	Defesa Maritima, Dili, Portuguese Timor.
DUIMR	M. Reico, 2660 T. Ayala, Singalong, Manila, Philippines.
ET3PT	via W8IEB.
HC8FN	via W2WUV, V. Bowers, Box 296, Massapequa, Long Island, NY.
MP4TAS	via G3KDE.
OH2AH/0	via Hammarlund DXpedition QTH (see ZD6PBD).
PZ1CM	Box 71, Nickerie, Surinam.
SUIIM	I. Mohamed, 7 El Roda St., El Roda, Cairo, Egypt.
TN8AD	C. Duvaut, B.P. 1095, Pointe-Noire, Rep. du Congo.
VK9GL	via W1ETF.
VP1TA	P.O. Box 488, Belize, Brit. Honduras.
VP2KM	Box 152, St. Kitts.
VR1B	via VK2EG.
VR1G	via W6BSU.
VS1MB	via K7GCM, 15929 Main St., Bellevue, Washington, USA.
VS1ME	I. H. Crowther, 390 MU, RAF, Seletar, Singapore, Malaysia.
ZD6PBD	via Hammarlund DXpedition, GPO, Box 7388, New York 1, NY 10001, USA.
ZS9A	via W8EFS.
5A3CJ	via GM3MBS, 11 Rowand Avenue, Giffnock, Renfrewshire, Scotland.
5H3JL	Box 127, Singida, Tanganyika.
5H3JR	via W2SNM.
5R8AI	B.P. 168, Tananarive, Malagasy Rep.
6O6BW	via WA4FXE.
9G1DZ	A. Bardewyck, PO Box 1974, Accra, Ghana.
9Q5UC	Box 1459, Leopoldville, Congo.
9A1VU	via DL1VU.

RSGB QSL Bureau: G2MI, Bromley, Kent.

Around the Bands†

The 1.8 Mc/s band has produced considerable DX during the past month, although our correspondents report widely varying conditions. However, they are all in agreement with **B.R.S.20317** (Bromley) who says "QRM is appalling." Nevertheless **G3RAU** (Bristol) provides an excellent list of stations worked: K1LJK (05.51), KP4ALD (00.12), OH2YV (01.50), OH3NY (00.30), OH0NI (05.47), VE2LIQ (06.50), VE3AGX (07.04), W1BB/1 (06.17), W2GGL (06.02), W8GDQ (06.35), ZB1BX (05.30), 9A1VU (01.55). The W/VE stations were received at RST 349 to 569, but the others were, in some cases, up to 589. Although **G3RAU** made his Stateside contacts in the early morning, both **B.R.S.20317** and **A.2340** (Plymouth) report W1BB/1 and other Ws from 22.00 GMT onwards. **A.2340** also logged HB9CM, PA0PN, OK1ADM, DL1FF and 6YAXG at 05.40 on the 1805 kc/s (569). A QSL return was received in eight days and 6YAXG commented that it was the first evidence of his station being audible in the UK that he had received this season. He recommends 1810 kc/s as the best frequency for QSOs, but this would cause QRM to the Ws trying to work Europe around this frequency. Finally, 9A1VU (23.00) provided a new country and at times was up to strength 8. QSLs should go via DARC. All the above reports were on c.w.

B.R.S.20317 (Bromley) found fair conditions for the second 160m test on December 15, 1963. W1BB/1 was the best at S7, and the rest nearer S3 to 4. Three new stations were heard: K1LJK, W2BYM and W4BAV in addition to the regulars. VE4RO was reported to be on 1.995 Mc/s, but nothing was heard at Bromley during one hour's listening and searching.

G5ZT (Plymouth) used his 600 ft. wire aerial running east-west to effect QSOs with VE2ATU (06.25), W1BNQ (07.15), W1WY (07.30), W2IU (07.40), W1BB/1 (07.45), ZB1BX (05.40), OH0NI (06.40), HB9CM (07.40), VE1ZZ (04.50), 9A1VU (06.24), W2EB (04.48), W2GGL (05.01), W2KQT (05.15), VE2UQ (05.20), W1BHQ (05.40), W1TX (06.00), W2EQS (06.07) and W2UWD (06.15). It is good to know that even the sunspot minimum has its compensations, and in this connection it is interesting to see the yearly QSO records of W1BB listing the number of different stations worked each season. 1954/5: 19; 1955/6: 26; 1956/7: 20; 1957/8: 10; 1958/9: 4; 1959/60: 5; 1960/1: 11; 1961/2: 31; 1962/3: 34; and 1963/4 to date has yielded 63. A QSO with 9A1VU brought the Top Band country total at W1BB to 75. Who said that DXCC on this band was impossible?

The consensus of opinion on 3.8 Mc/s is that whilst conditions vary from good to poor, severe QRM makes DX exceedingly hard to find. **A.2340** (Plymouth) logged a comprehensive s.s.b. list including OX3JV (23.00) EA9AZ (07.00), PY2QT (07.15), YV5ANS (08.00), 4X4DK (21.00), F9RY/FC (00.30), OH0M (23.00), LX1BW (22.15), 5A1TW (23.00), 9A1CWN (23.50), 5A3CJ (21.35), ZL1AIX (08.00), ZL3UN (08.17), ZL4LM (08.15), ZL4OD (08.07), OY7ML (22.00), VP9DL (23.00) and KP4AWH (07.15). VS1LP was heard through heavy QRM at 23.00 with weak signals. 5N2JKO heard at 22.00 was much weaker than at his usual time of 05.00. A new one for the band was 7X2VX at 22.30. **B.R.S.20317** (Bromley) found W/VE at poor strength around midnight. Also logged was HK4DP (01.35) at RST 449 and LA9FG/P (00.15) at S6 who produced some turmoil amongst the DXers.

The 7 Mc/s band is undoubtedly producing very good conditions but more reports are needed for an accurate assessment to be made. Fortunately, **B.R.S.20317** (Bromley), now in his 10th year of monitoring the bands, provides his

† Compiled by J. G. Cottrell, G3PSY

regular c.w. round-up. Generally, he observes that the band is patchy with openings occurring to distant places at unusual times. Conditions by continent were as follows.

Asia: Best DX at S7 was AC7A (14.15 to 00.00), KR6BQ (14.15) and KR6NG (11.10). Also BY1PK (15.10), MP4BEE (14.15), MP4BBE (10.50), 4S7WP (01.15) and VS1VZ (14.55). Japan was also heard quite well on long path at 08.30, including JA5YAP and JA1BRK. The short path between 10.00 and 14.15 gave all areas JA1 to JA6. Plenty of UA0 stations were present including UA0KIB at 15.30, located at Pevek in the Siberian Far East.

Australia: Open between 11.55 and 15.00. VK2HK (11.56) was heard at S4, and VK5ZP (14.22). There were also VK2QK, NS, 5GP and PC, all at S4 to 5.

Africa: Patchy, but often with good conditions in the early evenings. ZS was resolved at 19.00, and later 6W8/9L2 appeared. Also VQ2WR (17.45) and 5N2JKO (06.30).

North America: Workable through the day but sometimes falling right out in the small hours. Apart from the usual areas, OX3AY at 14.08, VE8RN (16.45), WA4MFS/VO1 (17.52), W7ETK (14.33) and W0DCA/5 (12.15) provided interesting DX.

Central America: Some unusual openings were noted, namely KV4AA (10.45), VP2KD (12.05), XE1FE (09.50) VP7BG (00.25), VP2MV (00.12), FG7XC (01.45), KZ5FC and many KP4s.

South America: During the occasions that the USA is inaudible, PY/YV stations are at good strength. Stations heard include PZ1CM (02.00) (Box 71 Nickerie), FY7YK (01.25), HC1LE (00.30) and PY9JF (00.12).

A.2340 (Plymouth) provides some unusual DX in the following list. VK0VK (17.50) (Windmill Island), VQ4IV (20.01), TF3AB (20.10), and XZ2ZZ (19.36) though this is a somewhat dubious call. Also heard were many 4X4s, most of the USSR republics, SV1AL (21.00), SV1YY (04.30), SV0WAA (17.35), ZL1MQ (08.15), ZS6KW and ZS6DF, both at 19.15. A.2340 also confirms many of the stations logged by other reporters.

G3LPS (Blackburn) unearthed most of the DX available bringing his score on this band to 131 countries in 35 Zones: AP5GB (23.50), MP4BEE (15.27), PY7ACS (23.48), UM8KAA (00.15), VK4VB (15.10), VP2KJ (00.55), VS1LP (15.06), W6s 15.30 to 16.00, ZL3JD (09.24), 6O6BW (23.20), and 9Q5AB (01.15). Despite TVI troubles G3PVS (Woking) QSOd MP4BEE (20.37), SV0WAA (17.50), TF3AB (18.04), VS1LU (17.56), UA1KAE/1 (19.20), ZB1RM (17.56) and various UM8s, UI8s and 4X4s after 20.00. **G3JAG** (Rochdale) found the month interesting although generally conditions were poor, John hopes partially to offset this decline by erecting a new 60 ft. vertical, weather permitting. His "DX of the month" was South Georgia, from where VP8GQ put in an unexpected appearance; it is believed that many operators were under the impression that 'GQ' was in the Falkland Islands which was his next advertised destination, but in fact he stopped off en route at S. Georgia. The log at G3JAG records the following QSOs: KC4USK (00.05), PX1RX and YV5ASP (00.10), UM8KAA, VP2KJ and MP4BBL (01.40), between 08.00 and 10.00 ZL3KN, ZL3JD, VK2NS, JA5ACD and 9A1VU were worked, VE8RG (16.45), OX3DL (18.00), SM5BKK/9Q5 (18.50), KP4AOO (23.00) and VP8GQ (23.50).

G3LPS also worked EL2AD (23.44), CN8FW (23.52), CN8GB (22.39), W6ULS (14.50), W2JAE (13.18), W6GRX (15.50), W6ILP (15.30), PY7ANS (22.55) and 5Z4IV (23.08). 9L1TL was heard at 22.25 working East Coast American Stations. **G3SEP** (Great Yarmouth) adds two interesting maritime mobiles: Y04WR/MM at 19.55 off the Kent Coast, and JA6COM/MM at 19.58 in the Gulf

of Aden, both on c.w. OZ5S (Copenhagen) found 5B4CZ (23.25) and UD6BD (23.16).

Despite the early evening close-down, **14 Mc/s** still provides the most DX and reports. The notable occurrences during the month have been openings to ZL and VK, particularly over the Christmas period. Your compiler **G3PSY** (Thorpe Bay) worked c.w. with VK6RS (14.52), VK4KS (11.51), VK2APK, VK2EO, (10.46), VK3MO (11.41), ZL4GA (09.36), ZL2VN (11.09), HL9KA (09.04). From the South came EA6AM (12.40), MP4QBF (09.06), ZS2RM (18.46), 9Q5SC (18.58), 9Q5CT (19.32), IT1PA (15.49), FB8ZZ (16.08) and CN8GC (15.36). At the beginning of the period, West Coast Ws were to be heard, but faded out during January. On s.s.b., G8JM (London) worked TT8AJ (16.40), KV4CF (11.35), 5N2RSB/TJ8 (16.30) VK0VK (17.05), ZD6PBD (17.20), MP4TBA (09.20), HZ2AMS (12.05), XE1CE (14.50), KR6CF (09.35), VP2KM (15.35), 9K2AN (08.50), 9M2DQ (14.50) and ZS8Z (16.03). C.w. yielded 9L1NH (16.58), 5H3HZ (15.35) and UA1KAE/1 (19.40) in Russian Antarctica. **G3SEP** (Great Yarmouth) worked c.w. with UJ8AR (09.14), 6W8AB (09.59), PY1MCC (09.06), HK3NQ (12.15). **A.3374** (Manchester) logged s.s.b. from 4U1SU (13.52), UG6BR (13.54), TG9AD (14.07) using a long wire 40 ft. high into a modified R1155. **A.3233** (Edinburgh) heard s.s.b. from VK2DD (13.40), JT1CA (09.19), VK6YU (13.40), and c.w. from KV4DE (12.30), MB4BWV (13.40), ZL1AZXB (14.02), VS9LA (18.27) and VK9D (18.40) on Christmas Island. **A.3699** (Renfrewshire), found a.m. from UO5KRU (14.14), 5NZEBO (09.24), PY7BLM (09.17), VK6LG (13.47), VK6DR (13.19), VK3VV (13.29) and VK6RE (14.05). S.s.b. was logged from 3A2CP (12.14), MP4TBE (12.44), VS9HRK (16.05), VS9HAA (17.55), ET3GC (14.37), ZS5CZ (15.46), ZS6Q (15.55), EA9AZ (16.05), KG6SJI (08.05), XE1AB (09.25) and many VKs.

A.2111 (Ilford) heard XW8AL (14.11), HS1S (14.13), and PZ1AX (18.17). **A.2498** (Evesham) uses an AR88, and a 132 ft. long wire running east/west. Loggings included CR6BZ (18.45), CR6FY (17.05), CR7CR, GF (18.00), EA8CM (11.45), EL3D (18.30), FG7XR (17.45), H18XHS (11.45), HK3LX (16.20), HZ1AB (13.15), LU6MR (11.35), OA4PD, PX (11.50), OD5AX (14.25), TI2CML (13.25), TT8AJ (22.45), many VKs, VP6 and VP7. Also 6O1WF (14.10), 9G1EO (17.10) and 9L1RO (11.45). **A.2340** (Plymouth) reports LE3AG (21.00), CP5CF (20.00), 9N1MM very active from Nepal around midday, HB9AET/4W at S9 (13.30), all on s.s.b. The c.w. mode produced AC7A (08.15), VS9ADV (a.m.), TC32A, VS9OC, AP5HZ and YA1BW (12.00), FR7ZD on Reunion Is. (14.00), CR8AD on Timor (13.50), 5R8AB (17.00), VR1B (08.15) and ZL4JF on Campbell Island. **A.3573** (Sweden) found rare 9K2AN at Z35 and UA0KYA (08.20) in Zone 23.

Short skip is troublesome throughout the day and is also appearing during the evenings. This provides European contacts although generally with much QSB.

The **21 Mc/s** band contained much activity in December, but fell off during recent weeks. **OZ5S** (Copenhagen) reports c.w. with CN8FW (10.55), W2CTN (15.06), UA9KDP (10.45), VQ8AM (13.15), YV5BMY (13.40). **A.2498** (Evesham) logged s.s.b. from KZ5LW (14.45), SV1AB (10.40), ZS8Z (14.50), and a.m. from EA8DR (14.40), ZE7JR (11.05), ZE8JK (14.45), ZS1BV (12.05), ZS2NG (11.20), ZS6U (11.10), 5N2FEL (14.35), 5N2JKO (10.35), 6W8AE (11.20) and 9G1EC (11.20). **G3SEP** (Great Yarmouth) worked ZS5K1 (14.44) and 9Q5AF (12.35) amongst others on c.w. **G8JM** (London) reports a.m. from ZD3A (11.30), PY7AKW (16.40) on Fernando Noronha, and c.w. from FR7ZD (09.50). **G2BJY** (Walsall) confirms the poor conditions and writes that no contacts of note have been made since early December. Little improvement can be now expected for some months, and in view of the sunspot

minimum in 1964, no real improvement is likely even in the summer.

No reports have been received for 28 Mc/s, and it is unlikely that anything will be heard before next summer.

DX Briefs

Norfolk Island is the destination of G3PJN, R. Hattersley, who hopes, in due course, to be active from this dxotic spot.

ZL4JF on Campbell Island is active and searches for DX QSOs during the period 06.00 to 08.00 on 7 and 14 Mc/s. (VK4SS).

W9TSS, Bus Howell, of East Alton, Illinois, is active on the 28, 21 and 14 Mc/s bands with 150 watts, and would appreciate contacts with UK stations particularly those with an interest in recording.

The following stations will be active on **Jan Mayen Island** during the coming year: LAs, 1LG, 4WH, 7IH, 9GI, 9MI and 9PI, all operating/P. (LA5HE).

CR8AD in Dili was worked by G2FFO on 14,045 kc/s c.w. at 13.20, the outgoing report being RST559. The QSL address will be found in *QTH Corner*.

UA1KED on Franz Josef Land is active on most days on 14 Mc/s c.w., the favourite frequencies being '040 and '060 kc/s. QSLs should be routed to RAEM.

Three new stations active from **Laos** on s.s.b. are XW8s AF, AU and AV.

Since returning to his former African haunts, **ZD6PBD** (formerly G3PBD) has contacted 100 countries in the first five weeks of operation, using a KW Electronics KW2000 and wire aerials, usually of the dipole variety. (G2HFD).

ZB2A, the RAF club station on Gibraltar, is now again active following a rebuild, and is running 100 watts to a long wire aerial, and has been well heard on 21 Mc/s. (G2HFD).

VS1MB is active almost daily on s.s.b. using KW Electronics equipment, the usual hours being between 11.30 and 15.00. QSLs should go to K7GCM.

Correspondents are thanked for their co-operation in providing news items and reports, and acknowledgement is made to the *West Gulf DX Club Bulletin* (W5IGJ), the *LIDXA Bulletin* (W2MES), *DXpress* (PA0FX), the *Florida DX Report* (K4IIF) and the *DX'er* (WA6TGY). Please send all items to RSGB Headquarters to arrive not later than **February 7** for the **March** issue and **March 11** for the **April** issue.

The European Band Plan

The plan, which is voluntary and supported by all IARU Societies in Europe, is as follows:

Frequency Band Mc/s	Type of Emission
3.5 — 3.6	c.w. only
3.6 — 3.8	phone only
7.0 — 7.05	c.w. only
7.05 — 7.1	c.w. and phone
14.0 — 14.1	c.w. only
14.1 — 14.11	RTTY and c.w.
14.11 — 14.35	c.w. and phone
21.0 — 21.15	c.w. only
21.15 — 21.45	c.w. and phone
28.0 — 28.2	c.w. only
28.2 — 29.7	c.w. and phone

Kuria Muria Expedition (Continued from page 94)

The equipment worked as well as expected, with two exceptions. The 32S3 blew up a bias electrolytic capacitor and we were off the air for about 40 minutes in the midst of two very big pile-ups. One generator shorted a primary turn and this kept us off the air for about 30 minutes. I was on at the time and I hope that the F station I was working got his report. We had one bad sandstorm on our last night and a terrific rainstorm. This was useful as we completely replenished our dwindling water supplies from a local waterfall but about half an hour later there was no trace of water.

Details of the complete stations are as follows:

Station A: Transmissions were mainly on s.s.b., except that during periods when s.s.b. stations were not on the air, c.w. was used. The equipment comprised a KWM2, TA33JR, Trap Dipole, and a 500 watt generator. VS9HAA (John) and VS9HRK (Ross) were the operators.

Station B: Transmissions were mainly on c.w. with occasional s.s.b. The equipment comprised a 32S3, 75S3, two 14AVS vertical aerials and a 500 watt generator. The operators were VS9HAA (Gus) and VQ4IN/VS9H (Ken). The results, as totals per band per mode are as follows:

band	80m	40m	20m	15m	10m	totals
c.w.	87	496	2337	1005	6	3931
s.s.b.	7	11	1256	45	6	1325
	94	507	3593	1050	12	5256

The number of different countries worked totalled 131, with one operator having worked over 100 countries.

The daily total of QSOs shown below make interesting reading when it is remembered that a c.w. sweepstake was on during the first weekend, and also the CQ C.W.—DX Contest, but c.w. conditions were not as good as expected.

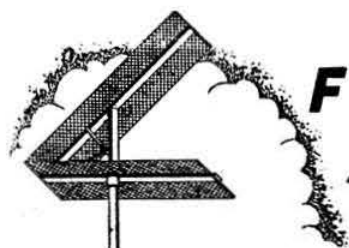
Date	16	17	18	19	20	21	22	23	24
(November) (6 hours)									(12 hours)
c.w./s.s.b.	388	798	588	615	693	667	488	756	263

We should finally like to offer our sincere thanks to those who helped to make the trip so successful, namely: Squadron Leader Silvester and his party who gave much practical assistance; the World Wide Propagation Study Association; the Shell Oil Co. Ltd. who supplied 175 gallons of petrol for the generators; Mosley Electronics who solved a complicated problem in relation to trap aerials; and to the many others who did so much to help.

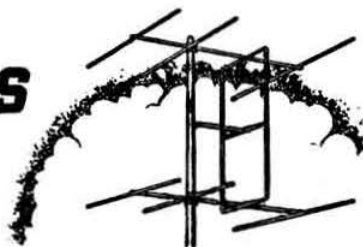
Theft of Police Radio Equipment

A quantity of radio equipment was recently stolen from a Home Office Radio Station near Folkestone. The Superintendent of Police thinks that the equipment may be offered for sale and has asked that the following details be published: Pye PTC703 receiver, PTC353 r.f. unit, PTC357 power unit, link receiver, and selective tone receiver. These units are all rack mounting. In addition there was a cardboard box containing 73 valves and some fuses.

Should any of the above equipment come to light, members are asked to contact the nearest Police Station or the Superintendent of Police, Folkestone, Kent.



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW *

WITH the advent of high quality broadcast transmissions on u.h.f., experience gained in constructing receiving equipment for 430 Mc/s will almost certainly be put to a rigorous test by those who are enthusiastic enough to experiment with apparatus for Channel 33. Designing for the reception of the sound channel is straightforward enough, but the principle difficulty is in attaining a flat response over a bandwidth of megacycles for the vision signal. That this is of practical significance is evidenced by bitter moans from many television servicemen.

G3CCA has recently been spending much time in developing a simple and cheap parametric amplifier which could be used on Channel 33. The converter consists of a parametric stage using a simple diode, and operates as an "up" converter followed by an 1N82A "down" converter and a transistor i.f. amplifier. Through the use of a new type of pump circuit it is possible to tune both the 144 Mc/s and the 432 Mc/s amateur bands on the one converter.

After three weeks of operation some startling results have been recorded. During a sked with G3RND (Pontefract) an astounding effect was noticed, for, irrespective of conditions, and provided that the signal at the aerial did not disappear, no QSB or flutter was recorded on his transmission with the para-converter, but on a valve converter, and also at the Pontefract end, QSB was often present—tape recordings prove this. G3CCA is now active /M, with the sole object of testing the paramp under mobile conditions. Oxfordshire and Huntingdonshire will be visited this year, weather permitting. Dates will be fixed later.

Auroral Communication

G3FZL has sent a very interesting report from SM6PU, who is co-operating in the IQSY programme. A digest of the report follows:

1962 81 days with aurora on 88-100 Mc/s
18 days with aurora on 144 Mc/s

1963, to December 15.

60 days with aurora on 88-100 Mc/s
29 days with aurora on 144 Mc/s

aurora increased considerably after mid-September
After this date

35 days with aurora on 88-100 Mc/s
24 days with aurora on 144 Mc/s

There were very strong aurora on September 22 and October 29. On October 29, SM6PU heard 107 stations in 16 countries: G, GM, GW, GI, ON4, PA0, DL, SP, UP2, UR2, UA1, OH, OH0, LA, OZ, SM.

10 G stations, 7 GM stations, GW2HIY and GI5AJ
—the latter being worked.

Some of the rare countries now audible on 2m will cause

some mouthwatering among the pundits. And, of course, if they appear via aurora, they can sometimes even be worked!

Another Sheepskin for the Collectors

The DARC have introduced a v.h.f. operating award similar to the RSGB Four Metres and Down Certificate, and is available to all radio amateurs, including the United Kingdom. Known as the UKW-DLD, it was introduced on May 18, 1963, although contacts may be back-dated to January 1, 1963, for validity. The award is available in four classes, for 50, 100, 150 and 200 contacts respectively, in accordance with the following rules.

1. Contacts made since January 1, 1963, may be made on any v.h.f. band (i.e., 144 Mc/s and up), using any mode of transmission permitted by the licence held.
2. QSL card proof is required of contacts with 50 (or 100, 150 or 200 for the higher classes) different DARC districts (see below).
3. Mobile and portable stations count for their home district.
4. Applications, which should include all necessary QSL cards, and the fee of 5/-, should be sent to the RSGB V.H.F. Manager, RSGB, 28 Little Russell Street, London, W.C.1, whereupon it will be forwarded to DARC.

The classification of DARC districts explains the appearance on German QSL cards of "DOK" numbers, the reason for which has up to now been rather obscure. These are in fact the local district reference numbers, and it is these which are referred to in rule 2 above, e.g., 50 different "DOK" numbers are required for the UKW-DLD 50 award.

The activity level during Continental openings shows that a large number of G-DL/DJ/DM contacts do take place, and we look forward to seeing who will be the first United Kingdom station to qualify for this award.

South Wales V.H.F. Group

A V.H.F. Group is being formed in South Wales and members interested in joining are asked to contact H. G. Hughes, GW4CG, 20 Austin Avenue, Porthcawl, Glamorgan-shire.

New York V.H.F. Convention

Ed. Tilton, W1HDQ, tells us that there is to be a National ARRL Convention in New York City on August 21-23, 1964, and a special effort is being made to turn this into an international affair, at least in the field of v.h.f.

The East Coast V.H.F. Society had been considering sponsoring such an international event, but in view of the advantages accruing from the proposed National ARRL Convention, the 50th Anniversary of ARRL, and the 1964 New York World Fair, it was decided to incorporate the East Coast Convention with the National event. The objective of the East Coast V.H.F. Society is to persuade v.h.f. enthusiasts from all over the world to attend this affair. Considerable time in the convention programme will be

* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the March issue to arrive by February 8, and for the April issue by March 6.

devoted to v.h.f. matters, and there will be technical and social events, especially for v.h.f. enthusiasts.

It is hoped that many amateurs who may be planning trips to the United States will be able to arrange their itineraries to coincide with the New York Convention. Any visiting v.h.f. enthusiast who wishes to participate in the convention programme will be given a guest ticket, so that he will be able to attend the convention without paying an admission charge.

Yuletide Tailpiece: or Getting Clarry on Two

Relaxing quietly amid congenial company at the North London home of G5DJ on Christmas Night, G6CL was astonished to hear a familiar voice addressing him from the loudspeaker of the television set next to his ear. The voice, that of G5UM, was coming through the G5DJ 2m receiver via the domestic hi-fi amplifier which feeds speakers in various parts of the house.

It was a put up job. Clem, G5DJ, had disclosed to G5UM a few days earlier that the then General Secretary would be visiting him on Christmas Night, and this opportunity to induct Clarry into the pleasures of 2m seemed too good to miss. A schedule was arranged for that Yuletide evening, and numerous Home Counties operators, hearing what was going on, checked in, too, to exchange greetings with "Gen. Sec." in what was believed to be his first time ever on what he called "that exotic band, Two Metres."

EI2W Safe

Our old friend, Harry Wilson, EI2W, and his family were on the ill-fated *Lakonia* at the time of the disaster, and were flown home after a harrowing time in one of the boats. We were all extremely happy to learn of the news of their rescue, and sincerely hope that they are again in the best of health and spirits.

Meteor Scatter

G3LTF (Galleywood) has had two more near misses with UA1DZ (Leningrad). During the Geminids (December 13) he copied everything, but the results at Leningrad were unsatisfactory. In the Quadrantids on January 4, G3LTF missed only his own call-sign. LZ1DW eluded G3LTF by a small margin on January 4, but the trouble was confusion with the QSO method—G3LTF copied the Bulgarian station very well this time!

On January 3, during the Quadrantids, SM and OZ were coming in, and also HB, LX and Southern DL, but G3LTF only worked SM7CJZ. OZ7IGY was heard. Later in January, conditions were good to northern England with many QSOs to stations in the Yorkshire area. On January 9

there were four two-way s.s.b. QSOs in a row: G6CW, G8SB, G3ILD and G3CCH. A great number of people now seem to be building for s.s.b. judging by comments heard by G3LTF.

Meteor bursts are frequently heard on 4m mainly from Czech f.m. broadcast stations which appear to use the band. A beacon can also be heard from a SW direction on approximately 70.26 Mc/s radiating a two-second dash on c.w. every 10 seconds. This has been heard on different i.f.s and is thus not 2nd channel reception.

In a letter to the V.H.F. Manager, SP5FM of Warsaw asks to be put into touch with any G stations who are prepared to make a series of MS skeds with him. Those interested are asked to write to: Wojciech Nietyksza, SP5FM, Komotow K/Warszawy, Slowackiego 1, Poland.

The equipment in use at present is 200 watts to a 10 element Yagi, and a converter with a noise temperature of 2kT°. During the Geminids shower, SP5FM very nearly pulled it off with LZ1AB, except for one part of a call-sign. Incidentally, SP5FM writes and speaks English very well.

Four Metres

G3GVM (Worthing) says that the 4m group on the south coast are still going strong. So far, the score is 17 stations, with more activity in the offing, as several of the SWLs are taking the RAE. There are probably as many as 10 SWLs using all types of equipment from converter tuners to Nuvistor converters. Stations can now be heard on most evenings, and the QRM sometimes becomes quite a problem. The normal local working frequency is 70.26 Mc/s, but many stations can QSY if necessary. Both vertical and horizontal polarization are in use, but the mobile operators all use quarter wave vertical aerials and coverage is good considering the very hilly country. It appears, however, that the RF27 unit in general use is not good enough, and that this may account for the supposed lack of activity. Stations calling CQ have often been called only to be heard to continue calling CQ.

The following is a list of active 4m stations between Eastbourne and Portsmouth: G5QS, G8RO, G2DSP, G3CNO, G3GFN, G3GVM, G3JLO, G3LYH, G3MZO, G3ORR, G3PUR, G3RMY, G3JHM, G3RTI, G3KLX, G3SFE and G3SGA.

G3MYI (Leicester) has been on 4m since early November, and among his equipment is a transmitter running 50 watts to a QV06/40 p.a. on A1 and A3. The aerial is a 6 element wide spaced Yagi at 40 ft., and the height above sea level is 200 ft., with a fairly clear take-off all round. Many Manchester stations are always to be heard, with G3JZN as the most consistent and G3CLW (Bromley) as the best from the London area. TVI has been troublesome, but with horizontal polarization and wavetraps in nearby TV feeders the trouble has almost been eliminated. At the moment, a transceiver type of exciter is being built using G2DAF type receiver oscillators (b.f.o.-crystal; h.f. oscillator-variable) feeding the exciter to give A1, A3 and A3A output on 1.8 to 3.0 Mc/s, and then from 21 Mc/s to 70 Mc/s and 28 Mc/s to 144 Mc/s. This should help with the TVI problem.

G3FDW (Gosforth, Cumb.) with a new Nuvistor converter in use, can now hear stations consistently as far away as G3EHY, and on a recent Sunday G5JU (Birmingham) was heard working G3EHY when G5JU's Beam was directed south! The conclusion has been reached that a good converter is necessary for 4m but that it does not necessarily bring any QSOs, the reason being that too many other people appear to be using poor front-ends. On January 5, 4m opened up at about 11.00 GMT, and signals between G3FDW and G3EHY (Banwell) peaked to S7/8 and a solid QSO lasting 40 minutes took place. Otherwise, however, there appeared to be little on the band. G3FDW is now constructing an s.s.b. transmitter which, with a QV06/40A

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
November 26, 1963	11.53 GMT	2490 c/s high
December 3, 1963	11.40 GMT	2540 c/s high
December 10, 1963	17.20 GMT	2950 c/s high
December 18, 1963	12.15 GMT	3065 c/s high
December 23, 1963	11.50 GMT	3300 c/s high
December 31, 1963	15.55 GMT	3280 c/s high
January 7, 1964	13.00 GMT	3236 c/s high
January 14, 1964	12.00 GMT	3210 c/s high
January 21, 1964	11.50 GMT	3304 c/s high

p.a. should give about 150 watts p.e.p. input. GM3FDW/P recently had a QSO with GW3MDY and wonders if this is a first GM/GW. G3FDW considers that the G8PD/A 70 Mc/s chart on page 40 of the January 1964 issue is a masterpiece, and wishes to thank him for the first class information. For future portable work, G3FDW will try to work on either 70-22 or 70-395 Mc/s.

G3KEP (Nr. Blackburn) is building a transmitter for 4m which may be in operation at the time of publication.

A list of claimed scores for the 70 Mc/s C.W. Contest follows. This is not a result, and the scores are subject to checking.

G3PIA/P	3302	G3ORE	715
G3OXD/A	3011	G2AXI	702
G8PD/A	2922	G3FD	664
G3MYI	2312	G3OKJ	657
G3KEU/P	1623	G3GOX	649
G3BJD/P	1602	G3OHH	601
G3OJE/A	956	G3HWR	488
G3PHG	932	G3PLX	408
G3SRC/A	908	G3YH	221
G3JKY	746	G2BJY	219
G3JEQ	735	G3ICO	173
G3PKJ	725	G3PDT	169

Seventy Centimetres

G3LHA (Coventry) comments that G3KEF and G3RYB/T are both fairly active from Coventry. In spite of poor locations in both cases, they appear to be active whenever conditions are good. G3KEF now has an aerial at 33 ft. (8-over-8 slot fed Yagi). G3NBQ and G3LHA have not been able to operate much lately, owing to other commitments, but they hope to be on when conditions are good. G3OPB/T (Epsom) was heard by G3LHA on December 28 for two hours at S9, but no QSO resulted. He was in cross band QSO with G3OSS (who was on 2m). G3LHA uses BBC Channel 1 as his guide for 70cm conditions. Normally, Channel 1 on an indoor aerial is unresolvable, but when it is reasonably strong, 70cm is usually open up to 100/150 miles. GB3GEC has not been heard for several weeks, but G3NBQ can usually be copied under various conditions. Congratulations are offered to G3NNG/P on being top portable station in the 2nd 420 Mc/s contest in October. More portable activity is needed on this band, and a special section might possibly provide a solution.

G3NBQ (Coventry) reports that G3RYB/T has nearly completed a camera, and should be transmitting video within a few months. CNOTA (Coventry Night on the Air) on 70cm is always on Wednesdays at 20.00 GMT. Stations in Coventry first work each other, and then look around for others outside the area. On the evening of January 3, an opening was recorded by G3KEF, G3LHA and G3RYB/T; PA, ON, F and SM being heard and called, though not raised. As often happens, the DX appeared to be working only south-east England stations. G3RYB, G3MXW, G3MYD, G2CIK, G3RJR and others are very often on the band with both audio and video signals.

Tropo conditions were very good to France and Belgium on December 28, according to G3LTF, who worked F3LP and F3XX on the band at S9+.

Picture transmissions from G5FS/T at Bristol Technical College are now being made each day and reports will be welcomed. Further information may be obtained from G5UH.

Twenty-three Centimetres

The following report on 23cm was submitted by **G3NBQ** (Coventry). In the Midlands, G3KPT (1298-1 Mc/s), G3KFD (1298-22 Mc/s) and G2CIW (1298-25 Mc/s) are now fully equipped for both transmission and reception and are very active. On September 8, G3NBQ received G3MAR/P (22

miles) at RS59 on 1297-08 Mc/s. G3MAR was using equipment owned by G3KPT. On January 2, 1964, G2CIW (19 miles) was received at RST 5-5/6-9. G3NBQ's equipment is an 8-over-8 slot aerial at 35 ft. and a crystal mixer converter with a 27 to 31 Mc/s i.f. Work is proceeding with a trough aerial, a QQV04-16 tripler and a 2C39A tripler. A 2C39 equivalent tripler and a corner reflector are also used.

All four stations mentioned are using converters built from a design in the ARRL Handbook, and is recommended to anyone who wishes to operate on 23 cm. It is simple to build, simple to align, and works well. The line-up can also be changed, if desired. G3NBQ uses two 6J6s, a 6AK5, and a GEX66 in the oscillator chain, with a CV364 as the mixer. Other stations who are interested in 23 cm and hoping to acquire the necessary equipment are G3RYB/T, G3LHA, G3KEF and G3OVQ.

Two Metre News and Views

GW3LJP (nr. Llandrindod Wells) was in QSO with PA0LX on December 3, and was materially assisted to success by G3SAR (Sevenoaks) who had previously worked the PA station and asked him to look out for GW3LJP. The QSO started on c.w. and later went on phone. It had previously been impossible to raise the PA, but G3SAR's help gave GW3LJP the rare pleasure of his first PA QSO over a very difficult path.

TABLE I

Month	1955	1956	1957	1958	1959	1960	1961	1962	1963
January	15* 4† 0‡	25 6 3	14 3 0	— — —	10 1 —	8 3 0	14 4 0	29 2 0	(3) — —
February	9* 1† 0‡	11 2 0	14 4 0	— — —	14 8 —	— — —	17 9 2	23 2 0	5 2 0
March	24* 12† 0‡	17 5 0	23 11 0	— — —	9 1 —	(2) — —	20 9 0	25 9 0	5 2 0
April	27* 19† 1‡	13 3 0	22 15 0	— — —	16 4 —	19 2 0	13 5 0	13 10 0	5 0 0
May	24* 14† 1‡	16 8 0	17 6 —	— — —	23 18 1	13 4 —	28 18 1	24 5 0	9 2 0
June	8* 4† 0‡	23 11 1	12 11 2	— — —	15 7 1	16 8 0	28 18 1	26 10 0	21 8 1
July	21* 20† 1‡	21 14 1	15 9 4	10 4 0	12 5 1	4 1 0	31 15 1	30 11 0	6 4 0
August	25* 16† 1‡	12 3 0	15 5 1	8 5 0	15 11 3	(2) — —	14 7 2	16 7 1	5 4 0
September	20* 14† 2‡	25 10 3	8 2 0	16 10 1	20 16 1	20 17 1	30 14 1	27 11 7	12 11 1
October	20* 10† 0‡	18 11 1	13 6 0	7 4 0	7 4 0	9 5 0	27 5 0	21 12 1	10 6 0
November	28* 19† 0‡	24 12 0	— — —	10 3 0	9 2 0	10 6 0	26 5 0	10 6 0	(1) — —
December	22* 5† 0‡	16 6 0	(1) — —	10 2 0	4 1 0	10 1 0	30 5 1	9 4 2	12 4 0

* Days monitored. † Days of good DX. ‡ Days of good C-DX.

TABLE 2

Percentage of days with DX or C-DX	1955	1956	1957	1958	1959	1960	1961	1962	1963	Average of total period	Month
DX	33	24	21	—	10	38	29	7	—	20.0	January
C-DX	0	12	0	—	0	0	0	0	—	2.7	
DX	11	18	29	—	57	—	53	9	40	30.2	February
C-DX	0	0	0	—	0	—	12	0	0	2.2	
DX	50	29	48	—	11	—	45	40	40	39.8	March
C-DX	0	0	0	—	0	—	0	0	0	0	
DX	70	23	68	—	25	11	39	77	0	45.3	April
C-DX	4.2	0	0	—	0	0	0	0	0	0.8	
DX	58	50	35	—	78	31	64	21	22	48.7	May
C-DX	4.2	0	0	—	4.3	0	3.6	0	0	2.0	
DX	50	48	92	—	47	50	64	38	38	51.7	June
C-DX	0	4.3	17	—	6.7	0	3.6	0	4.8	4.1	
DX	95	67	60	40	42	25	48	37	67	55.3	July
C-DX	5.0	4.8	6.7	0	8.3	0	3.2	0	0	3.4	
DX	64	25	33	63	73	—	50	44	80	52.8	August
C-DX	4.0	0	6.7	0	20	0	14	6.2	0	7.8	
DX	70	40	25	63	80	85	47	41	92	59.0 (max)	September
C-DX	10	12	0	6.3	15	5	3.3	26	8.3	11.0 (max)	
DX	50	61	46	57	57	56	19	57	60	47.8	October
C-DX	0	5.6	0	0	0	0	0	4.8	0	1.6	
DX	68	50	—	30	22	60	19	60	—	45.2	November
C-DX	0	0	—	0	0	0	0	0	—	0	
DX	44	38	—	20	25	10	17	44	33	24.3	December
C-DX	0	0	—	0	0	0	3.3	22	0	3.0	
Yearly Averages											
DX	59.2	41.2	47.1	45.8	50.7	43.2	41.0	35.2	47.8	45.1	
C-DX	2.6	4.1	2.6	1.6	5.8	0.9	3.2	4.3	2.2	3.4	

Sincere thanks are extended to G3SAR and also to VRZA, who gave a great deal of assistance and forwarded information and lists of Continental v.h.f. stations. The Welsh station is at 720 ft. a.s.l. but is surrounded by higher mountains with Radnor Forest (up to 2200 ft. a.s.l.) to the east. The rig at GW3LJP is a QV06/40 p.a. (75 watts) and the aerial a seven element Yagi at 37 ft. Two receivers are owned, (1) a G2IQ tunable converter into an R208 at 11.5 Mc/s and (2) a fully transistorized receiver which uses a 1742 r.f. stage, 1743 mixer, OC171 tunable oscillator, and has three 26.5 Mc/s OC171 i.f. stages. A crystal detector is used, and the maximum output is 250 mV. The PA QSO was taken on this transistor receiver for the first 10 minutes and then a comparison was made by finishing on the valve receiver.

With reference to G3HRH's recent remark that October was not to be despised as a DX month, B.R.S.22550 (Drybrough, Coventry) has been compiling 2m facts and figures over the last nine years or so, and has found this to be reasonably accurate. The station is in a fairly low location in a busy area and the aerial height has never exceeded 30 ft. The minimum distance to be deemed DX is 50 miles, and stations beyond 150 miles, i.e., continentals EI, GI, GD, GM and GC are termed C-DX. Listening times have generally been random, except for a concentration on evenings and weekends and a tendency to stay active when conditions were good. The findings, reproduced in Table 1, give the actual number of days, month by month from January, 1955, on which B.R.S.22550's station was active. The number of days per month for which DX and C-DX were logged are shown separately. Table 2 shows the average of the percentage of days per month on which DX and C-DX were logged

during the nine years, and also as an average for each year. It will be noticed that, for that particular location, September is the best month, but October, while not next in line, is not too poor. One surprise was the good showing of the December to January period for C-DX. It should perhaps be noted that July and August, and to some extent, June, were holiday months and thus less well sampled than during the rest of the year.

The highly individual nature of these results has been emphasized since G6NB was heard to say on January 3 that the band was crowded with Continentals, when not a whisper of them could be heard by SWL Drybrough! They were audible in the area, however, for G3RMB worked many with reports of S8 to S9.

G3XC (St. Columb, Cornwall) still finds time to put out a nightly CQ on 144-004 Mc/s at 21.00 GMT beaming towards London, but there appeared to be little activity at the beginning of the new year.

G3MTG (nr. Bridgewater) moved from the Bath area last August, and has since been operating with 25 watts to a temporary 12 element fencing wire Yagi at a height of about 12 ft. The beam can only operate between NW and NE. The best DX to the north has been G3RND (Pontefract) with many excellent contacts at shorter distances. On January 3, PA0ACG (10km south of Amsterdam) was worked with the aerial NE, which must prove something!

As this QTH is good in different directions from the old one, the opportunity of exploring pastures new has presented itself. Cornish friends, notably G3EKM, G3OCB, G3XC and G3OJY are missed, but it is hoped they will re-appear when the 6-over-6 at 35 ft. is erected. From December 7

BOOK THE DATE—

TENTH INTERNATIONAL V.H.F./U.H.F. CONVENTION

Saturday, May 16, 1964
Kingsley Hotel, London

to January 3 the following were worked: G3SJI, G3ICO, G3BOC, GW3PDI, G3PTM, G3BA, G3KUJ/M, G3CHW, G3RMB, G6RK, G3LAS, G3FUR, G6LQ, G3DKF, G2AUD, G3MPS/M and GW8NP.

G5MA (Gt. Bookham) has again been having good results, with HB9WB/P, F8VN, F3SZ and GC2TR worked on December 28, HB9LN and LX1AL on January 3, PAs, ONs and Fs on the 4th, and G13GXP on the 6th. It is many years since G5MA last worked Jersey, and he is very pleased about all these latest DX QSOs.

G2BJY (Walsall) found conditions generally rather poor during December despite some above average openings to the south coast. There have been two continental openings, the first on December 28 when F3NG was heard having a field day working queues of G stations over the h.f. end of the band. He was heard to say at 21.45 that in two hours he had worked over 50 northern G stations as well as HB, but curiously enough he appears to have been the only European station audible. The next session was on January 3, when F9NJ (Lille) was worked S9+ both ways, and F2TU heard. G6NB was heard calling HB9LN and PA, also F7GX, whilst G3OGX was heard calling LX1SI. G stations in the Home Counties and on the south east coast were very strong and the Bristol area was also good. Little was heard elsewhere, and this agrees with general observations this season, conditions this winter being quite inferior to those of last year.

G3EKP (nr. Blackburn) heard G3JZN working French stations on January 3, but could not resolve any of them himself. A later contact with G3OSI (Liverpool) brought the news that the latter had nearly finished a converter for 70cm.

G3OCB (Truro) missed the first part of the January opening owing to work on a 4X150 linear, but returned on the band by the 5th and worked G2DQ and G2JF on the old transmitter. The new linear was then put into operation, but is at present running only about 250 watts p.e.p. to one 4X150A. G3OBD was worked, followed by local QSOs with G3KHU (Plymouth) and G2BHW, with finally a QSO with G6GN (Bristol).

On January 6, a two-way QSO was made with G3LBA with signals over S9 at times. No other DX QSOs were made although some G-DX stations were heard including G6NB who gave the usual FB signal.

G3MBL (North Finchley) came on the band for the first time on October 16. The transmitter is a crystal oscillator-tripler-doubler-p.a., with a power input to an EF80 of 3½ watts. The speech amplifier uses an ECC82 into an ECL82 modulator. The aerial is a 5-element Yagi 35ft. above ground, the ground being 294ft. a.s.l. About 85 different G stations have been worked; F3NG and F8VN were worked on December 28, and ON5DK on January 3, all on phone.

G3SHZ (Harrow) has just started, with a QOV03/20A and a temporary makeshift aerial. The receiver uses a G3FZL Nuistor converter feeding an HRO at 2.4 Mc/s. A 5 element Yagi is to be erected shortly. So far, the best DX QSO has been with G3BLP. G3SHZ is 14 years old.

G3PBV (Wolverton) managed to catch the opening of January 3 in the late evening, and was one of the many Gs to work LX1SI, for his 14th country on 2m. This was the first since December, 1962, and the first one on the new 60 watt rig. G3PBV believes he heard an OK station at the bottom of the band, but cannot be quite certain. It would be

interesting to know if anyone else heard it. N.b.f.m. is often used by G3PBV these days, produced by feeding audio into the screen of the Colpitts oscillator which works reasonably well. Quite a lot of work is being done with transistors, and it is hoped to transistorise most of the receiving equipment and some of the transmitting sections, but it is a long-term project.

B.R.S.25194 (Laleham) received several Continental stations between 21.00 and 24.00 GMT on January 3. LX1SI was consistently heard at S5/8. DJ7KP/P, F9NJ and F3XY, with ON4MV, ON4WW and ON4TQ were also heard consistently during the evening. An interesting s.s.b. QSO was heard between G3LBA (Cobham) and PA0BM. Alterations have been made to the receiver, which now uses a tunable i.f. of 4.6 Mc/s, and a crystal controlled front end instead of a fixed first i.f. The r.f. amplifier is a 6CW4 in grounded cathode configuration.

G3SJI (Bristol) recently started on 2m with 10 watts to a QOV03-10 on 144.41 Mc/s. The receiver uses a 2N1742 transistor front end, and the aerial is a 6-over-6 at 25 ft. There is at present quite a high level of local activity on 2m and recent converts include G3KUJ and G3OUK—who should also be mobile by the Spring.

An old hand on 2m, G3CHW, is expected to be radiating QRO-s.s.b. about now, and there is much incentive to London and eastern county-chasers to turn beams west and south-west. Twelve members of the Bristol ARC are in the middle of building Nuistor converters of the G3FZL design under the guidance of G3OUK. About half of these are transmitting members.

GW3MFY (Bridgend) worked G3GOZ (Rickmansworth) and G3AHB (Slough) for the first time on January 5, and on January 3 conditions were excellent to the south-east. HB9LN was heard from 19.00 until 22.00 peaking S8 at times, but there was no reply to calls. DJ7KP/P (nr. Stuttgart) was also called without success. However, ON5DA replied to a CQ. December 29 was also good with G3OUF (Ealing) and G3SHK (Ruislip) worked for the first time.

The RSGB 144 Mc/s Open Contest on March 7/8, this year coincides with the IARU sub-regional Contest, and as these are generally well populated on the Continent there is plenty of scope for a very enjoyable session.]

BBC-2 U.H.F. 625 Line Test Transmissions

Since January 4, 1964, trade test transmissions for BBC-2 have been radiated from Crystal Palace, and will continue until the start of regular programmes on April 20, 1964. The test transmissions consist of documentary, travel and feature films, interspersed with periods of test cards and 400 c/s audio tone or music. These are between the hours 9 a.m. to 1 p.m., and 2 p.m. to 8 p.m. on Mondays to Fridays, and 9 a.m. to 8 p.m. on Saturdays.

BBC-2 tests are on Channel 33 using horizontal polarization (567.25 Mc/s vision, and 573.25 Mc/s sound). Signals at increased power of 500 kW will be radiated as from early March.

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, February 6 and
March 5, 1964

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BRITISH ISLES TWO METRE BAND PLAN MAP. A reprint on stiff card of the map published in the February, 1963, issue of the RSGB BULLETIN. Details are also given of the 70cm Zones. Price 6d. post paid.

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RADIO AMATEUR OPERATOR'S HANDBOOK. Contains a list of Amateur Prefixes with provision for heard/worked record, W.A.S. chart, Zones record, Counties Heard or Worked record, Call Areas, Directional bearings, Standard Frequency transmissions, etc. Published by Data Publications Ltd. 48 pages. Price 5s. post paid.

WEBB'S RADIO LOG BOOK. Inexpensive paper-backed log book conforming with GPO requirements. Price 6s. post paid.

MANUAL OF TRANSISTOR CIRCUITS. Intended to help those interested in radio and electronics to realize the possibilities of the transistor. In addition, it is an excellent reference source of semiconductor circuits. Published by Mullard Ltd. 308 pages. Price 13s. 6d. post paid.

TRANSISTOR RADIOS, CIRCUITRY AND SERVICING. Deals with the principles of transistors, printed wiring, receiver circuits and the servicing of transistor radios, with a brief review of the test equipment necessary. Published by Mullard Ltd. 72 pages. Price 5s. 9d. post paid.

RADIO VALVE DATA. Characteristics of 4,800 valves, transistors, rectifiers and cathode ray tubes. Base connections are included. Seventh edition compiled by the staff of *Wireless World*. 156 pages. Price 7s. post paid.

SHORT WAVE RECEIVERS FOR THE BEGINNER. Describes 1 and 2 valve battery receivers, 2 and 3 valve mains operated short wave receivers, with notes on soldering and an introduction to the short waves. Published by Data Publications Ltd. 72 pages. Price 6s. 6d. post paid.

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ARRL RADIO AMATEURS HANDBOOK, 1963. One of the best-known textbooks for the amateur written from the American point of view. Now in its 40th edition. 592 pages plus 34 pages of valve tables, 14 page index and 111 page advertising section. Price 38s. 6d. post paid.

UNDERSTANDING AMATEUR RADIO. A new ARRL publication containing down-to-earth information on circuit design, construction of receivers, transmitters, aerials and accessories, testing and adjustment. Sixteen easily understood chapters. 313 pages plus six page index. Price 18s. post paid.

RTTY HANDBOOK. A new edition of the well-known CQ publication by Byron Kretzman, W2JTP. A valuable textbook for both the beginning and experienced RTTY'er. 191 pages. Price 30s. post paid.

CQ NEW SIDEBAND HANDBOOK. The fundamentals of single and double sideband suppressed carrier transmission with many practical designs. Details of a number of commercial equipments are given. 232 pages. Price 25s. 6d. post paid.

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ARRL ANTENNA BOOK. Probably the best-known textbook on aerial systems for the amateur station. 320 pages. Price 18s. 6d. post paid.

CQ ANTHOLOGY 1952-1959. More than 75 articles published in CQ during the years 1952-1959. 256 pages. Price 23s. post paid. A few copies of CQ Anthology 1945-1952 are still available. Price 16s. 6d. post paid.

HINTS AND KINKS, Volume 6. A further selection of helpful ideas from QST's long-running feature. 128 pages. Price 10s. 6d. post paid.

SURPLUS SCHEMATICS. Circuit diagrams for more than 90 popular American surplus equipments. A useful addition to any club library. A CQ publication. 111 pages. Price 19s. 6d. post paid.

TELEVISION INTERFERENCE—Its Causes and Cures. By Phil Rand, W1DBM. The second edition of this well-known American guide to the cure of interference. Well illustrated with diagrams, photos, charts and tables. 56 pages. Price 14s. 6d. post paid.

A COURSE IN RADIO FUNDAMENTALS. A step-by-step course in the principles required for a basic understanding of amateur radio. Intended to be used in conjunction with the ARRL Radio Amateur's Handbook. 103 pages. Price 10s. 6d. post paid.

HOW TO BECOME A RADIO AMATEUR. Information on learning Morse, getting on the air, the fundamentals of radio, a two valve receiver and a simple one valve transmitter. An ARRL publication. 148 pages. Price 5s. post paid.

LEARNING THE RADIOTELEGRAPH CODE. Designed to help the beginner overcome the usual stumbling blocks encountered in learning the Morse code. One chapter is devoted to selected exercises. An ARRL publication. 48 pages. Price 5s. post paid.

AMERICAN MAGAZINE SUBSCRIPTIONS

QST. Journal of the American Radio Relay League. Devoted entirely to Amateur Radio. Monthly, direct from USA. Price 43s. 6d. p.a.

CQ, the Radio Amateur's Journal. Covers the whole field of Amateur Radio. Incorporates the monthly *V.H.F. Amateur* as a bound-in supplement. Monthly, direct from USA. Price 44s. p.a.

73 Magazine. Almost exclusively technical and constructional articles. Monthly, direct from USA. Price 28s. 6d. p.a.

RSGB PUBLICATIONS (Dept. B), 28 LITTLE RUSSELL STREET, LONDON, W.C.1

Society News

Mr. G. M. C. Stone, G3FZL, installed as President

There was an attendance of more than 100 at a General Meeting and Social Evening held at the Kingsley Hotel, London, on January 17, 1964.

During the evening Mr. Norman Caws, G3BVG, Immediate Past President and Honorary Treasurer, formally installed Mr. G. M. C. Stone, A.M.I.E.E., A.M.Brit. I.R.E., G3FZL, as the Society's thirtieth President.



Mr. G. M. C. Stone, G3FZL, President, 1964.
(Photo by H. R. Preece)

Resignation of Mr. J. Douglas Kay

The Council has accepted with regret the resignation, due to pressure of business, of Mr. J. Douglas Kay, G3AAE, from the Governing Body of the Society.

Mr. J. C. Foster, G2JF, a Member of Council

Mr. J. C. Foster, G2JF, has accepted an invitation from the Council to fill the casual vacancy caused by the resignation of Mr. J. Douglas Kay, G3AAE.

Nominations invited for the Vacant Office of Zone A Representative

Nominations are invited to fill the casual vacancy in the Council in the office of Zone A Representative.

Any 10 Corporate Members resident in Zone A (Regions 1 and 2) may nominate any other duly qualified person resident in that Zone by delivering their nomination in writing in a single document to the General Manager and Secretary, together with the written consent of such person to accept office if elected, but each such nominator shall be debarred from nominating any other person for this election.

Nomination papers must reach the General Manager and Secretary not later than 12 noon, **March 6, 1964.**

In the event of more than one duly qualified person being nominated for the vacancy a ballot will be conducted, details of which will be published in the April 1964 issue of the Society's Journal.

Zone A comprises the counties of Cheshire, Lancashire, Cumberland, Westmorland and Isle of Man (forming Region 1) and the counties of Durham, Northumberland, and Yorkshire (forming Region 2).

New Year Honours List

Congratulations to W.O.II J. D. Francis, VS1CW, who was awarded the M.B.E. in the New Year Honours List.

RSGB Intruder Watch

Mr. R. H. Farr, G8IJ, has been appointed Honorary Organizer of the RSGB Intruder Watch in succession to Major D. W. J. Haylock, G3ADZ.

I wish to express my most grateful thanks to all who contributed so generously to the fund which was established to provide a gift for me on the occasion of my retirement as General Secretary of the Society.

The first part of the gift—equipment for my station—will enable me to obtain still greater enjoyment from Amateur Radio. The second part—a most useful cheque—will enable me to



Mr. Clarricoats with the KW2000 transceiver presented to him on December 20, 1963.
(Photo by H. R. Preece)

realize a number of ambitions which have not previously been possible.

I should also like to record my thanks to the Council for electing me an Honorary Member of the Society. This is the highest honour the Council has the power to confer upon anyone and I appreciate it deeply.

JOHN CLARRICOATS, G6CL

December 21, 1963

Resignation of Miss Gadsden

Miss A. M. Gadsden resigned from the Headquarters Staff on December 31, 1963, after more than 34 years' service to the Society.

It is believed that many members would like to contribute towards a presentation to her. This is of course over and above arrangements made by the Council in connection with Miss Gadsden's pension.

Members who wish to contribute are asked to send donations to the President, Mr. G. M. C. Stone, G3FZL, who has agreed to act as treasurer for this presentation, at 10 Liphook Crescent, Forest Hill, London, S.E.23. Cheques should be made payable to G. M. C. Stone, No. 2 A/c.

Scottish V.H.F. Convention 1964

This year's Scottish V.H.F. Convention, organized by the West of Scotland V.H.F. Group, will be held at The Mill Hotel, Rutherglen, Glasgow, on April 18. It is hoped that as many v.h.f. enthusiasts as possible will attend.

The programme will follow the general pattern of previous years.

Further information may be obtained from W. B. Miller, GM3PMB, 14 Clamps Wood, East Kilbride, Glasgow.

The Quickstarter

There was a fairly self-evident error in Fig. 1 of the first part of "The Quickstarter" last month. The inductance L1 was quoted as having 50 turns. Although this was changed on the proof to the correct value of 15 turns—much more likely at the frequency of 23 Mc/s referred to—the error still crept through as errors have a habit of doing.

Sorry: please note 15 turns for 23 Mc/s.

Supplementary Report (Continued from page 78)

points to competitors, while Mr. M. Harrison, B.R.S.24733, submitted the most useful check log from among the non-transmitting British Isles RSGB members.

There were 115 entries compared with 105 for the 1962 event.

New Vice-President

The Council has been pleased to elect Mr. W. H. Martin, G15HV, of Greenisland, County Antrim, a Vice-President, in recognition of his long and distinguished services to the Society, especially in connection with the work of the QSL Bureau in Northern Ireland.



Mr. Frank Fletcher, G2FUX, receiving the Founder's Trophy from the President, Mr. Norman Caws, G3BVG, after the Annual General Meeting on December 20, 1963.

(Photo by H. R. Preece)

Applications to sit the Radio Amateurs' Examination, May 1964

Members who wish to sit for the Radio Amateurs' Examination, to be held on Friday, May 8, 1964, should apply immediately to their local technical college who will make the necessary arrangements with the City and Guilds of London Institute. The closing date for making such arrangements is February 24 but in exceptional circumstances entries may be accepted, subject to a late fee of £2, up to March 21, 1964. In cases of difficulty candidates should apply to the Director of Education for the county concerned.

The fee for the examination is £1 10s., plus, in some cases, a small local accommodation fee.

Henry's Radio Ltd.

Henry's Radio Ltd., of 303 Edgware Road, London, have received a large number of queries and complaints from customers concerning the non-delivery of goods ordered by post from them between November 10 and December 31 last.

As soon as the company discovered there had been a regular loss of mail they contacted the Post Office Special Investigation Department who have since discovered and dealt with the cause of the losses.

The Post Office have apologised for the inconvenience caused to Henry's Radio Ltd., and to the general public, and they have advised the company that customers who have sent postal orders to 303 Edgware Road, should claim and re-order as necessary.

LONDON LECTURE MEETINGS

Friday, March 13, 1964

"RADIO ASTRONOMY"

By Frank Hyde, F.R.S.A., F.R.A.S.

Friday, May 1, 1964

"AERIALS"

By H. V. Sims (Head of Engineering Maintenance Section, BBC)

at the

Institution of Electrical Engineers

Savoy Place, Victoria Embankment, London, W.C.2.

Buffet tea 6 p.m.

Lecture 6.30 p.m.

Annual General Meeting

Minutes of the 37th Annual General Meeting of the Radio Society of Great Britain held at Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2., at 6.30 p.m. on Friday, December 20, 1963.

Present: The President and Acting Honorary Treasurer (Mr. Norman Caws, F.C.A., in the Chair), the Immediate Past President (Mr. E. G. Ingram), the Penultimate Past President (Major-General Eric Cole, C.B., C.B.E.), the Executive Vice-President (Mr. G. M. C. Stone, A.M.I.E.E., A.M.Brit.I.R.E.), Messrs. J. C. Graham, R. C. Hills, B.Sc.(Eng.), A.M.I.E.E., A.M.Brit.I.R.E., J. Douglas Kay, A. O. Milne, L. E. Newnham, B.Sc., A. D. Patterson, B.A.Sc., R. F. Stevens, J. W. Swinnerton, T.D., B.Sc.(Econ)(Hons.), A.I.L., E. W. Yeomanson (Members of the Council), Mr. John Clarricoats, O.B.E. (General Secretary), Mr. John A. Rouse (Editor), Miss May Gadsden (Assistant Secretary), Mr. A. J. Reynolds (Secretary-Accountant). About 65 other members were present.

Apologies for absence were received from Messrs. H. A. Bartlett, L. N. Goldsborough and F. K. Parker (Members of the Council) and Mr. V. M. Desmond (Past President).

Notice Convening the Meeting

The General Secretary read the notice convening the meeting.

Minutes

Mr. Swinnerton moved, Mr. Thorogood seconded and it was RESOLVED that the Minutes of the 36th Annual General Meeting, as published in the January 1963 issue of the RSGB BULLETIN be taken as read, confirmed and signed as a correct record.

Annual Report

The President moved, Mr. Patterson seconded and it was RESOLVED that the Annual Report of the Council as published in the November 1963 issue of the RSGB BULLETIN be received and adopted.

Supplementary Report

The General Secretary read a Supplementary Report of the Council covering the period from July 1, 1963, to early December 1963.

New Telephony-only Licence

The President announced that a new "Telephony-only" version of the Amateur (Sound) Licence, which will permit amateur operation on amateur frequencies above 420 Mc/s and for which applicants will have to pass the Radio Amateurs' Examination but not the Post Office Morse Test, will shortly become available. No starting date had yet been announced by the GPO.

Report of the Acting Honorary Treasurer and Audited Accounts for the year to June 30, 1963

Before moving the adoption of his Report and the Audited Accounts the Acting Honorary Treasurer (Mr. Norman Caws, F.C.A.) referred briefly to various items of income and expenditure and explained the reasons for any major variations compared with the previous year.

Mr. Caws drew particular attention to the increase which had occurred in connection with the production of the Society's Journal and stated that every effort would be made during the current financial year to obtain an increase in revenue from advertising.

In reply to an enquiry Mr. Rouse stated that approximately 17,500 copies of the current edition of *The Amateur Radio Handbook* had been sold to date.

In reply to a further question concerning the *Handbook* the Acting Honorary Treasurer stated that the value of the copies held in stock as at June 30, 1963, was approximately £3,200.

Mr. Caws moved, Mr. Jessop seconded and it was RESOLVED that the Report of the Acting Honorary Treasurer and the Audited Accounts of the Society for the year ended June 30, 1963, be approved and adopted.

Election of Council

The President announced that the following members had

been elected unopposed to fill the vacancies which will occur in the respective offices on December 31, 1963.

President	Mr. G. M. C. Stone, G3FZL
Executive Vice-President	Mr. E. W. Yeomanson, G3IIR
Honorary Treasurer	Mr. R. N. L. Caws, G3BVG
Zone E Representative	Mr. R. H. James, GW3BFH

The President announced the result of the ballot as follows to fill the two vacancies which will occur on December 31, 1963, among the Ordinary Members of the Council:

Mr. J. C. Foster, G2JF	..	..	718 votes
Mr. F. E. A. Green, G3GMY	..	..	552 votes
Mr. L. E. Newnham, G6NZ	..	..	1288 votes
Mr. Louis Varney, G5RV	..	..	1355 votes

The President declared Mr. Newnham and Mr. Varney elected to serve on the Council for the next three years and reported that the scrutineers accepted 1993 papers for this ballot and rejected six. Fifteen papers arrived too late.

The President announced the result of the ballot as follows to fill the vacancy which will occur in the office of Zone C Representative on December 31, 1963:

Mr. J. C. Graham, G3TR	..	..	402 votes
Mr. P. J. Naish, G3EIX	..	..	257 votes

The President declared Mr. Graham elected to serve on the Council for the next three years and reported that the scrutineers accepted 748 papers for this ballot and rejected four.

In their report the scrutineers stated that a large number of members resident in Zone C, although voting for the vacancies among the Ordinary Members of Council, did not record a vote for either candidate in the Zone C election.

The President announced that the following members of the 1963 Council were not required to stand for election in their respective offices:

Mr. R. N. L. Caws, G3BVG	Retiring President
Mr. E. G. Ingram, GM6IZ	Retiring Immediate Past President
Mr. R. C. Hills, G3HRH	} Ordinary Members of Council
Mr. J. D. Kay, G3AAE	
Mr. A. O. Milne, G2MI	
Mr. R. F. Stevens, G2BVN	
Mr. J. W. Swinnerton, G2YS	
Mr. H. A. Bartlett, G5QA	} Zonal Representatives
Mr. F. K. Parker, G3FUR	
Mr. A. D. Patterson, G13KYP	

The vacancy in the office of Zone A representative would be considered by the Council at its January 1964 meeting.

On behalf of all members the President thanked Mr. Douglas Findlay, D.F.C., G3BZG, Mr. P. M. Elton, G3GOZ, and Mr. David C. French, G3HSE, for the very efficient manner in which they scrutinized the Ballot.

Mr. John Clarricoats, O.B.E., General Secretary, elected an Honorary Member of the Society

The President announced that in accordance with the requirements of Article 12, the retiring General Secretary of the Society (Mr. John Clarricoats, O.B.E.) had, at a meeting of the Council held on December 19, 1963, been elected an Honorary Member of the Society in recognition of his outstanding service to the Society over a period of 37 years.

The announcement was received with acclamation.

Auditors

Mr. Stone moved, Mr. Thorogood seconded, and it was RESOLVED that Edward Moore & Sons be re-appointed Auditors for the year to June 30, 1964, at a fee of 100 guineas.

Other Business

Mr. Fletcher enquired the purpose of Agenda Item No. 6 ("For the purpose of holding an annual general meeting").

The President replied that this was to consider any business notified in adequate time to the membership (The Articles of Association require 21 days' notice to all members—Article 34).

A notice submitted by Mr. Fletcher had been received allowing inadequate time to comply with the articles and therefore could not be raised during the formal business meeting. He would, however, be pleased to have the matter raised during the informal meeting to follow.

Mr. Fletcher accepted this.

The meeting terminated at 7.5 p.m.

Informal Proceedings

The President opened by saying that this was a doubly sad occasion since both the General Secretary, Mr. Clarricoats, and the Assistant Secretary Miss Gadsden, would be leaving the employment of the Society on December 31, 1964, after more than 30 years' service.

Retirement of Mr. John Clarricoats

The President paid tribute to Mr. John Clarricoats for his efficiency, ability and the invaluable work he has done for the Society and Amateur Radio in general over a great number of years.

The General Secretary was then presented with a KW2000 single sideband transceiver which had been purchased from K.W. Electronics Ltd., using part of the retirement presentation fund subscribed by friends and members of the Society. K.W. Electronics Ltd. donated a microphone, whilst the Council, to mark its personal appreciation, donated a K.W. multiband dipole. In addition Council presented Mr. Clarricoats with his office chair with a silver plate engraved "His Office Chair, presented to Mr. J. Clarricoats on behalf of the RSGB." A cheque for the balance of the presentation fund to the value of £456 was then handed to Mr. Clarricoats.

Mr. Clarricoats, in his reply, thanked the President, Council members, members and friends, for the gifts but stated that he considered the greatest honour that could be paid to him was his election as an Honorary Member of the Society. He spoke of the happy relations that had always existed between himself and the membership at large and referred briefly to some of the problems that lie ahead, especially in the international field.

Mr. Clarricoats was given a standing ovation at the conclusion of his remarks.

Resignation of Miss Gadsden

The President then announced that only a few days before the Annual General Meeting the Council had received the resignation of Miss May Gadsden to take effect at the end of the year. Council had accepted this with regret but had not been able to take any action to recognise her many years' service with the Society. This matter would be considered in the near future. Much of what had been said about Mr. Clarricoats applied to Miss Gadsden also.

Informal Discussion

Mr. Clarricoats

Mr. Fletcher then read the following motion: "That this Annual General Meeting, being very well aware of the exceptional experience and knowledge possessed by Mr. J. Clarricoats in all matters appertaining to Amateur Radio generally, and in particular appertaining to the conducting of negotiations with official bodies, and to the organisation and running of International Conferences and the like, is of the opinion that the Society should retain for its benefit the advisory services of Mr. Clarricoats, which would otherwise be lost to the Society on his forthcoming retirement. To this end this Annual General Meeting instructs Council to enter into negotiations with Mr. Clarricoats for his appointment as Adviser to the Society, or such similar position as should be agreed, and on such terms as to retaining fees as can be agreed between Council and Mr. Clarricoats."

Mr. John Savage spoke in support of the motion.

The President replied that Council had already implemented certain proposals and two specific projects had been given to Mr. Clarricoats for which he would receive remuneration. He could not give details as the proposals had only been finalised at the Council Meeting on the previous evening and it was the custom

not to publish the proceedings of Council Meetings until the minutes had been formally approved. (This will be at the January Council meeting.) Also Mr. Clarricoats in his capacity as an Honorary Member would be in very close touch with Society affairs and his advice would be invaluable. Mr. Caws was certain that Mr. Fletcher, Mr. Savage and the membership at large would be well satisfied with Council's action.

Both Mr. Fletcher and Mr. Savage were satisfied by the President's assurances.

International Amateur Radio Affairs

During the discussion it was suggested that it would be wise for a younger man to be trained by Mr. Clarricoats in International matters. The President pointed out that Mr. Clarricoats had already imparted a great deal of his knowledge to the Council. Also a younger member of Council had been present at the Malmo IARU Region I conference held in June.

Mr. Thorogood stressed the importance of giving assistance to promote Amateur Radio in the underdeveloped countries. Mr. Garrett enquired the extent to which majority decisions taken at International Radio Conferences were binding. Mr. Newnham replied that it was essential for decisions to be accepted for international frequency planning to work. However, certain countries entered disclaiming footnotes to decisions recorded in the Radio Regulations published following conferences such as Geneva 1959.

Mr. Milne stressed that notwithstanding the warnings given by the General Secretary and others regarding the possible future loss of amateur frequencies, no proposals had been made to reduce amateur allocations. These could not be made until the next International Telecommunications Union conference which would be held in a few years' time.

Other Matters

Mr. Fletcher enquired whether the Council could suggest any method whereby the present apathy among members could be overcome. He pointed out that only 2,000 members had voted in the Council elections notwithstanding the fact that the Business Reply system had been introduced for the first time. The President commented that he and the Council wished they knew the answer to Mr. Fletcher's question.

Mr. Thorogood felt that more should be done to encourage young people to take an interest in Amateur Radio. Mr. Caws replied that it was the Council's intention to set up an *ad hoc* committee in January to deal with this matter.

The informal proceedings then terminated and the presentation of trophies and awards followed.

EI2W Safe

EI2W and family wish to thank the many members of RSGB who sent letters and messages on their safe return from the "Lakonia" disaster. All letters will be answered individually as soon as possible.

Our Front Cover

The many members who have written to Headquarters to comment on the new front cover for the BULLETIN will be interested to know that it was designed by Jeremy Royle, G3NOX/T, of W. R. Royle and Son Ltd. Mr. Royle's aerial system, illustrated on the front of the January issue, comprises a 4ft. parabola for 1296 Mc/s, a 64 element stack for 420 Mc/s, a 16 element stack for the same band and various aerials for u.h.f. television.

Claims for RSGB Certificates

Members are reminded that claims for RSGB Certificates should be sent direct to Headquarters. Claims are acknowledged on arrival and passed to the Honorary Certificates Manager for attention.

When writing to the Author of an article published in the BULLETIN please enclose a stamped addressed envelope for reply.

Society Affairs

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

THE November meeting of the Society's Council was held at the Imperial Hotel, Birmingham, on November 24, 1963, and was attended by Messrs. G. M. C. Stone (Executive Vice-President), H. A. Bartlett, J. C. Graham, L. N. Goldsbrough, R. C. Hills, E. G. Ingram, A. O. Milne, L. E. Newnham, F. K. Parker, A. D. Patterson, R. F. Stevens, J. W. Swinnerton and E. W. Yeomanson (Members of the Council), John Clarricoats (General Secretary), John A. Rouse (Editor) and A. J. Reynolds (Secretary-Accountant).

Apologies for absence were submitted on behalf of the President, Mr. Norman Caws, who was in hospital recovering from an operation, Major-General E. S. Cole, Mr. J. Douglas Kay and Mr. A. C. Williams.

Membership

The Council approved 253 applications for membership (197 Corporate and 56 Associate). This figure included 123 applications received at the RSGB Radio Communications Exhibition. The Council also approved 10 applications for transfer from Associate to Corporate grade.

It was agreed to waive for one year the subscriptions of three members who suffer from blindness.

The Council granted affiliation to the Radio Amateur Invalid and Bedfast Club, Radio Society of Ceylon and University of Liverpool Amateur Radio Society.

Standing Rules for Committees

The Council approved a number of standing rules for Committees, relating to the submission of annual reports, the calling of meetings, the appointment of Committee members, out-of-pocket expenses and the co-option of additional Committee members.

Weekend Technical Courses

During the course of a discussion on reports of recent Regional Meetings it was decided to ask the Technical Committee to look into the practicability of the Society running weekend technical courses. It was also decided to consider at the January 1964 meeting of the Council the question of setting up an Education Committee. In connection with the latter, the very interesting display at the RSGB Radio Communications Exhibition by the Roding Boys' Club was discussed.

Regional Meetings

Mr. Ingram suggested that in future publicity for Regional Meetings it should be made clear that admission to such meetings is free to members.

Presidential Installation

It was agreed to hold a General Meeting on January 17, 1964, when Mr. Stone would be installed as President.

RAF Amateur Radio Society Expedition

It was reported that a message of loyal greetings from the Sheikh of Halliniyah Island to H.M. the Queen had been transmitted by Amateur Radio from the RAF Amateur Radio Society Expedition station in the Kuria Muria Islands.

Reports of Committees

At its meeting on September 28, the RAEN Committee discussed Network rules and dealt with correspondence.

The Mobile Committee met on October 11 to deal with a number of matters arising from the National Mobile Rally at Woburn Abbey in September and to consider the programme of rallies to be held during 1964.

The Exhibition Committee met on October 22 to make final arrangements for the RSGB International Radio Communications Exhibition and on November 8 for an analysis of the results of the exhibition.

At its meeting on October 31, the Contests Committee dealt with a number of letters relating to NFD, the Affiliated Societies' Contest, 1964, the Second 420 Mc/s Contest, General Rules for RSGB Contests to be held during 1964, the results of V.H.F. National Field Day 1963 and Low Power Field Day 1963.

On November 4, the Scientific Studies Committee discussed

BULLETIN articles, Tropospheric Propagation, the IQSY, the Lerwick experimental station, auroral observations on 28 Mc/s and matters relating to space communication, including *Oscar III* and *Echo A12*.

The Council was in session for four hours.

Representation

The following Corporate Member has been appointed to serve as a Deputy Regional Representative:

REGION 16

L. A. JACKSON, G3HPR, 8 Arnott Avenue, Gorleston-on-Sea, Great Yarmouth, Norfolk.

Area Representatives

The following are additional to the list published in the December 1963 issue:

REGION 1—LANCASHIRE

MANCHESTER AREA

A. B. LANGFIELD, G3IOA, 2 Rowland Street, Moston, Manchester 10.

—CHESHIRE

WIRRAL

K. BIRCH, G2FOS, 19 Lloyd Drive, Greasby, Upton, Wirral.

REGION 4—DERBYSHIRE

DERBY

J. ANTHONY, G3KQF, 10 Manor Road, Borrowash.

REGION 7—LONDON EAST

LEYTON AND WALTHAMSTOW

A. W. RIX, G3RYF, 17 Forest Drive, East Leytonstone, E.11.

—LONDON WEST

EDGWARE AND DISTRICT

R. H. NEWLAND, G3VW, 10 Holmstall Avenue, Edgware, Middlesex.

—LONDON SOUTH WEST

KINGSTON AREA

M. J. HUGGINS, B.R.S.25248, 1 Byfield Court, Malden Way, New Malden, Surrey.

REGION 9—CITY AND COUNTY OF BRISTOL

E. C. HALLIDAY, G3JMY, 4 Parkside Avenue, Winterbourne, nr. Bristol.

Affiliated Society Representatives

The following are additional to the list of Affiliated Society Representatives published in the December 1963 issue:

AERE AMATEUR RADIO CLUB

H. A. KEARSEY, G3GKD, Dormer Cottage, York Road, West Hagbourne, Didcot, Berks.

AQUILA RADIO CLUB

R. C. B. CUTTS, G3HRC, 8 Beech Court, Kingsground, Eltham, London, S.E.9.

CLIFTON AMATEUR RADIO SOCIETY

A. J. GOULD, G3JKY, 60 Merlin Grove, Beckenham, Kent.

CRAY VALLEY RADIO SOCIETY

W. J. GREEN, G3FBA, 790 Rochester Way, Sidcup, Kent.

DERBY AND DISTRICT AMATEUR RADIO SOCIETY

B. SPEAKMAN, B.R.S. 23256, Merrydown, Burley Lane, Quarndon, Derby.

EDGWARE AND DISTRICT RADIO SOCIETY

R. H. NEWLAND, G3VW, 10 Holmstall Avenue, Edgware, Middlesex.

RADIO SOCIETY OF HARROW

A. L. MYNETT, G3HBW, 52 The Rutts, Bushey Heath, Watford, Herts.

SLADE RADIO SOCIETY

N. B. SIMMONDS, B.R.S.21873, 5 Bowling Green Road, Stourbridge, Worcs.

WIRRAL AMATEUR RADIO SOCIETY

K. BIRCH, G2FOS, 19 Lloyd Drive, Greasby, Upton, Wirral, Cheshire.

V.H.F. National Field Day 1963

THOUGH the V.H.F. National Field Day held on September 7 and 8, 1963, was the second event under this title it was the first multiband portable contest for some years. As older v.h.f. men will remember, multiband events held in previous years proved extremely unpopular and it was with trepidation that the new contest was instituted. The results show that 45 clubs and groups entered, just over half of which operated two stations.

The overall winners were the Surrey Radio Contact Club with their neighbours, Crawley Amateur Radio Club, second. The high scores these two clubs amassed on 70 Mc/s accounted for their pre-eminent positions.

Band Results

Scoring on 70 Mc/s was very consistent; out of 31 stations entered on this band 17 scored 6500 points or higher (i.e. half the winner's score) and it would appear that the leader on this band could come from anywhere. The leading GW and GI entries came seventh and eighth respectively which contrasted with their performance on 144 Mc/s. In fact the two overall leaders also took the 70 Mc/s certificates leaving three other awards only on this band for the Belfast and District V.H.F./U.H.F. Group, the Stirlingshire V.H.F. Group and the Port Talbot Group in GI, GM and GW respectively.

Seven stations (five G's and two GW's) scored over 30,000 points on 144 Mc/s with only 2500 points covering the first four entrants. The Surrey Radio Contact Club take the certificate for the leading station while the runner-up was G5ZT/P, operated by a Devonshire group. Fourth on the band and leader in Wales was GW4LU operated by the Midland Amateur Radio Society while Belfast and Stirlingshire as sole representatives of their countries also receive certificates.

On 430 Mc/s the leaders were AERE Harwell, with Crystal Palace and District Radio Club a very close second. As only 22 stations amongst the entrants were active on this band, scoring was rather slow; had Crawley picked up another 2000 points on this band they would have won the contest. Port Talbot receive a certificate for what must have been a frustrating day on the band. The Belfast V.H.F./U.H.F. Group operated v.h.f. only on this occasion.

On 1296 Mc/s five stations started out but the Colchester Group came unstuck somewhere and submitted no log for this band. The Surrey Radio Contact Club made two cross-band contacts with stations on 430 Mc/s but were not able to contact anyone fully equipped to give them points. The Radio Society of Harrow and the Midland ARS were more fortunate and receive certificates for first and second respectively.

No entries were received from GC or GD, nor did any station claim points on bands above 2300 Mc/s.

Some comment is called for concerning the award of certificates to the sole entrants from GI and GM; this has been done because the Contests Committee thinks the scores can be improved upon and so that other groups in outlying areas may be encouraged to compete. With regard to band leaders in the s.h.f. bands it is intended to keep the position fluid and each case will be treated on its merits.

Equipment

The equipment used was of course the same as that used in the single band events and is described from time to time in the reports on these contests and it is not proposed to repeat this information here. The only items special to V.H.F. National Field Day are power supplies as power

sufficient for at least two stations must be provided for 24 hours (not counting time for testing and tuning up). As few Groups can afford standby power supplies this part of the station provided the main reliability problem; it has been proposed that some sort of prize be awarded to the first group that can keep a p.e. set going and delivering the right output for the whole 24 hours. It would appear that while anyone with a spare transmitter is welcome on field days, a man with a spare 12 volt accumulator can expect the red carpet to be rolled out!

Comments

Cumberland and Westmorland—60 knot winds and torrential rain. **Harrow**—Operators at G3EPX/P suffered the aroma of wet socks drying on an oil lamp—all operators will be equipped with rubber boots next year. **Stirlingshire**—Force 8 gale, torrential rain and low cloud; it was a toss up whether the mast would come down or the tent go up. **Harwell**—The least said (about the weather) the better.

Belfast—Every station identifiable on 2m was worked but the usual large number of unreadable phone carriers was heard. (This comment also from other outlying stations; a little c.w. goes a very long way.) **Reigate**—By the middle of Sunday we had worked all we could hear on 4m; the 2m station could not cope with stations on neighbouring "mountains." **Harwell**—4m not as good as June but low activity gave the impression that conditions were worse than they were. 70cm conditions abysmal until Sunday afternoon when we emptied the rainwater out of the feeder; also the main p.e. generator failed (the same one as in the June NFD?)

Rules

It is difficult to summarize the comments on scoring but it would appear that the stations whose operators enter regularly for v.h.f. contests and therefore have a reserve of "know-how" on the scoring system, had no complaints. On the other hand newcomers to the technique want something simpler. As, in practice, sites change little from contest to contest the old hands keep their rough notes from year to year making the whole thing fairly straightforward. There were also operators who had not met the QRA Locator



G3LHZ operating G8RW/P (Crawley ARC) during V.H.F. National Field Day 1963.

V.H.F. NATIONAL FIELD DAY 1963

Posn.	Club or Group	No. of Ops.	Call-Signs	70 Mc/s	144 Mc/s	420 Mc/s	1296 Mc/s	Total
1	Surrey Radio Contact Club ..	6	G2RD/P G3ODY/P*	13,219	*39,418	5,682	Nil	58,319
2	Crawley Amateur Radio Club	8	G8RW/P G3FRV/P*	12,222	*37,263	3,288	—	52,773
3	Midland Amateur Radio Society ..	6	G3MAR/P GW4LU/P*	6,347	*37,062	2,688	2,020	48,117
4	Devonshire† ..	4	G3LMG/P G5ZT/P*	6,082	*38,842	—	—	44,924
5	Severn Valley ARC ..	4	G3ENY/P GW3KMT/P*	10,138	*31,093	3,681	—	44,912
6	The Radio Society of Harrow No. 1 ..	5	G3HBW/P G3EFX/P*	6,327	*28,948	6,538	2,616	44,429
7	AERE Harwell ARC ..	10	G3NNG/P G2HIF/P*	6,910	*27,530	7,855	896	43,191
8	Lincolnshire† ..	4	G2HOP/P	6,056	31,140	4,434	—	41,630
9	Crystal Palace & District Radio Club ..	8	G3FZL/P G3IIR/P*	9,938	*23,580	7,356	—	40,874
10	North West V.H.F. Group ..	4	G3BAK/P G3OHF/P*	4,033	*25,939	3,564	—	33,536
11	Southampton Group ..	8	G3KEU/P G3ION/P*	9,925	*21,567	1,989	—	33,481
12	Dorking & District Radio Society ..	8	G3NDF/P G3CZU/P*	9,047	*18,274	5,690	—	33,011
13	Cornish Radio & Television Club ..	4	G3XC/P	—	32,504	—	—	32,504
14	Murphy Radio Sports Club ..	10	G5UM/P G8LM/P*	—	*25,947	5,360	—	31,307
15	East Cheam Wireless Group	7	G3OJE/P G3OSC/P*	7,328	*21,017	2,781	—	31,126
16	Norwich & District Radio Club ..	5	G2YU/P	7,740	20,369	1,806	—	29,915
17	SRDE Technical Society ..	5	G3OBD/P G3NOH/P*	1,722	*27,784	384	—	29,890
18	Grimsby ..	2	G3RPY/P G3NJF/P*	8,011	*21,073	—	—	29,084
19	Derby & District Amateur Radio Society ..	5	G3PDD/P G3ERD/P*	5,448	*19,623	—	—	25,071
20	London† ..	2	G3FD/P	3,505	17,495	3,796	—	24,796
21	Yorkshire† ..	6	G8NN/P G3PHO/P*	8,211	*16,442	—	—	24,653
22	Reigate Amateur Transmitting Society ..	10	G3REI/P G3PNA/P*	6,816	*17,002	—	—	23,818
23	Albright & Wilson Amateur Radio Society ..	3	G3OXD/P	5,550	14,150	2,844	—	22,544
24	Hampshire† ..	2	G3JUG/P	—	22,266	—	—	22,266
25	Colchester Group ..	4	G3FIJ/P G3SJO/P*	7,020	*13,548	786	Nil	21,354
26	Cumberland & Westmorland V.H.F. Group ..	5	G3FDW/P G3BJD/P*	6,948	*13,169	—	—	20,117
27	Staffordshire† ..	3	G3PTY/P	—	19,404	—	—	19,404
28	North Kent Radio Society ..	4	G3ENT/P	3,422	15,488	—	—	18,910
29	Somerset† ..	4	G3JMY/P	—	18,144	576	—	18,720
30	Belfast & District V.H.F./U.H.F. Group ..	6	G13HXV/P G13KYP/P*	8,374	* 9,271	—	—	17,645
31	Monmouthshire† ..	5	GW2HIN/P	—	17,164	—	—	17,164
32	Port Talbot Group ..	7	GW4CG/P GW3REQ/P*	8,604	* 7,475	964	—	17,043
33	Reading RSGB Group ..	4	G5HZ/P	—	16,387	—	—	16,387
34	Somerset† ..	1	G3EIW/P	—	14,950	1,266	—	16,216
35	Cambridge & District Amateur Radio Society ..	4	G3PKF/P	—	14,585	—	—	14,585
36	Clifton Amateur Radio Society ..	7	G3OQB/P G3GHN/P*	3,348	*10,608	—	—	13,956
37	Pye Telecommunications Radio Group ..	4	G3PYE/P	8,995	—	3,932	—	12,927
38	Verulam (St. Albans) ARC ..	4	G3LXP/P	4,230	8,680	—	—	12,910
39	Wirral Amateur Radio Society ..	4	GW3NWR/P	—	10,481	—	—	10,481
40	Purley & District Radio Club	5	G3GKF/P	706	9,710	—	—	10,416
41	The Radio Society of Harrow No. 2 ..	3	G3PSH/P	—	8,571	—	—	8,571
42	Peterborough & District Amateur Radio Society ..	1	G3RED/P	—	7,991	—	—	7,991
43	Cheltenham RSGB Group ..	3	G3OLN/P	—	5,482	—	—	5,482
44	Stirlingshire V.H.F. Group ..	3	GM6XW/P	942	4,300	—	—	5,242
45†	Ravensbourne Amateur Radio Society ..	1	G2DHV/P	—	3,751	—	—	3,751

†Late entry

‡Single or multiple operator station, but not a club or group.

system before; it is to be hoped they recover in time for the 1964 event.

In the table of results the county of origin is shown for those entries which declared no local affiliation. Presumably these were ad-hoc groups assembled for this event only; this of course is quite all right but perhaps in future these participants would adopt some title so that their activities can be more readily followed from year to year.

There were some minor problems in the rules (there always are, it seems!). It is intended in future to make the rules for the more important RSGB Contests self contained without any reference to the General Rules and the rules for V.H.F. NFD 1964 are amongst those to be rewritten in this form.

The attempt to use the ordinary cover sheets was an abysmal failure and special cover sheets are being prepared for the event this year. Otherwise it is intended to keep the rules much the same for another year since though a few entrants had strong comments to pass on the scoring, the general consensus last year was favourable.

Three entrants wanted restrictions making the bands "contest only" for 24 hours by excluding other stations (or a particular station such as the RSGB news transmitter) during the event. The Contests Committee are firmly of the opinion that this would be a very bad mistake. Some years ago GB3VHF was turned off during a contest and the howl of wrath which resulted convinced us that it would be unwise to try such a thing again. If a non-contestant wishes to take part in some other activity, such as rag-chewing with the neighbours, then he is quite entitled to do so; the only thing that is surprising is that it should be necessary to say this here.

Logs

In general the standard of logs was high and entrants had obviously been careful to get their distances right. Some operators did not realize the importance of correctly copying the QTH in v.h.f. events and a few logs were penalized heavily for this mistake. A few were obviously troubled by the National Grid System, producing some interesting numbers (in one case with 10 digits) but not much information. The NGR in the form suitable for contest use consists of two letters and six figures and instructions for obtaining it are on every sheet of the one inch maps (e.g. NGR of



Dorking and District Amateur Radio Society had their 'B' station on Leith Hill, famous Surrey landmark at 997 ft. a.s.l. For 70 cm, a corner-reflector built by G3OVS gave good results, whilst for 70 Mc/s a 4 element Yagi was used. Here, SWLs Ron Hodson and Peter Gilbey stoke-up the generator, whilst G3HJZ steers the 4m beam.

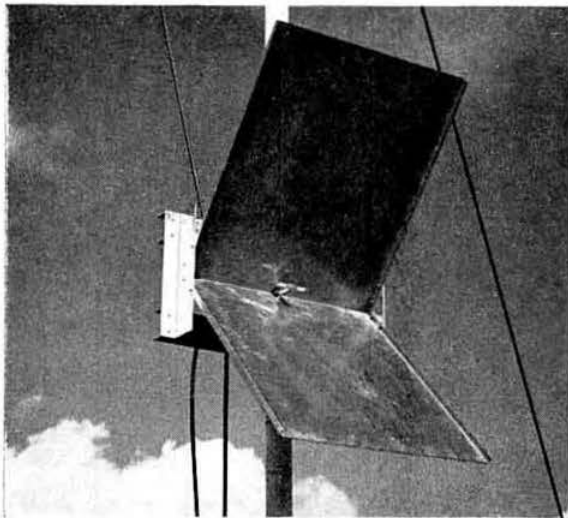
(Photo by G3NDF)

RSGB Headquarters is TQ/302815). This figure gives the location correct to 100m and can be used to calculate distances to this degree of accuracy without reference to the maps. Variations introduced by entrants are at best confusing and at worst misleading; in particular writing the sheet number in place of the coarse grid letters and inverting the order of the figures are errors that appear from time to time. Latitude and longitude are almost useless for our purpose and anyone who has calculated the distances between points using that system will know why; life is just too short. It is unfortunate that GC and GI are not on the grid and in these cases latitude and longitude have to do.

Check Logs

It is usual to acknowledge briefly at the end of a report those amateurs who, though not taking part in the event, send in a check log of contacts made. In V.H.F. NFD where over half the QSOs are with non-entrants such check logs are especially valuable. G3EMU at Canterbury operated portable on 2m but declined to enter because of some unspecified infringement of the rules. Their score would have been about 7300 and it is hoped that they will enter this year. Valuable check logs were gratefully received from G2WS/P, G2XG, G3EHR, G3EMU/P, G3HWR, G3PMJ, G3RPE, G4IB/P, G5BB, G5FK, A.3278 and B.R.S.15744. In addition the second copy of certain IARU logs were forwarded by R. C. Hills, G3HRH, the Society's V.H.F. Manager, after he had checked the entry for the IARU Region 1 contest which coincides with V.H.F. NFD.

**432-434 Mc/s ACTIVITY NIGHT
SATURDAYS at 7 p.m.**



The 1296 Mc/s aerial used by the Severn Valley ARC.
(Photo by G8IJ)

CONTEST NEWS

— RESULTS — REPORTS — RULES —



Second 144 Mc/s Portable Contest 1963

The general impression appears to be that the Second 144 Mc/s Portable Contest, held on July 6-7, 1963, was enjoyed and for the most part the weather was good. Conditions were reported as being average.

The Contests Committee have sympathy with contestants over the claiming of scores for continental contacts: continental stations appear to have given only a four cypher QRA locator instead of the five characters required. In future, contestants will have to obtain the full Locator cyphers and the continentals will now know (after Malmö) that these must be given. Where only four cypher locators are received, the distance will be calculated from the near corner of the relevant square.

The biggest snag is the lack of a suitable map from which distances can be measured although one is in course of production. The judges have, perhaps, the only map extant in the UK on which distances can be measured directly, and this was laboriously drawn up by a Committee member. Even this is only a makeshift and is on a smaller scale than it should be. It is ruled on a Bartholomew's A.A. Map of

Europe, this being the only reasonable one available. The scale is 1 : 3,000,000.

Scoring should not be left to the judges, and those who did so cannot take it for granted that the up-pointing of their logs is equal to the correct distance $\times 2$ of their continental QSO's.

Many distance errors were doubled by the scoring system in this contest. As an example, one log comes out with almost the claimed score, but this is because the deductions for errors are cancelled out by the additions. Quite a number of claimed scores have been upgraded.

All claimed scores should be correct, and the Committee are being generous until such time as maps are freely available.

There would not be so many incorrect calculations made for UK contacts if only contestants could be induced to pass NGR's to each other. Errors are caused by stations giving incorrect directions from towns in particular and, to a lesser extent, incorrect distances.

The French station who was reported as saying that he was in square A1 south of Paris was incorrect because no part of A1 is south of Paris. A British station giving his QTH as a certain number of miles north of a town might in fact be, according to his NGR, nearer northwest. As some of the distances were not small, many contacts gave incorrect scores. Either operators do not stick rigidly to the location of station as transmitted, or stations in contact record the locations as known to them, or as usually referred to by stations using the site. This leaves the judges with the problem: was the contact complete (99 per cent reports are 59!); if so, who erred?

General comments on the contest have already been reported in *Four Metres and Down*. Any questions or suggestions will be considered by the Contests Committee when next formulating the rules.

Comments, information and suggestions are always welcomed by the Committee and should be included with the logs. Material for *Four Metres and Down* should be sent direct to G2AIW and not enclosed with contest entries.

Many reports were received on the lack of adherence to the Band Plan, and steps should be taken to correct this. Any practical suggestions as to how such operation can be monitored will be welcomed by the Committee and given serious consideration.

Check logs from A.2453 B.R.S.19682, B.R.S.24643, GB3DTS, G3EHR and G3HWR are gratefully acknowledged.

Listeners' V.H.F. Contest

The following are the details of the Listeners' V.H.F. Contest to be held at the same time as the 144 Mc/s Open Contest.

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

2. **Duration.** The contest will commence at 17.00 GMT on Saturday, March 7, and end at 19.00 GMT on Sunday, March 8, 1964.

3. **Scoring.** Entrants will be required to log stations operating in the 144-146 Mc/s band. Each station heard may be logged once only in column II. Each complete log entry of a telephony transmission will score 10 points; for each complete entry of a telegraphy transmission 20 points may be claimed. In addition a bonus of 25 points may be claimed for the first station logged in each new county in accordance with the list given on page 52 of the January 1964 issue of the RSGB BULLETIN. The whole of the London Postal Districts will count as one county only. Stations outside the entrant's own country will score 25 points (50 points if on telegraphy) for each complete log entry.

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

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

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

Second 144 Mc/s Portable 1963						Points
Posn.	Call-sign	Input	Aerial			
1	G3KMT/P	S 10 W	6/6 slot			12353
2	G3PIA/P	M 15 W	6-over-6 42 ft.			11928
3	G3LIT/P	M 20 W	4-over-10 33 ft.			11783
4	G3LHA/P	M 25 W	5-over-5 30 ft.			10776
5	G3OBD/P	S 22 W	16 element 30 ft.			10647
6	GW4LU/P	S 23 W	5-over-5			10532
7	GW3KMS/P	S 25 W	4-over-4 slot			10255
8	G3PYE/P	M 25 W	6 element 30 ft.			9708
9	G3OXD/P	M 25 W	2 \times 7-over-7 slot			9299
10	GW3RUF/P	M 20 W	8-over-8 25 ft.			9067
11	G3MAR/P	M 25 W	8-over-8 slot			8838
12	G3MDH/P	M 20 W	4-over-4 slot			8676
13	G6NBP/P	S 6 W	8 element 20 ft.			8105
14	G3ENY/P	S 24 W	16 element			8064
15	G3NUE/P	M 4-5 W	6-over-6 20 ft.			8057
16	G3KCB/P	S 25 W	6-over-6 slot			7988
17	G3FFV/P	M 15 W	5 element			7830
18	G3FD/P	S 16 W	5-over-5 slot			7783
19	G5ZT/P	S 7 W	8-over-8 slot			7619
20	G3ERD/P	M 15 W	16 element stack			7412
21	G5TN/P	S 25 W	6-over-6 slot			7353
22	G3MAX/P	S 24 W	8-over-8			7350
23	G3CGQ/P	S 17 W	6-over-6 slot			7292
24	G3GWB/P	M	4-over-4 \times 2			6630
25	GW3JGA/P	S 24 W	6-over-6 slot			6214
26	G3OSC/P	M 25 W	6-over-6 slot 15 ft.			6091
27	G3FWD/P	M 16 W	4-over-4 slot			5910
28	GW3JJE/P	M 20 W	6-over-6			5589
29	G3KEU/P	S 10 W	6-over-6 slot			5321
30	G3MWB/P	S 7 W	4-over-4 slot			4507
31	G2YU/P	S 25 W	6-over-6 25 ft.			4338
32	GW3JZG/P	S 4 W	4 element			4285
33	G3KHU/P	S 12 W	4-over-4 slot			4256
34	G3NJP/P	S 15 W	4 element			4019
35	G3JDM/P	S 18 W	4-over-4			3771
36	GW3CBY/P	S 15-7 W	8 element			3670
37	GM6XW/P	S 25 W	8-over-8 slot			3588
38	G3DIT/P	S 15 W	5-over-5 20 ft.			3587
39	G3KKP/P	S 10 W	4-over-4 slot 20 ft.			3569
40	G5HZ/P	M 12 W	6-over-6 30 ft.			3515
41	G3GHN/P	M 10 W	5 element			3207
42	G2DSP/P	S 5 W	5 element			2959
43	GW3PWH/P	S 9 W	8 element			2530
44	G3OYZ/P	S 20 W	6-over-6 13 ft.			2265
45	G6OI/P	M 15 W	6-over-6			2112
46	G2DHV/P	S 15 W	10 element			1681

* General Rule 5. † General Rule 7. ‡ General Rule 8. S Single operator. M Multiple operator.

(d) Entries must be postmarked not later than March 23, 1964.
5. Awards. At the discretion of the Council, certificates of merit will be awarded to the winner and to the runner-up.

144 Mc/s Open Contest 1964

RSGB members throughout Europe are invited to take part in this popular v.h.f. contest. Both phone and c.w. may be used. Contestants are requested to distinguish carefully between the words "county" and "country" in these rules. Comments on equipment, conditions and any other points of interest will be welcomed.

Contestants are strongly recommended to operate in accordance with the British Isles Two Metre Band Plan.

1. When: 17.00 GMT on Saturday, March 7, 1964 to 19.00 GMT on Sunday, March 8, 1964.

2. Eligible Entrants. All fully paid-up members of the RSGB resident in Europe.

3. The General Rules published in the January 1964 issue of the RSGB BULLETIN relating to RSGB Contests will apply except as superseded by the rules of this Contest.

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

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW *

Batteries

By now, batteries which started the winter in poor condition are likely to be on their last legs after arduous usage. Mobile operators who obtain power from one battery only may not realize that the majority of cars sold on the home market are fitted with "original equipment" batteries of comparatively small capacity and will in fact accept export models having up to 50 per cent greater capacity. The only modification necessary will be the provision of longer fixing rods and, possibly, a deeper battery case and car body insulating plate.

Interference Suppression

Most amateurs approach this subject from a radio viewpoint rather than from the vehicle constructor's angle. The writer recently obtained free of charge an 18 page pamphlet No. 2015 on the subject from Joseph Lucas Ltd., entitled *Radio Interference Suppression*. It deals with suppression in four stages: (a) statutory suppression required by the Wireless Telegraphy Act 1949; (b) broadcast reception by car radio; (c) v.h.f. broadcast reception by car radio; (d) v.h.f. radio communication purposes.

Whilst mainly concerned with these non-amateur applications there is much in the well-illustrated pamphlet which can be of help to mobile operators who operate on any of the normally used bands. The range of equipment which this firm manufactures covers all the components which are likely to be needed, and applications are dealt with progressively. The components certainly appear to be far more rugged than radio components, and are designed for vehicle mounting. Apart from the familiar types of plug lead resistors and suppressor capacitors, there are feed-through capacitors with various types of mountings, filter units for suppressing windscreen wipers, compensated voltage control boxes, and other general sales items available off the shelf. More complex equipment such as fully screened and suppressed coils, distributors and C.V.C. units are available as limited batch items or as one-off products. It is understood that the full suppression of a vehicle is undertaken on an individual basis. However, most would prefer to do the job themselves as the cost could run into three figures! The writer feels that this pamphlet can be of value, not only for the technical advice, but also for the five page list of components giving the manufacturer's part numbers and comprehensive application notes.

* 1 Shortbatts Lane, Lichfield, Staffs.

5. Scoring: For each completed contact 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. In addition a bonus of 25 points may be claimed for the first contact in each new county in accordance with the list on page 52 of the January 1964 issue of the RSGB BULLETIN. The whole of the London Postal Districts will count as one county only.

6. Contest Exchanges. RST or RS reports followed by the contact number, the location and county (e.g. RST599001 Hull, Yorks). 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.

7. Logs. (a) Must be tabulated in columns headed in this order "Date/Time GMT," "Call-sign of station worked," "My report on his signals and serial number sent," "His report on my signals and serial number received," "Location," "County of station worked," "Points claimed."

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

(c) Entries must be postmarked not later than March 23, 1964.

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

Rally Notes

RSGB National Mobile Rallies are to be held during the 1964 season as follows:

April 5, 1964, at the Texas Instruments plant at Bedford. Apart from the usual raffle, lucky dip, talk-in stations, Society stands, etc., there will be a trade exhibition and full cafeteria refreshment service with free tea and coffee.

Texas Instruments manufacture semi-conductor devices, and a highlight of the afternoon will be a conducted tour of the factory. In order to arrange for sufficient guides to be available and in the interests of trade security it is necessary to advise our hosts of the number of persons who wish to tour the plant, together with their names and occupations. Would all who wish to participate in the tour please advise Headquarters, or the Chairman of the Mobile Committee, stating the names and occupations of the members of their parties. This information will be required by mid-March at the latest, but earlier advice would be of help to the Committee.

The very popular rally at the USAF Station, Wethersfield, nr. Braintree, Essex, will be held on May 24. The Woburn Abbey Rally will be held on September 13.

UBA Rally at Ardennes

According to information received from G3BID, an informal rally is being organized for August 29 and 30, 1964, by the Luxembourg Section of UBA at the Hotel Rochers du Herou, about 35 miles south-east of Namur. Talk-in stations will operate on August 30 on 3.5 and 144 Mc/s a.m., and 3.5 Mc/s s.s.b. It is understood that temporary /M licences will be granted to foreign amateurs by the Belgian RTT. Full details may be obtained from M. A. Lentz, Rue Neufchateau, Villeroux-Sibret, Province of Luxembourg, Belgium.

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RSGB PUBLICATIONS

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CLUBROOM

A Monthly Survey of Group and Club Activities

News from the Newsletters

The *AERE ARC Newsletter* prints the Chairman's Report for 1963, which was perhaps the club's most successful year. The constructional programme has included 70 Mc/s and 1250 Mc/s equipment. The *Coventry ARS Newsletter* stresses the importance of accurate log keeping and gives a startling example of the very opposite which happened in a recent contest. The same *Newsletter* reports suspected piracy of G3RYB/T's call-sign on 3.5 Mc/s. A Top Band DX success is reported in the *Crawley ARC Newsletter*: G3TR worked WIBB on c.w. using his top loaded 60 ft. vertical aerial. The *Ex-G Radio Club Report* suggests that UK participants in the 19.00 GMT Sunday net on 14.345 Mc/s might do well to turn their beams down Africa way where ZB1A and others may be heard. During Debden Fair Week the Loughton and District RS operated an exhibition station, GB3LOU, which proved a great success: their *Newsletter* reports that more than 600 QSOs were made on all bands from 160m to 2m. Another interesting feature was the wired TV installation by G3MJZ/T. This was all given good coverage by the local press. The *MARTS Newsletter* discusses the problem of a new headquarters for the Medway Society. They may even be fortunate enough to receive help from the Chatham Council in this difficult task. Some thought provoking statements on s.s.b. appear in the *Mitcham Newsletter*. Purely from a theoretical point of view, how does one produce m.c.w. with an s.s.b. transmitter? In *Mobile News* G6GR points out some of the advantages of working on 80m instead of 160m and suggests that more people should give 80m a try. Further details for building the Project Chieftain receiver are given. For mobile enthusiasts the North Kent *Newsletter* describes a novel method of securing a whip to a car. This consists of a strong magnetic base to which the aerial is attached using a suitable insulating material. This system is alleged to have been tested on a car travelling at 100 m.p.h. without the aerial coming off. South Shields *Spectrum* gives a useful selection of constructional hints which should be helpful to those whose enthusiasm to complete a job quickly tends to cause poor workmanship. While still on the matter of construction, the West Kent *QLF* gives some ideas and advice on the making of printed circuits. An American "ink beam" recorder is mentioned in the *Wolverhampton Newsletter*: a beam of ink, like a beam of electrons, is deflected electrostatically and can be used for signals up to 10 kc/s.

Club Reports

Ainsdale Radio Club. The Club AGM was held on January 8 at which N. Horrocks, G2CUZ, was appointed ASR/Honorary Secretary. The Chairman is R. J. Woodroffe, G2DQX, and the Honorary Treasurer is P. Cardwell, G3FXL. Club members are 100 per cent licensed and 100 per cent RSGB members. The Honorary Secretary's address is: 34 Sandbrook Road, Ainsdale, Southport, Lancs.

AERE ARC. The first talk of the current season, on RAF signals equipment, was given by S/Ldr Green from RAF Benson. The club also had an interesting talk on communications via satellites, given by Mr. Meller of the GPO Engineering Department. The Honorary Secretary is C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Berks.

Barnet RC. The sixth Christmas Party was held at Oakmere House, High Street, Potters Bar, on December 7, when there was an attendance of 216 including LA9AG. The G3AAE Cup was awarded to K. Spicer, G3RPB. At a recent junk sale a Type R1155 receiver which was claimed to be in good working order, was sold for 1d. Honorary Secretary: F. E. A. Green, G3GMY, 48 Borough Way, Potters Bar, Middx.

Barnsley & District RC. The Annual Dinner was held on January 18. The club is grateful for the support it receives from the radio and electronics industry. Details of activities may be obtained from the Honorary Secretary, P. Carbutt, G2AFV, 19 Warner Road, Barnsley, Yorks.

Burton-upon-Trent & DRS. The Fifteenth Annual Dinner of the Society was held in November. The Mayor and Mayoress of

Burton were guests of honour. Honorary Secretary: H. C. Harrison, G3ACR, 38 Baker Street, Burton-upon-Trent.

Bury & Rossendale RS. The AGM was held in December, and the following were elected: President and Chairman, R. J. Parsons, G3MTL; Honorary Secretary, J. Bennett, G3PVG; Honorary Treasurer, J. Openshaw, G2AYG; QSL Manager, T. Platt, G2GA. Committee Members: D. Fletcher, SWL; K. Drinkwater, G3RHR; H. Priestley, G3FLR. The RAE and Morse Classes given by G3PVG and G3MTL respectively, will continue as before. The Club meets at the Knowsley Hotel, Kay Gardens, Bury. Club fees are paid on an attendance basis, and all are welcome, whether members or not. Details of meetings may be obtained from the Honorary Secretary, J. Bennett, G3PVG, 21 Harwood Drive, Elton View, Bury, Lancs.

East Kent RS. A very successful Christmas party was held in December: there was a good attendance. A committee meeting was held to discuss the planning of future events, one of which will be a lecture on the Fire Service by G3SGH. Details of the year's programme may be obtained from the Honorary Secretary, D. N. T. Williams, G3MDO, Seletar, New House Lane, Canterbury, Kent.

Cheshunt & District RC. This is a new club and meetings are held on the first Friday of each month at the Cheshunt Civil Defence HQ at 8 p.m. The Honorary Secretary is B. B. Charge, whose address may be obtained from the Publicity Officer, W. R. Hawthorne, G3MCS, 3 Robinson Avenue, Goffs Oak, Cheshunt, Herts. New members and visitors will be very welcome.

Cheltenham RSGB Group. M. Mason, G6VX, gave an excellent lecture to the Cheltenham Group in December. Entitled "Introduction to s.s.b.," the talk dealt with all the aspects of transmitters, receivers, and transceivers, that were essential for a proper understanding of the subject. G6VX intends holding a further session in March or April. The Area Representative is J. J. Yeend, G3CGD, 30 St. Luke's Road, Cheltenham, Glos.

Civil Service Radio Society. The Society welcomes applications for membership from members of H.M. Civil Service and other persons in comparable employment. Lectures and demonstrations are held at the Science Museum, South Kensington, London, S.W.7, on the first Monday of each month from September to May, usually commencing at 6 p.m. Before each meeting a tea bar is available for members and their guests. There is also a meeting throughout the year on the third Monday evening of each month in the Demonstration Room, on the first floor of the Science Museum. Further particulars may be obtained from the Society's Publicity Officer, D. E. Tomkinson, G3IIE, 24 Mead Way, Coulsdon, Surrey.

Cornish Radio & Television Club. At a recent meeting which was attended by 36 members, G3NKE gave a talk on the importance of correct log keeping. A debate on Two Metres versus Top Band was held, but the results appear inconclusive. Honorary Secretary: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Coventry ARS. The Coventry Society's V.H.F. Cup has been won by G3NBQ. The new room at the TA Headquarters, Westfield House, is a great improvement on the old premises, and the club has full permission to erect any aeriels it requires. Aeriels are now going up fast. The Honorary Secretary is A. J. Wilkes, G3PQQ, 141 Overslade Crescent, Coundon, Coventry.

Cray Valley RS. At a meeting held in December, G2AQB gave a talk on the effects of changes of ambient temperature on the stability of v.f.o.'s. Meetings are held at 1 Court Road, Eltham, London, S.E.9. The Honorary Secretary will be pleased to supply details: W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.

Crawley ARC. At the AGM held in December, the following were re-elected: Chairman, J. C. Graham, G3TR; Honorary Secretary, R. G. B. Vaughan, G3FRV; Honorary Treasurer, J. E. Parsons, B.R.S.22560. The 1964 Committee Members are K. V. Franklin, G3JKF; A. J. Gibbs, G3PHG; E. J. Lettis, G3RXJ; M. J. Underhill, G3LHZ. For the January meeting,

the Club moved to a new headquarters at the Trinity Congregational Church, Ifield. The Annual Dinner will be held on Friday, March 6, at the "Grasshopper," Tilgate. The February programme is still being arranged, but visitors are assured of a warm welcome, and details may be obtained from the Honorary Secretary, R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley, Sussex.

Crystal Palace & DRC. There was a good attendance of Club members at the RSGB AGM. Some outstanding bargains were to be had at the Junk Sale, thanks to the Cedar brothers who arrived with a vanload of equipment. The Club AGM is on Saturday, February 15. Honorary Secretary: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.

Dorking & District RS. The Christmas Dinner was held on December 17 at the Parrot Inn, Forest Green. One of the guests was the Editor of the *Dorking Advertiser*. The Honorary Secretary is J. Greenwell, G3AEZ, Eastfield, Beare Green, near Dorking, Surrey.

Grafton RS. A highly successful Christmas Social was held on Saturday, December 7, at the Bedford Corner Hotel. There was an attendance of approximately one hundred, and guests included G3FZL, G6CL, G3IIR, and G3TR. During the function, John Clarke, G2AAN, President of Grafton, presented on behalf of the Society a token of thanks to Bert Wennell, G2CJN, in appreciation of thirteen years' service as secretary. The 1964 Grafton Party will be held on Saturday, December 5. Advance bookings are already arriving. Honorary Secretary: A. E. Bristow, B.R.S.25879, 37 Tyndale Mansions, Upper Street, London, N.1.

Halifax & District ARS. The RR, J. Petty, G4JW, addressed the meeting held on January 7. Matters discussed included the preservation of the amateur bands, location of new RSGB HQ, RSGB membership, availability of the BULLETIN to non-members on an economical subscription basis and quality of matter in the BULLETIN. The Publicity Officer is M. Whitaker, G3IGW, 39 The Green, Northwram, Halifax, Yorks.

Enfield Group. G3HRH gave his postponed lecture on various aspects of aerials and feeders. A number of questions put by members were answered. A very interesting and instructive evening was marred by a very poor attendance. The Area Representative is John Gazeley, B.R.S.20533, 192 Haselbury Road, Edmonton, London, N.9.

Kingston & District ARS. NFD has been discussed at recent meetings, and those who are interested in building equipment for this event are urgently requested to get in touch with the Honorary Secretary, A. Wheeler, G3RHF, 22 Meadow Road, Ashford, Middx.

Liverpool & District ARS. Having unfortunately lost the old meeting place, the Club now meets at West Derby School, Meadow Lane, West Derby Village, Liverpool. A Hamfest and Dinner Dance will take place on March 7 at the Gateacre Country Club. Tickets and information from the Honorary Secretary, H. James, G3MCN, 448 East Prescott Road, Liverpool 14.

Lothians RS. On December 12 an "Any Questions?" night was held: most of the answers were provided by the audience, much to the relief of the panel. A surprising number of members turned up for the Ragchew on December 26, but this is Scotland and the story would have been different if the meeting had been on January 1! Honorary Secretary: L. R. Richardson, GM3AKM, 64 Wester Drylaw Place, Edinburgh, 4.

Loughton & District RS. The second AGM was followed by a very successful junk sale which resulted in some £20 being added to the club funds. The following officers have been elected: Chairman, C. Watnam, G3NKK; Treasurer, W. Patten, G3PAT; Field Day Organiser, M. Raitton, G8AB. The Honorary Secretary is A. W. Sheppard, G3JBS, 11 Barfields, Loughton, Essex.

Luton & District ARS. This society is being re-activated and moved to a new headquarters on January 21. The regular meeting evening has been changed to Tuesday, but the premises will be available to members on Mondays and Thursdays, also at weekends for participating in contests. An attractive programme has been arranged. Members are particularly reminded of the Activity Contest arranged for March 23 when there will be a prize for the best home-built gear on view. Honorary Secretary: D. G. Pinnock, G3HVA, 265 Chesford Road, Luton, Beds.

Manchester & District ARS. The AGM was held on December 11 when the 1964 Committee was elected: Chairman, A. B.

Langfield, G3IOA; Secretary, D. H. Poole, B.R.S.25698; Treasurer, P. Singleton. Members of the Committee: F. Sawyer, G3SLN; H. Tyreman, G3SLI; R. Hill, G3SMZ; A. Flood, I. Goodwin, T. Cook, G. Newsome. Details of meetings may be obtained from the Honorary Secretary, D. H. Poole, B.R.S. 25698, 215 Greengate, Middleton Junction, Manchester.

Medway Amateur Receiving & Transmitting Society. A prize of £1 10s. 0d. will be awarded for the best heading design for the new *MARTS Newsletter*. Designs should not take more than three inches of depth. Please send entries to the Editor not later than February 18. The Honorary Secretary is Mrs. J. D. Davis, 42 Trinity Road, Gillingham, Kent.

Mitcham & District RS. An enjoyable Christmas meeting was held at which there was a Christmas Draw: B. Searl held the winning tickets. The G5UX Key was won by G3NGY, and the Les Blake Listener's Trophy by S. Stevenson. The Constructional Cup was won by G3HQX with a v.h.f. converter. Honorary Secretary: A. Thurlay, G3SQJ/T, 50 Bruce Road, Mitcham, Surrey.

Amateur Radio Mobile Society. This Society caters for the specialised requirements of mobile enthusiasts. Prospective members should get in touch with the Honorary Secretary, N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.

Northern Heights ARS. Recent events have included the Annual Dinner and a very interesting lecture by H. Makin, G3FDC, on building a 10 to 80m transmitter using a Gelofo v.f.o. A full programme has been planned, and details can be obtained from the Honorary Secretary, A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax, Yorks.

North Kent RS. The club is solvent and it will not be necessary to raise the subscription. There will be a raffle which will be drawn at the Annual Dinner to be held on February 22. Honorary Secretary: B. Reynolds, G3ONR, 49 Station Road, Crayford, Kent.

Paddington & District RS. The AGM was held on January 8 at which the following were elected: President, D. S. Jewiss; Chairman, W. Bailin, G3NOZ; Vice Chairman, A. B. Altschul, G3JDP; Honorary Secretary, J. E. Alban, G3JEA; Honorary Treasurer, S. Legg, G3KNL; Committee: E. W. Holt, G3MHQ; L. Harbin, G3PLC; N. Hilberry, A.3226. The club operates on all bands from Top Band to 2m. Details of meetings may be obtained from the Honorary Secretary, J. E. Alban, G3JEA, 172 Droop Street, London, W.10.

Peterborough & District ARS. A display of home-built gear was held at the Peterborough Technical College on January 10. There was also a discussion on TVI with wired relay systems. Honorary Secretary: D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants.

Plymouth RC. The new clubroom at Virginia House has now been completed and all meetings will now be held there. On December 3, G3LMG gave a most entertaining lecture on "Commercial V.H.F." and on January 7 there was a talk on "Gadgets" by G5ZT, the Club President. For full details about the G5ZT Construction Trophy, contact the Honorary Secretary, R. Hooper, G3SCW, 2 Chestnut Avenue, Peverell, Plymouth, Devon.

Reading ARC. The AGM was held on January 25 when new officers were appointed and the Club Badge Competition was judged. The Annual Dinner was held on January 18 and proved a great success. The meeting to be held on February 29 will be devoted to a discussion on the contests to be entered in 1964. Honorary Secretary: R. G. Nash, G3EJA, Peacehaven, 9 Holybrook Road, Reading, Berks.

Reigate Amateur Transmitting Society. The Annual Constructional Contest was held at the December meeting and was judged by a panel from Crawley ARC headed by their Chairman, J. C. Graham, G3TR. K. J. Wheatley, G3BBR, won the G8KW Cup for his mobile transmitter, and R. Wells, G3RIN, in the Junior Class, won the XYL Cup for his oscilloscope. The judges congratulated the juniors particularly on their very high standards. The Annual Dinner and Dance will now take place at the Warwick Hotel, Redhill, on Saturday, February 15. Tickets and further details from the Honorary Secretary, F. D. Thom, G3NKT, 12 Willow Road, Redhill, Surrey.

Rotherham & District RC. The AGM was held on January 3 when the following Officers were elected: President, E. E. Davies, G2LG; Chairman, A. Tinsley; Vice Chairman, M. Parkin; Honorary Secretary, J. W. Howe, G3NXZ; Treasurer, J. H. Johnson, G3GCV. Other Committee Members: T. Walton, J. Barnes and R. F. Elliott, G3SDM. The Club Station, G3OAM

is on the air on club nights. For details of future meetings contact the Honorary Secretary, G3NXZ, 18 Laburnum Grove, Conisbrough, near Doncaster, Yorks.

Shropshire ARS. At the December meeting there was a talk by G5IC entitled "Feeding Your Aerial." This covered sufficient ground to be of interest to both the beginner and the more experienced amateur. The club has now been issued with the call-sign G3SRT and a station will be put on the air as soon as a suitable transmitter has been built by the members. An interesting programme of lectures and films has been planned, and details may be obtained from the Honorary Secretary, K. E. Jones, G3RRN, Greystones, Shrewsbury Road, Church Stretton, Shropshire.

South Dorset RS. At the January meeting R. Staniforth, G3EGV, gave a talk on v.h.f. and u.h.f. transmitters and receivers and aerial systems. This was followed by a discussion on this year's NFD equipment. The Honorary Secretary is C. E. Biggs, 54 Prince of Wales Road, Dorchester, Dorset.

Southgate, Finchley & District Group. The G6QM Trophy for 1963 was won by C. Jardine for his 2m transmitter, and the junior entry was won by B. Simpson for his transistor VOX. The attendance at the AGM was rather disappointing with less than three dozen members present. The AR is G3PKZ and the Honorary Secretary is K. Spicer, G3RPB, 22 Clifton Road, Finchley, London, N.3.

South Shields & District ARC. In November there was a visit to the Heaton Works of C. A. Parsons Ltd. Members were able to see the construction and testing of large turbines and alternators. Honorary Secretary and Editor: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.

Stourbridge & District ARS. The club is getting dangerously low in the supply of operators for various contests, and licensed members are urged to come forward to put this unfortunate state of affairs right. Please get in touch with the Honorary Secretary, R. A. G. MacIntosh, B.R.S.20894, 50 Field Lane, Oldswinford, Stourbridge, Worcs.

Torbay ARS. At the January meeting members welcomed H. Williams, DL3BQ. A talk was given on radio operating in Singapore and Malaysia by W. Jones, G3BBF/VS1LV, who is with the RAF and who is at present home on leave. Honorary Secretary: Mrs. Gee Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay, Devon.

Southampton Group. Details of meetings and where they are held may be obtained from the AR, G. J. Meikle, 34 Victoria Road, Netley Abbey, Southampton.

West Kent ARS. Meetings are held on the second and fourth Friday of every month at Culverden House, Culverden Park Road, St. John's, Tunbridge Wells, commencing about 7.30 p.m. and closing at 10 p.m. Refreshments are available at a small charge about half way through the meeting. Programme details may be obtained from the Honorary Secretary, H. F. Richards, 17 Reynolds Lane, Tunbridge Wells, Kent.



Among those who attended the Welwyn Garden City Group's 1963 Sausage Supper were R. C. Hills, G3HRH (Council Member), and three well-known local 2m operators, from right to left, F. E. A. Green, G3GMY; P. J. Simpson, G3GGK; R. E. Parry, G3BJC. (Photo by G5UM)

Wolverhampton ARS. The Honorary Secretary, J. Rickwood, G3JJR, will be pleased to supply any details of future activities; his address is 852 Stafford Road, Fordhouses, Wolverhampton.

Club of the Month

WELWYN GARDEN CITY GROUP

Welwyn Garden City Group first entered for National Field Day as long ago as 1937. When after The Great Close Down the members got together again in 1946 they debated earnestly whether to re-form themselves as a group or to start a club instead. By an emphatic vote they decided "Group"—though you can hear some of them from time to time saying "See you at the Club Meeting tomorrow night!"

The WGC Group can make the unusual claim of having provided a member for Council for the best part of 20 years. The present member is Ray Hills, G3HRH. Before him Jack Hum, G5UM, served on the governing body for seven years, and before him again George Bloomfield, G2NR.

An idea of the Welwyn Garden City Group's coverage may be had by any listener on the 2m band on Mondays, Fridays, and Saturdays at 8 p.m., when the Mid-Herts Net swings into action on 145.1 Mc/s. From within a radius of a dozen miles—perhaps often even farther—members congregate at Welwyn Garden City on the second Thursday of every month. Many come from the neighbouring clubs at St. Albans and Stevenage, with whom there is close and friendly reciprocity. The reciprocity is extended even more widely on the occasion of the October Meeting, traditionally the date when the WGC Group are hosts to other groups and clubs anywhere in the Home Counties. Another fixed point in the calendar is the March Meeting, always the Constructors' Exhibition. Like the October Meeting, this is an occasion for a social foregathering and the occasion too when Mr. Stanley Harrison, J.P., G3EPK, awards his two trophies for the best pieces of home constructed equipment submitted by over 21's and under 21's respectively.

Apart from these two special events, meetings are generally held at the Murphy Radio establishment in Welwyn Garden City, where a Conference Room is permanently available for the use of members. As might be expected, large numbers of members work for that Company, and there is no lack of willing helpers when the Murphy Club's call sign G8LM goes on the air.

During its 18 years of post-war existence the WGC Group has had only two elected representatives, Gerald Gibbs, G3AAZ, and Jack Hum, G5UM.

BOOK REVIEW

RADIO AND LINE TRANSMISSION (Volume II) by G. L. Danielson and R. S. Walker. 289 pages and 224 diagrams. Published by Iliffe Books Ltd. Price 22s. 6d.

This volume continues with the subject matter of Volume I of the same title at a higher level. It is intended to cover the syllabus of the Radio and Line Transmission B examination of the City and Guilds of London Technicians' Certificate, but will be of considerable use to those studying for the Higher National Certificate and similar level examinations. The text is very readable and provides a useful source of questions to give the student practice in answering numerical and other problems on the various topics covered in the text. It can be recommended also as a reference book to those wishing to refresh their memories on fundamentals learnt in the dim and distant past!

G.C.F.

Closing date for the March issue

February 7

Closing date for the April issue

March 6

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

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).**—February 12, 26, 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).—February 11, 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, Stonycroft.
Macclesfield.—February 18, March 3, 42 Jordon-gate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droydsden Road, Newton Heath, Manchester 10.
Manchester (SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Rackhouse, Daine Avenue, Northenden.
Morecambe.—February 5, March 4, 125 Regent Road.
Preston.—February 11, 25, St. Paul's School, Pole Street. (All meetings start with a Morse practice at 7.30 p.m.)
Southport (SRS).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport.—February 12, 26, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral.—February 5, 19, March 4, 7.45 p.m., Harding House, Park Road West, Cloughton.

REGION 2

- Bradford.**—February 11 ("Colour Television," by G. N. Patchett), February 25 (Field Day Discussion), 7.30 p.m., 66 Little Horton Lane.
Catterick.—Tuesdays and Thursdays, 7.30 p.m., Club Room, Vimy Road, Catterick Camp.
Halifax.—February 11 (Visit to Bradford Club).
Northern Heights.—February 5 (Ragchew), February 19 ("Accidents in the Shack," by F. C. Luxton), 7.30 p.m., Sportsman Inn, Ogdens.
Scarborough.—Thursdays, 7.30 p.m., Chapman's Yard, North St.
Spenn Valley.—February 6 ("Noise Problems," by W. Dougherty), February 20 (Junk Sale), 7.15 p.m., Heckmondwike Grammar School.
York.—Thursdays, 8 p.m., British Legion Club, Micklegate.

REGION 3

- Birmingham (MARS).**—February 18 ("More thoughts on S.S.B.," by George Brown, G5BJ), 7.30 p.m., Midland Institute, Paradise Street, Birmingham.
Birmingham (MRCC).—March 6, 7.30 p.m., Windmill House, Weatheroak, Wythall, Birmingham.
(Slade).—February 14, 7.45 p.m., The Church House, High St., Erdington.
Cannock (CCARS).—March 5, 8 p.m., The Tavern, Bridgtown.
Coventry (CARS).—Mondays, 8 p.m., Westfield House, Radford Road, Coventry.
East Worcestershire Group.—February 13, 8 p.m., Old Peoples Centre, Redditch.
Lichfield (ARS).—February 18, 7.30 p.m., Swann Inn, Lichfield.
Salop Amateur Radio Society.—February 13, 7.30 p.m., The Tennis Club, Harlescott Crescent, Harlescott Lane, Harlescott, Shrewsbury.
Stourbridge (STARS).—February 11 ("Hi-Fi Without Tears," Part 2, by G. Woolfenden), 7.45 p.m., Foley College, Stourbridge.
Stratford-upon-Avon (ARS).—Fridays, 7.30 p.m., Flat 1, Birds Commercial Motors, Stratford-upon-Avon.
South Birmingham (ARS).—February 20 ("Thirty Years of Amateur Radio," by Tom Parton, G2AGK), 7.30 p.m., Friends Meeting House, Balsall Heath.

- Sutton Coldfield (ARS).**—February 14, 7.30 p.m., 92 The Parade, Sutton Coldfield.
Wolverhampton (ARS).—Mondays, 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

- Burton on Trent (ARS).**—Wednesdays, 7.30 p.m., Club Rooms, Stapenhill Institute, Burton on Trent.
Chesterfield (C & DARS).—February 12, March 11, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.
Derby (D & DARS).—February 5 (AGM), February 12 ("History of Recorded Music," Part 1), February 15 (Annual Dinner and Dance), February 19 (Open Evening), February 26 (NFD, 1964 Discussion), March 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, Alveston, Derby.
Graham (G & DARS).—Mondays, 7.30 p.m., Club Room, rear of Manners Arms Hotel, London Road, Graham.
Grimsby (ARS).—February 13, 27, March 12, 19 (Annual Dinner), 8 p.m., Grimsby Model Engineers Club Rooms, Fletchers Yard, Wellowgate, Grimsby.
Heanor (H & DARS).—February 11 ("Relays," by W. McCallum, G3HPV), February 18 (Surplus Sale), February 25 ("Applications of the CRO," by C. E. Shaw), March 3 (Films), 7.30 p.m., Room No. 5, Heanor Technical College, Ilkeston Road, Heanor.
Leicester (LRS).—Mondays, 7.30 p.m., Club Room, 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, Wharnclyffe Road, Loughborough.
Mansfield (MRS).—Fridays, 7.30 p.m., Hope & Anchor Hotel, Union Street, Mansfield.
Melton Mowbray (ARS).—February 20, 7.30 p.m., St. John's Ambulance Hall, Asfordby Hill.
Nottingham (ARCN).—Tuesdays and 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).—February 7, March 6, 7 p.m., Room No. 13, Electronics Block, Peterborough Technical College, Eastfield Road.
Workshop (NNARS).—Tuesdays (Beginners), Thursdays (Informal), 7.30 p.m., Club Room, Victoria Institute, Eastgate, Workshop, Notts.

REGION 5

- Cambridge (C & DARC).**—February 7 (Discussion on "Four Metres"), February 14 ("Crystal"), February 21 (Informal), February 28 ("Transparencies Evening"), March 6 (Junk Sale), Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
Cambridge University (CUWS).—Tuesdays, 8.15 p.m., Psychology Department, Lecture Room, on Downing Site during University Term.
Luton (L & DARS).—Tuesdays, February 11 (RSGB Tape Recorded Lecture), February 18 (Quiz by G3RXW), February 25 ("NFD Planning"), 8 p.m., ATC Headquarters, Crescent Road, Luton, Beds.
March (M & DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, High Street, March, Cambs.

LOOKING AHEAD

- March 13.**—London Lecture Meeting at IEE.
March 18-24.—Electrical Engineers Exhibition, Earls Court, London.
April 5, 1964.—RSGB National Mobile Rally, Texas Instruments Ltd., Bedford.
May 1.—London Lecture Meeting at IEE.
May 24, 1964.—RSGB National Mobile Rally, USAF, Wethersfield.
May 24, 1964.—Northern Mobile Rally.
June 21, 1964.—Longleat Mobile Rally.
July 5, 1964.—South Shields Mobile Rally.
August 16, 1964.—Derby Mobile Rally.
August, 1964.—International Mobile Rally, Belgium.
September 13, 1964.—RSGB National Mobile Rally, Woburn Abbey.

- Oakington RAF, Cambs.**—A club is in course of formation at this station. G3NCO wishes to contact anyone interested in joining.
Royston (R & DARC).—Thursdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Herts.
Shefford (S & DARS).—Thursdays, 7.45 p.m., Digsell House, Hitchin Road, Shefford, Bed.

REGION 6

- Oxford (O & DARS).**—Second and fourth Wednesdays in each month (RAE classes), 7.15 p.m., Cherwell Hotel, Water Eaton Road, N. Oxford.

REGION 7

- Acton, Brentford & Chiswick (ABCRC).**—February 18, 7.30 p.m., ("Simple TX," by G3LGM), AEU Club, 66 High Road, Chiswick.
Bexleyheath (NKRS).—February 13, 27, 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.
Barnet (BRC).—February 25 ("Green and Davis Products"), 8 p.m., Red Lion Hotel, Barnet.
Chingford (Group).—February 9, contact G3NQT, Loughton 2397. (SC).—Fridays (except first), 8 p.m., Chingford Community Centre, Enday Hill.
Clifton (CARS).—February 7 ("Transmitter Design," by G3OYU), February 21 (slides and films of the field day, and a tape recording from Voice of America), March 6 ("DXpeditions," by G3JEQ).
Croydon (SRCC).—February 11, 7.30 p.m., Blacksmiths Arms, South End, Croydon.
Dorking (D & DRS).—February 11 (Discussion on "Receivers"), 8 p.m., "Wheatstheaf," Dorking. February 25 ("Wiring Techniques, printed circuits etc.," by J. Green of Decca), 8 p.m., Star & Garter, Dorking.
East Ham.—February 11, 25, Tuesdays fortnightly, 7.30 p.m., 12 Leigh Road, East Ham.
East London District.—February 16 ("Geneva—Its Relationship with Amateur Radio," by A. O. Milne, G2MI), 2.30 p.m., Ilford Town Hall, High Road, Ilford.
East Molesey (TVARTS).—February 5, Carnarvon Castle Hotel, Hampton Court.
Edgware & Hendon (EARDS).—February 10, 24, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Enfield.—February 20, 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Gravesend (GRS).—February 19, 7.30 p.m., RAFA Club, 17 Overcliffe, Gravesend.
Guildford (G & DRS).—Second and fourth Fridays in each month, 8 p.m., City Cafe, Onslow Street, Guildford.
Harlow.—Tuesdays, 7.30 p.m., rear of G3ERN

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(G. E. Read), High Street, Harlow. (SRC).—Wednesdays, 7 p.m., Edinburgh Way, Harlow.
Harlow (RSH).—Fridays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harlow.
Holloway (GRS).—Mondays and Wednesdays, 8 p.m., Fridays (Club 7.30 p.m.), Montem School, Hornsey, N.7.
Hounslow (HADRS).—Mondays, fortnightly, February 10, 24, 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.—February 13, 8 p.m., YMCA, Eden Street, Kingston. Morse Classes weekly on Fridays at 2 Sunray Avenue, Tolworth.
Leyton & Walthamstow.—February 25, 7.30 p.m., Leyton Senior Institute, Essex Road, E.10. Interested new members contact A. Rix, 17 Forest Drive East, E.11.
Loughton.—February 7, 21, 7.30 p.m., Loughton Hall, nr. Debden Station.
Mitcham (M & DRS).—February 14, 7 p.m., "The Canons," Madeira Road, Mitcham.
Norwood & South London (CP & DRC).—February 15 (AGM), CD Training Centre, Bromley Road, Catford.
Paddington (P & DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.
Purley (P & DRC).—February 7, 21, 8 p.m., Railwaymen's Hall (side entrance), Whytecliffe Road, Purley.
Reigate (RATS).—February 22 ("Glassblowing") 7.30 p.m., The Tower, Redhill. February 15 (Annual Dinner), Warwick Hotel, Station Road, Redhill.
Romford (R & DRS).—Tuesdays, 8.15 p.m., RAFA House, 18 Carlton Road, Romford.
Science Museum (CSRS).—Mondays, February 17 (Informal Meeting, RSGB Tape Recording, "The Engineer and Society," by the late Capt. P. E. C. Slesley), 6.30 p.m., Science Museum, South Kensington.

Can You Help?

- Alan M. Deacon, G3NPH, 31A Moss Grove, Kingswinford, Brierley Hill, Staffs. who requires information on a technical book, preferably not too expensive, giving formulae for permeability tuning in modern transistor car radio receivers?
- I. G. Munt, A.3776, 28 Welbourne Road, Childwall, Liverpool 16, who requires information on the APN-1 radio altimeter and R15/APN-3 and ID-17/APN-3 radar units?
- E. Hart, A.3136, 52 Glenholme Avenue, Shirley, Croydon, Surrey, who requires a National HRO receiver manual and also details of modifications?

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RSGB Publications (Dept. B),
28 Little Russell Street, London, W.C.1.

Sidcup (CVRS).—February 6 ("International Aspects of Amateur Radio," by A. O. Milne, G2MI), Congregational Church Hall, Court Road, Eltham.
Slough (SARS).—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street, Slough.
Southgate & District.—February 13, 8 p.m., Aclasta Lodge, Tottenham Road, N.13.
St. Albans (Verulam ARC).—February 19 (AGM), 7.30 p.m., Hedley Road, St. Albans.
Sutton & Cheam (SCRS).—February 18, 7.30 p.m., The Harrow, High Street, Cheam.
Uxbridge (UDRS).—February 17, 8 p.m., St. Andrews Church Scout Hut, Uxbridge Road.
Welwyn Garden City.—February 13 ("Micro Miniaturisation and Recent Transistor Developments," by Geoff Watts), 8 p.m., Conference Room, Murphy Road, Bessemer Road.
Wimbledon (W & DRS).—February 14, 8 p.m., Community Centre, St. George's Road, Wimbledon, S.W.19.

REGION 8

Crawley (CARC).—February 12 (Informal, for details, contact G3FRV, Crawley 23359), February 26, 8 p.m., Trinity Congregational Church, Ifield, 8 p.m.
West Kent (WKARS).—February 14 (Film Show of films supplied by Electricity Board), February 28 ("Beginner's Approach to Hi-Fi," talk and demonstration by D. Colwell), 7.30 p.m., "Culverden House," Culverden Park Road, St. John's, Tunbridge Wells.
Worthing (W & DARC).—February 10, 8 p.m., Adult Education Centre, Union Place, Worthing.

REGION 9

Bath.—February 12, 7.30 p.m., Committee Room, Technical College, Lower Borough Walls, Bath.
Bristol.—February 28, 7.15 p.m., Small Physics Theatre, Royal Fort, Bristol University, Woodland Road, Bristol 8.
Burnham-on-Sea (BoSARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.
Cambridge (CR & TC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, near Cambridge.
Exeter.—First Tuesday in each month, 7.30 p.m., George & Dragon Inn, Blackboy Road, Exeter.
Plymouth (PRC).—First Tuesday in each month, 7.30 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St. Andrews 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. February meeting at Weymouth.

Torquay (TARS).—First Saturday in each month, 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.—February 10 ("S.S.B.," by D. N. Thomas, GW3RXW), 7.30 p.m. TA Centre, Park Street, Cardiff.

REGION 13

Edinburgh (LRS).—February 13 ("Application of Silicon Planar Transistors," by a representative of Hughes International), February 27 ("S.S.B.," by W. H. F. Lamb, GM3EDL), 7.30 p.m., YMCA, South St. Andrew Street, Edinburgh.

REGION 14

Ayrshire.—Third Sunday in each month, ATC Hall, Mews Lane, Kilmarnock.

Glasgow.—February 7, February 21 (AGM), 7.45 p.m., Christian Institute, Bothwell Street, Glasgow.

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.

Great Yarmouth (GYRC).—Fridays, 7.30 p.m., at The Old Power Station, Manager's Office, South Quay, Swanston Road, St. Yarmouth. Details from G3HPR.

Norwich (Norfolk ARC).—Meets regularly at "The Branford Stores," Branford Road, Norwich. Details from G3NJK, 50 Vicarage Road, Norwich.

Southend (SDARS).—Meetings on alternate Fridays, 8 p.m., in the Executives' Canteen, E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Details from the Honorary Secretary, Mrs. P. M. C. Collop, 53 Bedford Avenue, Westcliffe.

REGION 17

Southampton.—February 8 ("Photography," an illustrated lecture by G3NJK), 7 p.m., the Engineering Lecture Theatre, Southampton University.

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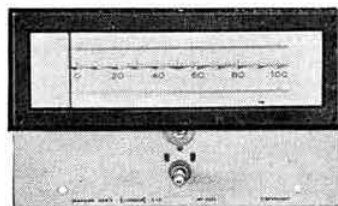
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Time	Call-sign	kc/s	Town	Time	Call-sign	kc/s	Town
Sundays				Wednesdays			
08.00 ...	G3KLT	1827	Birmingham	19.00 ...	G3GBJ	1870	Redditch, Worcs.
09.30 ...	G3KZZ	1920	South Shields, Co. Durham	20.00 ...	G3RQX	1840	Wolverhampton, Staffs.
10.15 ...	G3CGD	1875	Cheltenham	20.00 ...	G3KFE	1980	Stevenage, Herts.
10.30 ...	G3JEX	1860	Belfast	20.30 ...	G3SAD/A	1920	Theydon Bois, Essex
11.00 ...	G2FXA	1900	Stockton-on-Tees	20.30 ...	G3AGN	1875	Felixstowe
12.00 ...	GM3HBY	1903	Glasgow	21.00 ...	G3HVI	1890	Stoke-on-Trent
12.00 ...	G3HVI	1890	Stoke-on-Trent	21.00 ...	G3OGD	1892	Salisbury, Wilts.
12.00 ...	G3OGD	1890	Stoke-on-Trent	21.00 ...	G3PLQ	1892	Salisbury, Wilts.
18.30 ...	G3NCZ	1920	Blackburn, Lancs.	21.00 ...	G3POU	1850	Doncaster, Yorks.
19.00 ...	G3SEP	1980	Gt. Yarmouth	21.00 ...	G3KAD	1850	Doncaster, Yorks.
21.00 ...	G3LKT	1892	Salisbury, Wilts.	21.00 ...	G3SFO	1850	Doncaster, Yorks.
21.15 ...	G3PLQ	1920	Beckenham	Thursdays			
21.30 ...	G3NQR	1875	Harrow Weald, Middx.	18.30 ...	G3NCZ	1968	Swindon
Monday				19.00 ...	G3NUT	1875	Wallasey
18.30 ...	G3NCZ	1920	Swindon	19.00 ...	G8RQ	1920	Chesterfield, Derbys.
18.30 ...	G3NCZ	1920	Blackburn, Lancs.	20.00 ...	G3NHR	1900	Hounslow
19.00 ...	G3MXS	1875	Birkenhead	20.00 ...	G5XB	1838	Reading
19.00 ...	G8RQ	1920	Chesterfield, Derbys.	20.00 ...	G3IRM	1981	Bury St. Edmunds
20.00 ...	G3HJG	1825	Manchester	21.00 ...	G3MWO	1892	Salisbury, Wilts.
20.00 ...	G3IBJ	1910	Southampton, Hants.	21.00 ...	G3PHW	1892	Salisbury, Wilts.
20.00 ...	G3OGE	1910	Beckenham, Kent	21.00 ...	G3LKT	1892	Salisbury, Wilts.
20.00 ...	G3PKZ	1930	London N.22	21.30 ...	G3PLQ	1865	Redditch, Worcs.
21.00 ...	G3IRM	1981	Bury St. Edmunds	22.00 ...	G3EVT	1980	Wingate, Co. Durham
21.00 ...	G3MWO	1892	Salisbury, Wilts.	Friday			
21.00 ...	G3PHW	1892	Salisbury, Wilts.	18.30 ...	G3NCZ	1920	Blackburn, Lancs.
21.15 ...	G3ADQ	1990	Bradford, Yorks.	19.00 ...	G3LLM	1820	Bath
21.30 ...	G2BSW	1865	Studley, Warks.	19.00 ...	G8RQ	1920	Chesterfield, Derbys.
Tuesday				19.30 ...	G3PWU	1850	Reading, Berks.
19.00 ...	G8RQ	1920	Chesterfield, Derbys.	20.00 ...	G3PED	1920	Goodmayes, Essex
20.00 ...	G3RZO	1865	Redditch, Worcs.	20.00 ...	G3LLM	1820	Bath
20.00 ...	G3PJI	1910	Southampton	21.00 ...	G3LKT	1892	Salisbury, Wilts.
20.00 ...	G3AYJ	1925	Birmingham	21.00 ...	G3PLQ	1990	Bradford, Yorks.
20.30 ...	G3NKK	1915	Loughton	21.30 ...	G3RZI	1865	Redditch, Worcs.
21.00 ...	G3LKT	1892	Salisbury, Wilts.	21.30 ...	G3RPV	1900	Pudsey, Yorks.
21.30 ...	G3HJG	1865	Redditch, Worcs.	23.00 ...	G3KSS	1903	Bradford
22.00 ...	G3LLM	1820	Bath	23.00 ...	GM3HBY	1903	Glasgow
22.00 ...	G3AWL	1980	Wingate, Co. Durham	Saturday			
22.00 ...	G3HJG	1925	Manchester	13.00 ...	G2FXA	1900	Stockton-on-Tees
Wednesday				14.00 ...	G3JEX	1860	Belfast
18.30 ...	G2FXA	1900	Stockton on Tees	20.00 ...	G3KPO	1980	Peterborough
19.00 ...	G3GBS	1865	Moseley	21.00 ...	G3LKT	1892	Salisbury, Wilts.
19.00 ...	G8RQ	1920	Chesterfield	21.00 ...	G3PLQ	1892	Salisbury, Wilts.

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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 West 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.

Radio Society of Great Britain

(INCORPORATED 1926)

Patron: H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, K.G.

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I agree that in the event of my election I will abide by and observe the Rules, Regulations and Articles of Association of the Society and that in the event of my resignation from the Society given under my hand in writing, I shall after payment of all arrears which may be due by me at that period, be free from this obligation. I further agree to observe strictly the terms of any licence issued to me by the responsible authorities to operate transmitting or receiving apparatus.

Signed

PERSONAL DETAILS TO BE COMPLETED BY THE APPLICANT

Surname (BLOCK LETTERS)

Christian Names in full (BLOCK LETTERS)

Address for all correspondence (BLOCK LETTERS)

Nationality Age (if under 21)

Current Call-sign (if any)

Details of previous membership (if any)

DETAILS TO BE COMPLETED BY THE TWO PROPOSERS

I wish to propose for Corporate Membership.

Proposer's Name (BLOCK LETTERS)

Address (BLOCK LETTERS)

Call-sign (or BRS No.)

Signed

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Proposer's Name (BLOCK LETTERS)

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