RSGB

BULLETIN

APRIL 1967
VOL 43, No. 4

Drum Mountain Expedition by the University College Bangor Amateur Radio Society.

(see page 247)

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

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RSGB BULLETIN

APRIL 1967
VOLUME 43 No. 4

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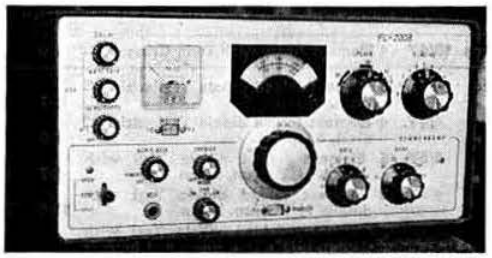

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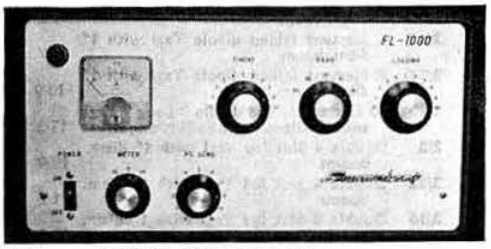

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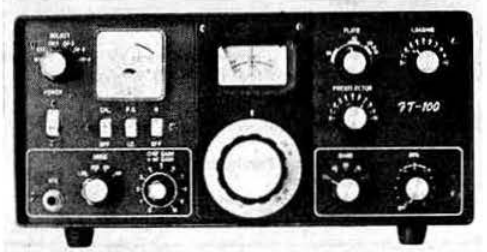

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Note my Sommerkamp linear ad.—I now say 960W input. I did this before and sold a lot of them, but since saying 400W output I haven't sold a single solitary one!! Marvellous!!
Incidentally, I suppose I ought to apologise for flogging this Japanese gear, at which a lot of people scream "cheap Jap junk!" I can't help noting though, the number of *owners* who are sitting back with a self satisfied smirk on their faces!! I have yet to hear any screams from them! They said the same about Pentax cameras and Yamaha motor cycles!! Ah well, that's the way it goes.

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Incidentally, I'm always interested in the more exotic stuff such as 5IJ's, 75A's etc., and will guarantee to offer you a low, low price so that I can get fat on the profits! Anyone wanting such equipment at a high, high price—sing out.

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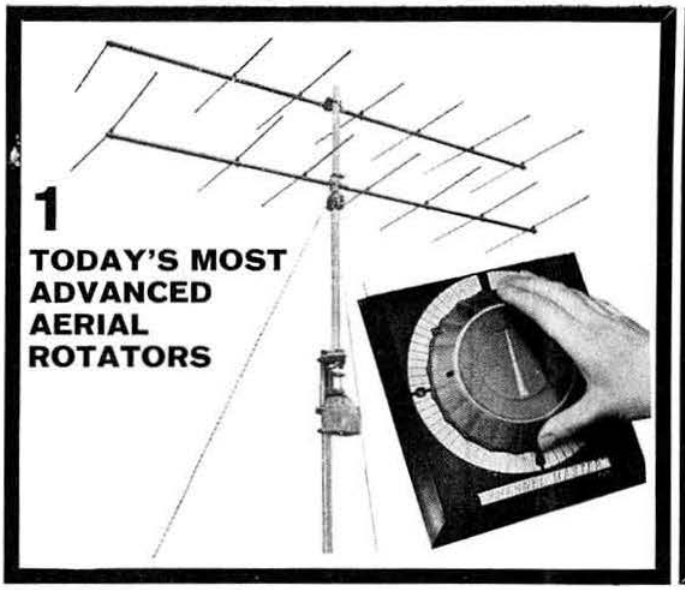

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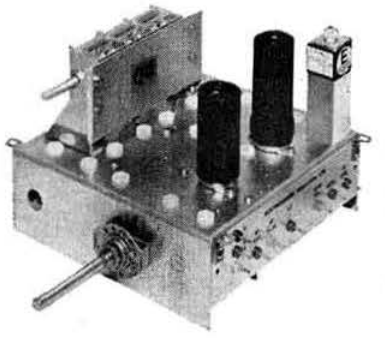

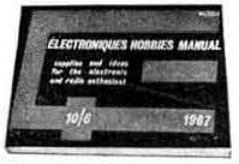

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CURRENT COMMENT

DISCUSSING TOPICS OF THE DAY

"All Amateurs Closed Down"

THESE words, last heard in September 1939, might seem to be something out of George Orwell's *1984*, but would again be possible if the *Wireless Telegraphy Bill*, recently published, reaches the Statute Book in its present form.

This Bill, published at the beginning of March, attracted immediate public attention because of its provisions relating to the compulsory disclosure by television receiver dealers to the GPO of the names and addresses of persons purchasing or renting sets. This and other matters are covered by Part 1 of the Bill, but it is to Part II of the document that radio amateurs should pay the greatest attention, for by the sweeping and blanket powers conferred by its provisions their existence could be in jeopardy.

The heading of Part II is innocuous enough—"*Miscellaneous*"—but the side heading should give the red light—"*restriction of manufacture or importation of certain apparatus.*" Under section 7. (1) and (2) of the Bill if the PMG "specifies" apparatus, no person shall manufacture, whether or not for sale, any apparatus of that class or description; and the importation of apparatus of that class or description is prohibited. The only limitation placed on the powers of the PMG to specify equipment is that it must be related to "interference," which could be extended logically to include any form of receiving, test or transmitting equipment containing an oscillator. It will be seen that not only may one not buy "specified apparatus" but also it may not be built, so that by carrying the possibilities to their full limit you could be in serious trouble by constructing a grid dip oscillator.

The power to prohibit the importation of wireless apparatus is presumably designed to restrict the flood of Japanese made walkie-talkies, the total number of which now reaches several hundreds of thousands and which are now causing interference to television receivers (for which amateurs are often blamed) and to our friends in the model control field. Co-operation between the Board of Trade and the PMG seems to be long overdue in this matter. A vast saving of public money used in tracking down unlicensed operators could have resulted if transmitting equipment could have been sold only to persons holding a GPO licence, either commercial or amateur. However such action would now have little practical effect in view of the tremendous amount of transmitting equipment now in the hands of unlicensed users.

It will, of course, be said that the PMG would never use his sweeping powers to prohibit amateur equipment, but what PMG would consider himself bound by the words of his predecessor in another government. Many reasons could be found for a change of policy. No, this is not the answer, which lies in a nation wide effort to prevent this Bill from becoming law in its present form.

Have our friends who advertise in the pages of the "Bulletin" considered the possible effect on their trade, if this consists mainly of selling components to the thousands of constructors throughout the country. Restrictions in the types of equipment which may be built in the home workshop—note the words *whether or not for sale*—could put them out of business overnight. We concur completely with the editorial in *Electronics Weekly* which says "unless the present Bill is drastically changed the cure could be a lot more serious than the disease."

By the democratic processes of government this Bill must be submitted to Parliament before it reaches the Statute Book. This then is the place where we must make known our feelings and ensure that they be translated into action before it is too late. You, as a member of the Society, could be affected by the almost unlimited powers about to be placed in the hands of the PMG, and therefore it is **your** duty to record your disapproval to your Member of Parliament. Don't leave this to Jack up the road, he may be leaving it to you, do this forcefully and do it **now**. Concurrently with the action by our Members the Society will be making known its views wherever it is considered that most good will be done in preventing this Bill from becoming law in its present form.

R. F. S.

Front Cover

Geoff White, GW8APM and Jon Hawkins, GW8AOH assembling the 4m 6-over-6 beam for the University College, Bangor, entry in a recent RSGB four metre contest. The elements are located in slots in the booms and bound with adhesive tape—simple method in icy winds. The aerial withstood a 70 m.p.h. gale for eight hours. The mountain in the background is Foel Fras—3092 ft. a.s.l.—currently the subject of much interest to the group!

Three Cases of TVI *and how they were cured*

By D. A. PILLEY, G3HLW*

NEW house, new estate and trouble! Everything was fine using a multi-band dipole made from 300 ohm ribbon and located in the loft of the house, except my signal reports. Naturally the answer was a good outdoor aerial, but what could be put up in a garden 40 ft. × 50 ft. After discussions with G3PBC it was decided to go vertical, so up went a ground plane, up went signal reports, and down came the TVI.

Until then I had considered that as long as my own TV set was free from interference I was in the clear and this was considered to be fair reckoning as the TV aerial was only 2 ft. away from the centre of the indoor dipole. My own set was a vintage Pye V7. However within just 48 hours of putting up the outside aerial and advertising the fact that I existed, three complaints of TVI were received. All had been receiving slight interference when the dipole was in use, but with the outside aerial it was now complete.

The transmitter in use was a KW2000A and the ground plane was designed for 14 Mc/s with the s.w.r. being better than 1·1 : 1.

Receivers in use by the three complainants were:

(i) A DER rental (v.h.f./u.h.f.) with a door jamb type aerial propped against the wall in the loft. This receiver was about 100 yards away.

(ii) The receiver was a Co-operative Society rental set of *HMV* manufacture (v.h.f./u.h.f.) and the aerial was a band 1/3 loft type. This installation was also some 100 yards away.

(iii) The receiver in use was another Co-operative Society rental set of HMV manufacture, again with a loft type aerial.

In all three cases the interference consisted of complete blanketing on channels 4 and 8.

When dealing with any case of television interference, the first action is to remove any aggression the complainant may have towards you, or Amateur Radio. How this is accomplished I leave entirely up to you, but I am sure if this first step is not successfully completed, then it is useless going any further. Maybe I was lucky but all three owners were understanding, although I must admit a demonstration working a few Ws with no interference on my own TV receiver obviously helped. In my junk box I found a Labgear high pass filter and this was fitted in turn to each TV receiver. In every case the interference was immediately cleared indicating the interference was possibly a fault in the receiver or aerial installation. All complainants were impressed, but I explained I only had the one filter and as the fault pointed towards their receiver it was the owners' responsibility to provide these filters. As the receivers were rented, you can well imagine the reactions!

In the meantime I had written to the RSGB TVI/BCI Committee who sent me a lot of helpful information on approach, reasons for interference, cure and responsibilities.

Complainant 1 contacted the owners of his receiver and two days later an engineer arrived and changed the receiver—for an identical model. When told all that was wanted was a filter, the engineer said they did not have such things and away he went.

Complainant 2 wrote to his owners but has never received a reply.

Complainant 3 called in to see his owners, who in turn, telephoned their engineer who, without even visiting, advised the fault was mine. In an endeavour to obtain action I wrote to the owners of 1 and 3, but this did not even produce a reply. By now the complainants were really on my side having had no action from the owners so it was agreed to request help from the Post Office Engineering Department. Unfortunately they were extremely busy and time was passing, the ARRL DX contest was getting near, so I set about building three filters.

* 27 Oxted Rise, Oadby, Leicester.

Filters

I never knew there were so many types all claiming different figures. The first type I built was a single frequency rejector, as Fig. 1. This was built in a standard miniature i.f. assembly with the co-axial socket screwed to the side. This was tuned using the general coverage receiver, inserting the unit in series with the aerial and tuning for minimum signal. This appeared to provide about 30db of attenuation but of course is only suitable for single frequency working. The obvious requirement was a filter comparable in performance to the Labgear unit. The RSGB had sent some circuits with lots of useful data and after considering this and reading every article I could find on the subject I settled for the circuit as shown in Fig. 2.

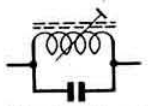

Fig. 1. Simple filter with 30db attenuation at resonance.

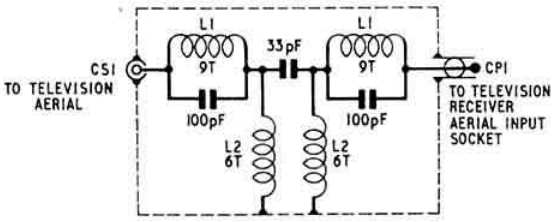

Fig. 2. A more satisfactory high pass filter.

Each unit was built in a standard 2 oz. tobacco tin. L1 and L2 were made by winding 16 turns of enamelled 16 s.w.g. copper wire, expanding this to single turn spacing by running another piece of 16 s.w.g. wire between the turns. Nine turns were counted off, and the tenth turn was expanded leaving

(Continued on page 223)

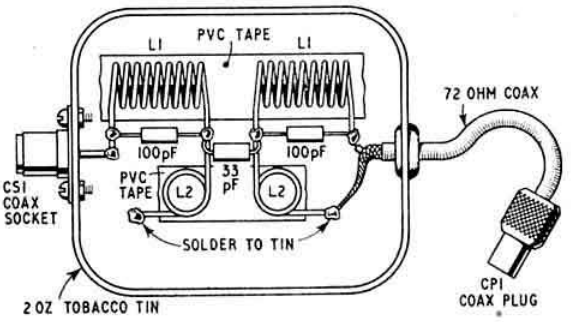

Fig. 3. Construction of the filter shown in Fig. 2, mounted in a tobacco tin. The coils are ⅜ in. i.d.

Crystal Controlled Mixer/Oscillator

for Transmitter Applications

By B. K. BOOTH G3SYC*

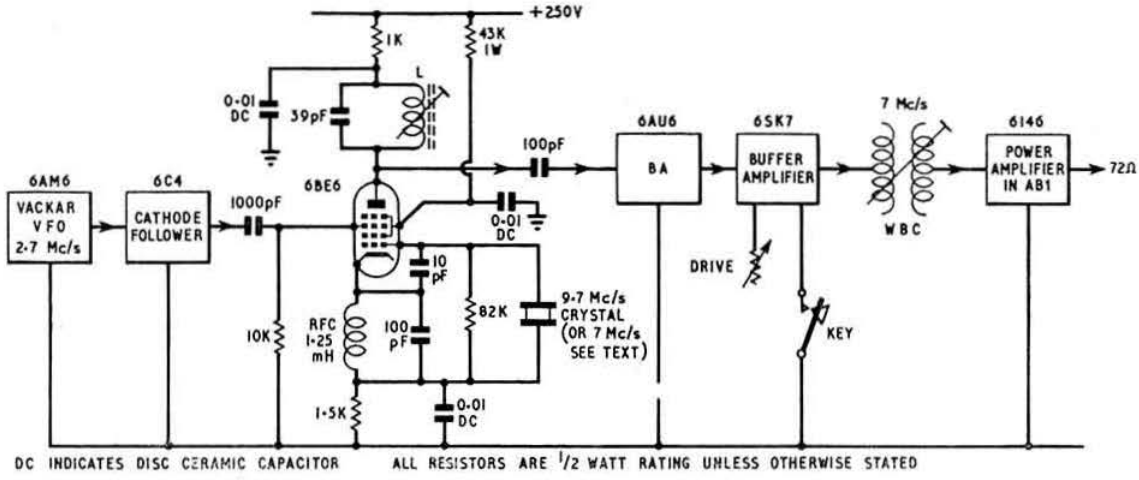

Fig. 1. A block diagram of a 7 Mc/s transmitter, incorporating the single valve mixer/oscillator. The transformer can be v.f.o. or crystal controlled, by appropriate choice of the mixer oscillator crystal.

AFTER a year of working on 3·5 Mc/s, it was decided to explore the potentialities of c.w. working on the 7 Mc/s band. On 80m a conventional v.f.o./c.f./b.a./p.a. transmitter had been employed, the v.f.o. being a Vackar-type circuit operating on the transmitted frequency.

In all respects the 80m transmitter had proved entirely satisfactory, and while it would have been relatively simple to have included a frequency doubler in the transmitter, and thus arrive at 7 Mc/s, or even for that matter modify the v.f.o. for 7 Mc/s operation, it was decided to employ a crystal controlled mixer operating in conjunction with a low frequency v.f.o. the difference between the crystal and the v.f.o. frequencies being the desired carrier frequency.

The decision to adopt this course was influenced very largely by the need to gain experience with this type of circuitry, which is so widely employed in s.s.b. equipment, and which it is proposed to employ in a multiband transmitter proposed for the future. While these notes lay no claim to originality, it is hoped that they will be of use to other members contemplating a break with traditional transmitter design.

System Advantage

While it is quite possible to design and construct a v.f.o. which exhibits a satisfactory frequency stability when working on higher than usual fundamental frequencies, the construction of such a v.f.o. requires considerable care, not only in layout but also in the selection of components. In respect of components in particular, junk box items of unknown vintage and questionable parentage are invariably useless, and may result in a v.f.o. which shows considerable drift.

With the mixer/oscillator system of control, it is invariably the rule—except in one or two special cases—that the variable frequency oscillator works on a frequency which is substantially lower than that of the carrier, the desired frequency being produced by additive or subtractive mixing with a crystal. Assuming that the crystal is operated in a circuit which does not degrade its inherent stability, then the stability of the output frequency will be equal to that of the v.f.o. Since the v.f.o. now operates on a low frequency, it becomes simpler to construct, and not quite so demanding on component quality, although this should not be construed as indicating that good quality components are not needed.

Simplification of problems associated with v.f.o. stability is not the only advantage given by mixer systems. Efficient frequency multiplication requires stages operating in class C, and this in turn means a string of harmonics, not just the one required. There is no need to elaborate on the potential TVI which can be generated by such stages, nor of the complex, and often futile, steps which nearly always have to be taken to remove or reduce their radiation. Better that the offending harmonic string is not generated in the first place.

With mixer systems, the carrier frequency can be generated at a low level and, by the use of stages operating in AB1, the power level raised. That harmonics may still be present is true, although their level will be a function of design, but of greater interest, they will be very substantially lower in power, and consequently easier to deal with.

The foregoing might lead one to wonder why no amateurs continue to use the traditional designs when they are so likely to produce one form of interference or another. Such a conclusion has considerable justification, but to secure maximum advantage from mixer systems the frequencies employed have to be chosen with care.

As a general guide to the choice of frequencies for mixer systems, frequencies should be such that up to the fifth order harmonic, they are not likely to cause interference if inadvertently radiated. Consideration must be given to the additive frequency produced, if subtractive mixing is used.

The frequencies chosen also have to be considered in another light. They should be such that they are sufficiently divorced from the carrier frequency to allow the selectivity

(Continued on page 223)

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Modifications to the B44

Mark 3 Transmitter-Receiver

By D. WHITELING, G3HJG*

The Microphone

THE B44 is a well known, very popular ex-Army v.h.f. transmitter receiver, and performs well with only the most fundamental changes made to enable it to operate on the 4m amateur band. Nevertheless, there is considerable room for improvement, especially if the equipment is to be used for more than just local net contacts, and one of the first sections worth investigating is the microphone and early modulator stages. Many amateurs have attempted to improve the modulation level, which is sadly deficient as it stands, by exchanging the moving coil microphone supplied with a carbon insert or adding an outboard preamplifier.

The first method is probably quite effective, but some may consider it a retrograde step as it degrades the speech quality. An extra amplifier stage is more satisfactory, but in most installations takes up space. The microphone case, however, provides a very convenient solution; the moving coil insert is quite small, and yet the case is relatively large, thus leaving ample space for a simple single transistor preamplifier capable of equalling the microphone's quality and raising the modulator output to a much more useful level. Provided the equipment is run from a battery, as when mobile, there is, too, a convenient supply for the preamplifier.

The circuit which the writer has incorporated in his B44 microphone case is drawn in Fig. 1. As shown, it is only suitable for negative earth operation, but if the alterations for positive earth operation described in the next section of this article are carried out, it will only be necessary to transpose the connections X-X. The right-hand section of Fig. 1 provides all the necessary information for modifying the connections to the socket on the B44 panel. The component layout and wiring in the microphone case is shown in Fig. 2. The OC71, 8 μF capacitor and 560 K ohm resistor are all miniature components, and fit quite snugly, without fouling the outer cover when re-assembling.

This modification has performed without trouble, and has enabled the writer to maintain comfortable 4m contacts, receiving good reports, with Wales, the Midlands, Yorkshire and Cumberland. The equipment was operated from his home QTH, using a four element aerial.

Operating the B44 on 12 volts Positive Earth

The B44 can only be used with a negative earth 12-volt supply system, and therefore before it can be used for mobile operation from most types of vehicle, several changes in the internal wiring of the power supply unit must be performed. The circuit of the power supply before the alterations have been carried out is shown in Fig. 4. The sequence of modifications follows.

(i) Remove the two screening covers below the chassis of the power supply. Unsolder the blue battery supply wire and the red and white output wires from the power supply. Remove the six retaining screws and detach the supply unit from the chassis.

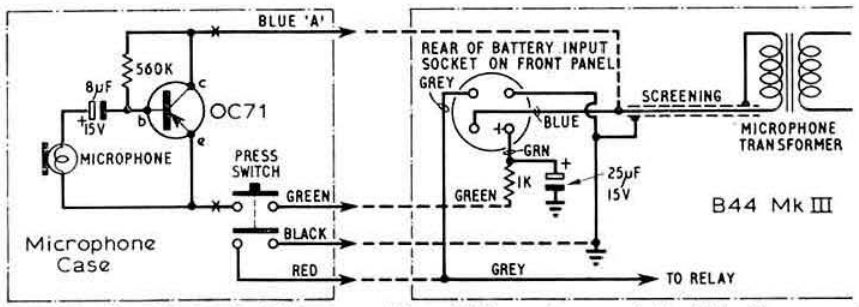

Fig. 1. The simple circuit of the preamplifier which can be mounted within the case of the moving-coil microphone supplied with the B44. Although the transistor specified is an OC71, many other types will be found suitable, the only change which may be required being the value of the 560 K ohm collector-base resistor. The existing press-to-talk facilities can be retained. Necessary circuit changes on the main chassis can be determined from the right-hand section.

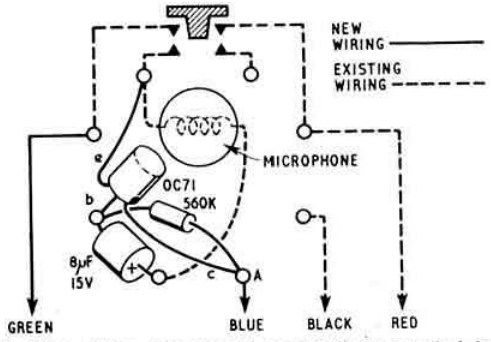

Fig. 2. The wiring layout and connections needed in the microphone case. Existing wiring which does not have to be touched is shown dotted.

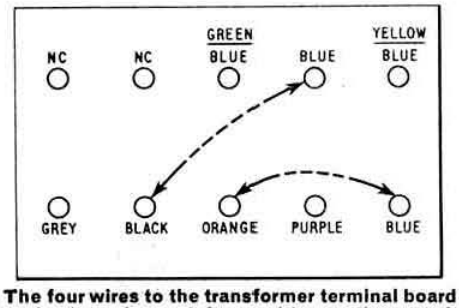

Fig. 3. The four wires to the transformer terminal board which must be interchanged for positive-earth operation.

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(ii) Unsolder the connections and remove the 100 μF l.t. filter capacitor C1, insulate the can from the fixing clip, and remount it. Resolder the connections to this capacitor in reverse, i.e., the blue lead to the negative terminal and the positive terminal to the chassis.

(iii) Remove the screening can from the vibrator transformer and change over the black, orange and blue leads according to Fig. 3. Replace the screening can.

(iv) Remount the power supply unit on the main chassis and solder the blue, red and white wires in the original positions.

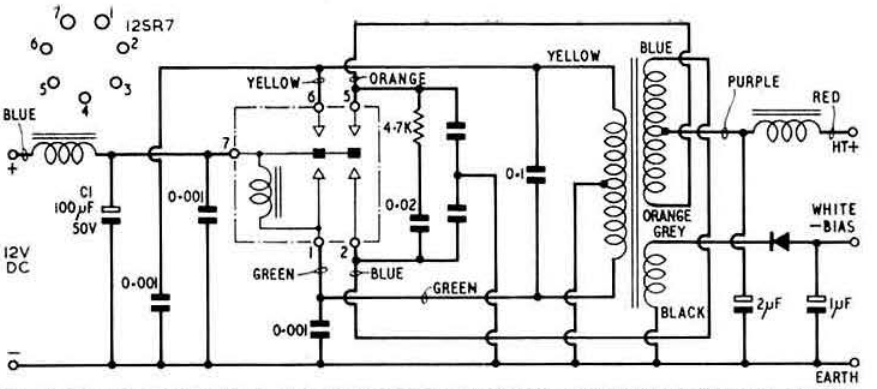

Fig. 4. The complete circuit diagram of the power supply unit bolted to the B44 chassis. Necessary changes for positive-earth operation are described in the text.

(v) Reverse the wires on the back of the main power input socket, and change over the battery meter leads.

(vi) Remove the cover of the aerial filter and reverse the connections to the diode in the final compartment. Replace the cover.

Before actually connecting the set to a car accumulator, it is a wise precaution to check the condition of the battery, as the current drain will be very heavy. Frequent attention must be paid to its state of charge, or it can easily suffer a very short life under these conditions.

Three Cases of TVI

(Continued from page 220)

the remaining six turns for L2. The time taken per unit was no more than half an hour and the results were perfect. No fancy checking was necessary—the units were just connected to the television aerial input socket, the aerial connected to the socket of the filter, and the interference was gone.

Of course the first thing to point out to the complainant is the improved definition in his picture now that the filter is in use, which helps to explain away the tobacco tin dangling from the back of the television receiver.

Within a week of fitting these units the engineers arrived from the GPO and each complaint was very efficiently investigated from the aerial down. I found the engineers more than helpful and real diplomats when it came to explaining to the complainants that it was the sets that were really at fault. They explained that they could supply a filter to the complainant, but it would cost money. However, if they had no objection to having these tobacco tins I had no objection to leaving them. All was accepted and all were happy.

To cover myself in each instance I wrote to the owners of the sets explaining that I had fitted these units, that they were a passive device and that I took no responsibility for any fault in either their installation or the receiver. I also suggested that perhaps they would like to fit their own unit in the near future, but no acknowledgement has been received.

Another and more recent visit has been made by the GPO engineers following an official complaint from a viewer some 250 yards away. The set was a Robinson Rental and the fault was identical to the other three. The same procedures were followed and another TTF (Tobacco Tin Filter) made its successful mark.

In conclusion I should like to emphasize the point that the GPO engineers were more than interested and helpful in providing assistance and advice.

Crystal Controlled Mixer/Oscillator

(Continued from page 221)

of the transmitter tuned circuits to reject them and so prevent their radiation.

G. R. B. Thornley, G2DAF, has covered all these points in a very thorough manner in various articles on s.s.b. equipment.

Practical Design

The circuit employed by the writer is shown in Fig. 1. A 6BE6 is operated as a self-excited crystal controlled mixer employing a surplus 9·7 Mc/s type 10X crystal in a Colpitts arrangement between the valve's oscillator grid and its cathode. The v.f.o. frequency is fed to the "signal" grid of the 6BE6, and for an output of 7 Mc/s (subtractive mixing) the v.f.o. operates on 2·7 Mc/s.

Satisfactory attenuation of the v.f.o. and crystal fundamental frequencies, harmonics, and undesired mixer products is achieved by the anode tuned circuit plus the bandpass coupling circuit used between the buffer amplifier and the p.a. which is operated in class AB1.

When the circuit was originally tested, it was found that the output frequency drifted erratically. This was eventually traced to the signal grid being driven into a few microamperes of current by the v.f.o. output. While this could have been cured by reducing the value of the coupling capacitor between the cathode follower and the signal grid, it was found better to increase the value of the cathode bias resistor to the 1·5K ohms shown on the circuit diagram. This point is mentioned since, with this circuit, if a very high output v.f.o. is employed, it may be necessary to experiment with the value of the capacitors which couple the v.f.o. to the signal grid.

Conclusion

One additional benefit of this particular design is that if the crystal is replaced by one at the carrier frequency, in this case in the 7 Mc/s range, then the transmitter becomes crystal controlled. In certain applications this may be a useful feature.

The mixer system described has been successfully employed by G3JKS in a transmitter for 14 Mc/s, and it is hoped that the information given will encourage other members to experiment with this method of approach.

A Review of the Yagi-Uda Aerial

By C. R. FRY, M.Sc., Grad. I.E.E., VE2ARO, G3NDI*

THE Yagi-Uda aerial was developed over 35 years ago in Japan by H. Yagi and S. Uda, and has since become a well-known array, not only in the Amateur Radio field. In its usual form, the aerial is constructed from a number of simple dipole elements in such a manner that the direction of maximum radiation lies in the plane of the elements and along the normal to the elements. The elements are parallel and separated by some fraction of a wavelength. The simplest type has a single reflector or director in conjunction with the driven element, although models have been constructed with 42 or more parasitic elements. In the majority of cases the array will have only one driven element; however, two driven elements have been used in order to produce a wider than normal operating bandwidth. The other elements are parasitic because they " feed on," or accept, the radiation from the driven element and one another and re-radiate it.

One may see that the term " end-fire array " is aptly applied to the Yagi-Uda (as it is to certain other aerials), but perhaps not so obviously, the expression " travelling surface-wave aerial " or array. By looking at it from this second point of view it has been found possible to obtain a design method applicable to the longer Yagi-Uda aerials which is somewhat easier to handle than the conventional empirical methods. The latter methods, though, have been developed to such a degree that quite good designs over a wide range of frequencies can be obtained using the graphs and tables to be found in various papers and handbooks.

The early Yagi-Uda aerials were used in the upper h.f. and lower v.h.f. ranges. They comprised relatively few elements, which could be looked upon as discrete but mutually coupled circuits. At this stage it was fairly easy to construct an array optimized with respect to a certain characteristic, e.g., sidelobe level, forward gain, etc. It was even possible to analyse the array mathematically, though for more than three or four elements the equations became too complex to handle. These could doubtless be solved now by a digital computer, but it is probably simpler and cheaper to use design charts.

Later, the u.h.f. band and higher frequencies became widely used and naturally the physical dimensions permitted the use of long arrays with many elements, together with large reflecting surfaces. The result was that various designers obtained similar performances from aerials of a dissimilar design, the result being a certain amount of confusion as to the optimum design.

The subject matter concerning the Yagi-Uda is sufficient to fill a book and it is impossible to mention all details explicitly. For this reason a fairly extensive bibliography has been included. It is by no means complete (in fact, over a 100 references are in the writer's possession), but should be consulted for a fuller description of the various topics mentioned. These journals may all be obtained through the Interlibrary Loan Scheme.

Design Requirements

Some of the more usual requirements are listed below, any one of which may be optimized at the expense of the other parameters.

(i) The gain in the direction of maximum radiation. For long arrays the power gain is proportional to length. Related to the gain is the width of the main lobe or beam. As the array becomes longer the beam widths in the E and H planes converge.

(ii) The position and amplitude of the sidelobes. Perhaps the main disadvantage of the Yagi-Uda designed from conventional methods is the high first sidelobe level, some 9db below the main lobe.

(iii) The front-to-back (F/B) ratio.

(iv) Operating bandwidth. This will usually be determined by the maximum allowable standing wave ratio, or distortion of the radiated pattern.

To obtain the best performance using any design method the elements' spacings, lengths and, to a lesser degree, the diameters can be varied. One may also vary the height above ground and length of the array. That one design can be called better than another of similar kind is a debatable point, depending very definitely on the parameter which has been optimized; comparisons are really only valid where the same parameter has been chosen for optimization.

Whether a long or short array is being designed experimentally, resort must be made to orderly variations in the physical dimensions. One parameter, e.g., director spacing, should be kept constant while another is varied, e.g., director length. Experiments have shown that a second co-planar linear reflector element gives very little improvement over the first.

One-way power gain is used on the various graphs with respect to a half-wave dipole, unless noted otherwise. Where possible, differences in experimental conditions are briefly mentioned on the graphs, which explain to some extent the variations in the results obtained. Experimental curves are denoted by symbols; plain curves are theoretical derivations.

Resonant Aerial Design

Two Elements. If a half-wave dipole is placed near another dipole, which is driven, then currents are induced in the first one whose phase and amplitude are a function of the spacing and length of the element, i.e., dependent on its reactance. Generally speaking, close spacing produces high currents involving high losses and wide spacing the reverse. So that the induced current, in conjunction with that of the driven element, produces a required radiation pattern, the element length will differ by quite a large factor from the free space value of $\lambda/2$. These above remarks are applicable to arrays of more than two elements also. The appropriate reduction factor for various diameter/wavelength ratios will be found in most Handbooks.

The driven dipole coupled to a parasitic radiator has been investigated at great length by a number of workers. Some of their findings have been summarized in Fig. 1.

Multiple Elements. The dividing line between short and long aerials may be taken as approximately one wavelength. As mentioned earlier an adequate design can be produced by considering each element as a lumped resonant circuit, i.e., by altering the lengths, diameters and spacings of each element one can vary the impedance of the element's equivalent circuit at the input terminals.

Greenblum [1] has considered aerials up to 8λ in length and gives many graphs obtained from experiments. Fishenden and Wiblin [2] discuss aerials over 1λ in length with equal director spacings and lengths for a given aerial. Nose [*QST*, March, 1958, 1960] also gives some useful results obtained at 2m with a short aerial, whereas Kmosko and Johnson [*QST*, January, 1956] have considered a longer aerial.

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As may be seen from Table 1, Fishenden and Wiblin covered quite a range of lengths in their experiments. Their results were obtained at frequencies of 600 Mc/s and 200 Mc/s. For their particular design they do not claim that maximum gain has been obtained. Besides using only a single reflector element, a mesh type and a trigonal type were also tried. The backward radiation can also be decreased, apparently, by adjusting the spacing and/or length of the last director, though this has not been noted elsewhere. The mesh reflector, if it subtends a suitable angle at the last director, can improve the F/B ratio but no figures are given and it would be a matter for experiment between two stations. The trigonal reflector consists of three elements spaced $\lambda/2$ in a plane at right angles and $\lambda/8$ behind the driven element. The improvement in power gain for long aerials was some 30 per cent compared to 10 per cent for a four directional aerial when this type of reflector was used.

Greenblum has dealt in detail with the Yagi-Uda's performance over a wide range—some 7-500 Mc/s. The results are summarized, in a number of useful graphs, certain of which are to be found in the ARRL *Antenna Book* (10th Edition). The three-element array is described with the aid of curves giving gain as a function of element spacing. At $0{\cdot}2\lambda$ spacing for both parasitic elements a gain of approximately 7db is obtained, with $l = 0{\cdot}45\lambda$. If the value of s_D, the director spacing, is such that $0{\cdot}15\lambda < s_D < 0{\cdot}25\lambda$ the change in gain is small. At spacings in excess of $\frac{3}{4}\lambda$ the pattern deteriorates to produce high sidelobes. Greenblum's results also indicate a change in director diameter, d, from $0{\cdot}002\lambda$ to $0{\cdot}01\lambda$ decreases length l by approximately $2\frac{1}{2}$ per cent.

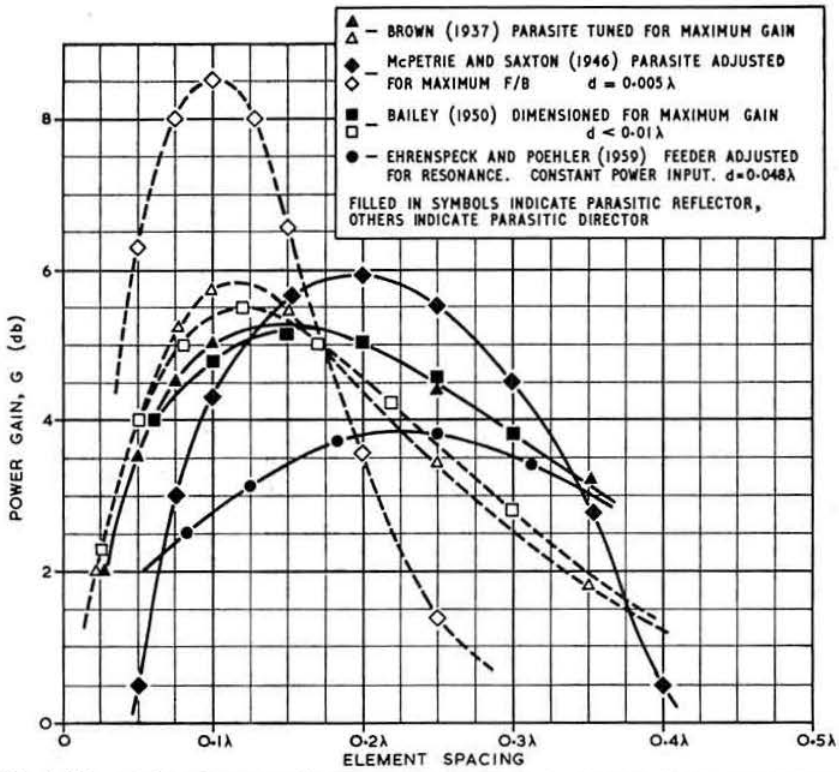

Fig. 1. The results of some authors showing the variation in gain for a two element array, using the parasitic element as a reflector or director.

TABLE 1

L	No. Elements	Power Gain db	Optimum Director Length (Sidelobe Amplitude 30 per cent)	Beamwidth at Half Field Strength Points degrees
1·36λ	4	9	—	46
1·70	5	—	0·434λ	—
2·38	7	—	0·423λ	—
3·06λ	9	11·1	—	37
3·40λ	10	—	0·42λ	—
4·42λ	13	11·8	0·414λ	31
6·80λ	20	13·2	0·407λ	26
10·2λ	30	—	0·40λ	22
14·38λ	42	—	0·385λ	—

These figures have been taken from Fishenden and Wiblin. The spacing used was 0·34 λ with emphasis on choosing the correct length for the number of directors used.

Surface-Wave Design

Uniform Array. The previous papers that have been briefly mentioned covered, in general, Yagi-Uda aerials up to a few wavelengths long. The method of design described in this section is of more modern vintage and may be applied to very long arrays. The dominant design principle is that a travelling surface wave can be propagated on various radiating structures, e.g., Yagi-Uda, helix, dielectric rods, etc., with a velocity under the control of the designer such that certain parameters can be optimized. As the aerial becomes longer, giving a higher gain, so the velocity approaches the free space velocity and at the same time the surface wave extends farther from the surface for a given amplitude. This implies that care must be taken in stacking the aerials, e.g., for a length $L \simeq 5\lambda$ the amplitude of the wave has decreased to 0·1 of its surface value at a distance of $\lambda/2$ from the surface. Up to 75 per cent of the input power can be radiated as a surface wave, the rest coming from the driven element as if the other elements were not present. For angles off end-fire direction that lie between approximately 45° and 315° the driven element is the main contributor to the pattern. That the surface wave may be established requires that L have a value,

$$L_{min} \not< \frac{\lambda}{6}\left(\frac{v}{c-v}\right)$$

In 1950, R. A. Smith suggested in his book† the controlling action of the director elements on the velocity, but no investigation was reported. At later dates other authors have

† *Aerials for Metre and Decimetre Wavelengths.*

used the surface wave concept to describe variations attained in the performance of the Yagi-Uda. Stated simply, the principle resulting from these investigations is, that if the allowable length, L, and the maximum gain, G, are known for the aerial then the propagation velocity, v, of the surface wave is uniquely determined, i.e., it has only one value. This value of v is also defined by an infinite number of combinations of the director parameters. The manner in which we choose the combination is irrelevant as long as v is obtained. In other words, two arrays may have the same gain and length but different numbers of directors if their lengths and diameters have been appropriately chosen.

Ehrenspeck and Poehler [3] have used this principle in their experimental investigations, which were restricted to using directors of *equal* height, spacing and diameter. The F/B ratio and sidelobe levels were also ignored, which may require for some cases the measurement of these quantities to see if a satisfactory design has been achieved. However, as the array is optimally designed (to their requirements) the theoretical value of −9·3db should possibly apply. This cannot be checked unfortunately as no patterns are presented in the article. The authors found that if the reflector/driven element combination was first adjusted for maximum forward gain (see Fig. 1) the addition of different numbers of directors had negligible effect on this adjustment.

With the addition of the directors it was found that the maximum gain was almost independent of their spacing up to approximately $s_D = 0{\cdot}4\lambda$ and with L varying up to 6λ and d up to $0{\cdot}048\lambda$. The authors were limited by practical reasons to these maximum values of L and d. The drop in gain that was apparent for $s_D = 0{\cdot}4\lambda$ could be counteracted to a great extent by an additional director spaced $0{\cdot}1\lambda$ from the feeder.

Some theoretical and experimental results are shown in Fig. 2 for the maximum gain obtainable over a range of L for the parasitic array as given by various authors. The wide spread in gain is probably due not only to differences between the aerials, but also to experimental error. The main conclusion seems to be that the curves indicated by circles and squares for the non-uniform arrays are together and above the curves for uniform arrays whose gains lie broadly in the region defined by

$$10 \log \left(\frac{3{\cdot}05L}{\lambda} \right) < G < 10 \log \left(\frac{5{\cdot}6L}{\lambda} \right)$$

The main results of Ehrenspeck and Poehler are shown in Fig. 3 from which one can design a Yagi-Uda by the simple expedient of drawing a line parallel to the x-axis from the required gain or array length to intersect with the appropriate curve. By doing this one is finding the optimum velocity to give maximum gain. Using this graph for designs below 1000 Mc/s, as an arbitrary figure, may not give optimum results as the element diameters used by the two authors are relatively large in the v.h.f. and u.h.f. regions.

For this type of aerial and others which have been designed for maximum forward gain Jasik‡ quotes an expression for the average half-power beamwidth,

$$\theta_{3db} \simeq 55 \sqrt{\frac{\lambda}{L}} \text{ degrees}$$

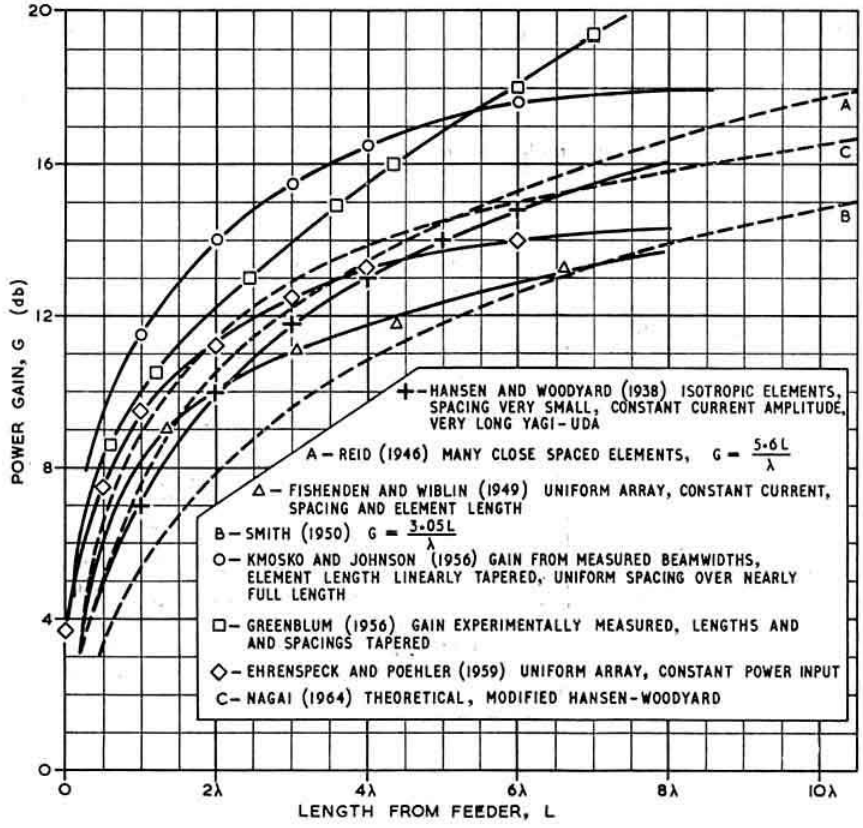

Fig. 2. These curves describe the variation in gain of the Yagi-Uda with its length as found by various authors. Some are theoretical derivations, the others are experimental curves.

Non-uniform Array. In discussing the uniformity of arrays one can refer to the physical equality of the element spacing and length or to the current distribution in the elements. It has been assumed by some authors, for example, that the current amplitude in a Yagi-Uda is constant in each element, but this is not true for a parasitic array. Only if all the elements were driven would it be possible for such an amplitude distribution to be obtained. For a very long Yagi-Uda the distribution may be approximated by a constant, the greatest change occurring in the first three or four directors.

If the constant velocity of the previous section is changed in such a manner that its value along the array varies according to some law, then the array is said to be tapered. This is a further useful design principal as beneficial effects result from its application in regard to the sidelobe level, bandwidth, etc., but the tapering *must be gradual*. Reid suggests that tapered director spacing could give an improvement over the gain obtained from $G = 10 \log(5L/\lambda)$. Goward [4] and Sengupta [5] have discussed either or both

‡ *Antenna Engineering Handbook*, H. Jasik, McGraw-Hill.

tapering the length and spacing of the director elements.

When the parasitic elements are identical the only means available of changing the surface-wave velocity is by varying the interelement spacing, s_D. If the elements also have adjustable lengths then two methods are available. These are our only means of changing the elements' currents to improve the radiation pattern as compared to the case of the endfire array with separately driven elements. In this latter case the currents' amplitudes and phases are determined by the driving voltage and the impedance seen at the input terminals.

Another method [6] of improving the gain, in particular for the very long Yagi-Uda aerials, is to " modulate " the current amplitude. The Hansen-Woodyard criterion§ is applicable to such long aerials, as the current amplitude is virtually constant after a few wavelengths, but by giving the current a periodic variation in amplitude, say sinusoidal, such that an integral number of cycles are present over the whole length, the gain is increased. This gain increase can be as much as 2·2db (an effective transmitter power increase of roughly 1·7 times) over the Hansen-Woodyard value. However, if there are an integral number of half-cycles the gain is less.

It is also beneficial if the director lengths are tapered not necessarily over the complete length, but in the region next to the driven element, over roughly 20 per cent of L where v/c starts at 0·77–0·83. Also it will be found that tapering of just the last few directors of any of the designs is beneficial and should be done over the last half-wave length.

As already mentioned the fairly high sidelobes of the maximum gain design can be decreased by various tapering methods to the order of 20db below the maximum gain. A further 10db or so is possible by placing parallel rows of directors on either side of the array over the last half of its length at a spacing d given approximately by (see Jasik, p. 16-16),

$$\frac{d}{\lambda} \simeq \frac{1}{4}\sqrt{\frac{L}{\lambda}}$$

The sidelobe level of the uniform maximum gain design may be reduced to around −13db if some gain can be sacrificed, as Sengupta has shown with some experimental results. The aerial is operated at a frequency lower than the design frequency f_0 (approx. $0{\cdot}8f_0$ for −13db), the drop in gain being due to a broadening of the main beam. He then proposed *gradually* varying or tapering either or both all the directors' spacings and lengths as one goes along the array. If this is done the sidelobes can be reduced another 5db approximately without appreciably upsetting the forward gain. In doing this the surface-wave velocity varies inversely in some manner depending on the method chosen. The value of v is constant in Ehrenspeck and Poehler's design, for a given length. Sengupta has derived a useful equation for the velocity in terms of the spacing, length and radius of the elements and gives some criteria, quoted here, for the design of long Yagi-Udas.

(i) The directivity becomes less frequency sensitive for values of $s_D < \lambda/4$. Therefore as the optimum gain is not dependent on s_D for $s_D < 0{\cdot}4\lambda$ a reasonable choice is $0{\cdot}1\lambda < s_D < 0{\cdot}25\lambda$ with due regard to losses, cost of extra elements, greater wind loading and weight at close spacings.

(ii) The value of director diameter, d, is suggested to be $0{\cdot}05/k \leq d \leq 0{\cdot}15/k$ where k is the propagation constant of free space and is numerically given by $2\pi f/c$. For example, at 145 Mc/s with d = 1cm, a reasonable value, $kd = 0{\cdot}063$ which lies within the quoted range. This design, of course, is for a first sidelobe of no better than −9·3db. This is about 1½ S points; not a particularly effective value when the congestion on 2m is considered under good propagation conditions.

One of the main effects of tapering as suggested by Sengupta, is that the travelling surface wave is affected as little as possible by " jumping off " into space at the end of the array. If the phase velocity v approaches c, the speed of light, i.e. $v/c \longrightarrow 1{\cdot}0$ at the end, then this method of design should produce better results than the simpler designs of Spector [7], Ehrenspeck and Poehler and others.

An example of the tapered array

§ The criterion requires the phase shift along the array to be such that there is one extra half-wavelength present over the equivalent physical length of the array, in terms of the free space wavelength. *Proc. IRE*, 1938, p. 233.

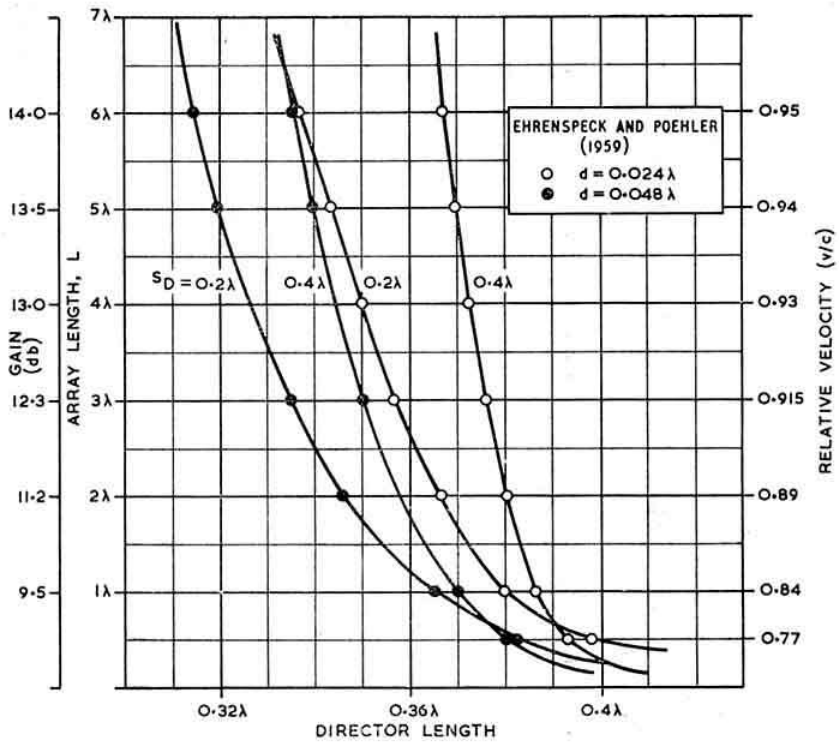

Fig. 3. This set of curves is given by Ehrenspeck and Poehler for the rapid design of a Yagi-Uda. It is thought inadvisable by the present writer to use them at frequencies in the v.h.f. region as the element diameters seem unsuitable. Note that the graph supplies all the information required for a particular design.

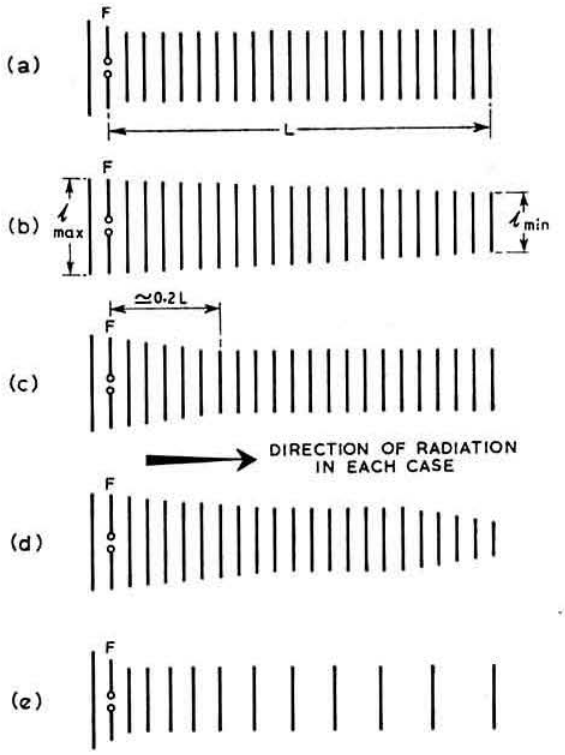

Fig. 4. Various schematic arrangements of the elements in long Yagi-Udas. (a) is the ordinary array such as used by Fishenden and Wiblin; (b) is the array described by Sengupta, and together with (c) and (d), shows forms of element length tapering. In particular (e) is an example of s_D being tapered. Sophisticated designs might take advantage of all these forms. For clarity the rates of tapering have all been exaggerated.

A typical value of l_{max}/l_{min} for $L = 6\lambda$ is 1·176.

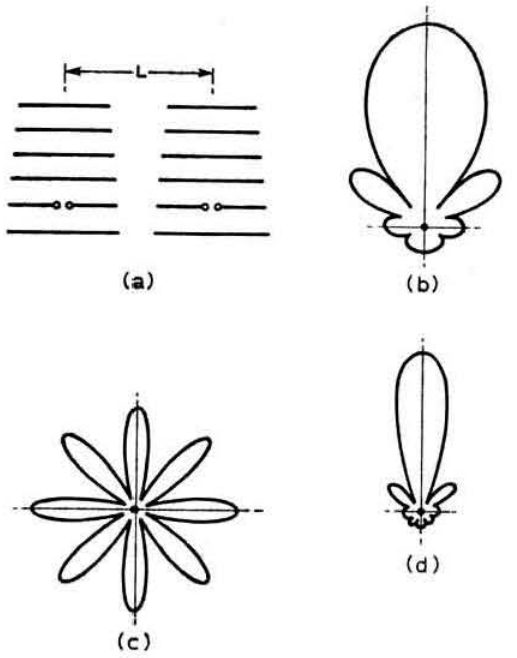

Fig. 5. A pair of spaced Yagi-Udas is shown at (a) each having separately the same arbitrary pattern shown in (b). The pattern of two isotropic aerials fed in phase and spaced 2λ is shown in (c). When pattern (c) is multiplied by (b) the resultant pattern of the two aerial array (d) is an improvement over (b).

empirally obtained is given in the previously quoted reference of Kmosko and Johnson, which is a combination of (c) and (e) in Fig. 4. A commercial array with tapering is the 10m " DX Long John " produced by Hy-Gain.

Miscellaneous Designs

Besides the standard planar, multiple, linear element array of Yagi and Uda, various authors have produced designs based on the original, having certain features in particular. These are briefly described.

A pair of crossed Yagi-Uda aerials at right angles on the same boom have been described by Messenger for polarization diversity reception (BULLETIN, December, 1962). It is necessary for a 90° phase shift to exist between the driving currents of the two driven elements, obtained with the appropriate lengths of coaxial cable, to give a performance better than a single aerial. Apart from the increased cost and weight it is suggested that this type of array should be seriously considered for its *superior performance* compared to the normal Yagi-Uda when constructing a beam, particularly at higher frequencies. Reynolds [8] has discussed the twisted Yagi-Uda where the elements all lie in different planes that intersect along the array axis. The use of two driven elements to improve the bandwidth has already been mentioned, and of course at microwave frequencies it is possible to launch the surface wave from a horn placed at one end.

A rather odd-looking design is mentioned by a number of authors. In this case the place of the linear elements is taken by metal discs placed on the boom [9, 10]. This can be done practically by soldering the discs to nuts and threading them on a screwed rod. The surface wave is propagated by appropriate choice of the spacing and diameter of the discs. At frequencies below say 1000 Mc/s this type would have a high wind loading and weight factor compared to the Yagi-Uda of similar size, but the discs could be made of expanded aluminium or copper wire mesh.

Yagi-Uda aerials have also been produced by cutting slots in curved and planar metal surfaces. This is a method usually restricted to missiles and high-speed aircraft. Circular elements or loops have been described by Doty [*QST*, November, 1958] in the form of a multi-element endfire array. This aerial was constructed for the 10m band using 72 ohm cable into a balun.

One fairly recent modification to the standard Yagi-Uda is the " backfire " aerial of Ehrenspeck and Poehler where the array is mounted so as to aim towards a plane reflector. The radiated wave passes back along the array setting up a standing wave. Circular and linear reflectors have been used with this aerial. The advantages accruing from this " backfire " Yagi-Uda are a higher gain, lower sidelobe and backlobe levels than the equivalent Yagi-Uda.

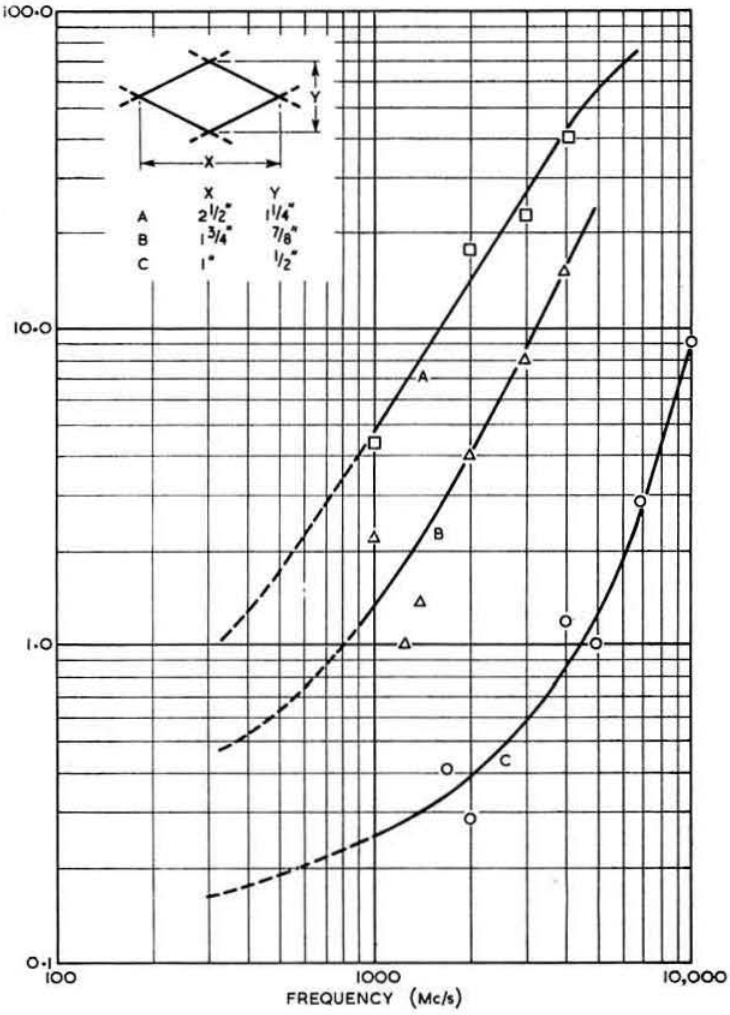

Fig. 6. These experimental points were obtained using the diamond mesh figure shown in the inset. The *E*-field polarization was parallel to the *X* dimension. The transmission was less than 0·1 per cent for a mesh ¾ in. × ¾ in. and is not therefore shown. Note that the scales are logarithmic and below 1000 Mc/s the curves are extrapolated.

Multiple Arrays

The main reason for using the beam aerials that have been described is to produce a maximum amount of radiated power in usually one preferred direction. To this end an improvement may be effected by stacking two or more and feeding them all in phase, so that one has a multiple array or an array of arrays. For example, if four Yagi-Uda arrays are placed vertically above one another then the field (or power) pattern will be narrow in the plane in which the arrays' axes lie, i.e., the vertical plane; alternatively if they are all placed side by side then the pattern is narrowest in the horizontal plane.

The resultant pattern of a multiple array can be obtained by using the theory of pattern multiplication. The field pattern of an array of *similar* aerials is the product of the pattern of the individual aerial (or element pattern) and the pattern of an array (or array factor) of isotropic aerials having the locations, amplitudes and phases of the non-isotropic aerials. For example, consider Fig. 5 using two Yagi-Uda aerials. If the pattern of a single Yagi-Uda is as shown and the pattern of two isotropic aerials replacing them is that shown, then the resultant pattern of the two Yagi-Udas is the product of the two patterns.

The pattern of the first example mentioned in this section may now be obtained in a similar manner. Only a brief sketch of the method has been given and the subject is covered in more detail in the handbooks, where the patterns of isotropic sources at various spacings are given.

More sophisticated methods utilize variations in the current amplitude and phase to each driven element in a multiple array to produce improvements in the overall pattern that Goward, Sengupta and others have obtained for single arrays. Two such examples are the Binomial and the Dolph-Tchebyscheff arrays.

Apart from making more efficient use of low power transmitters an array of aerials is a definite requirement for moonbounce experiments and is a help in areas surrounded by hills, in which case the " obstacle diffraction method " can produce surprising results [*QST*, March, 1958].

Reflectors

The use of some type of reflector is almost mandatory with the Yagi-Uda. Probably the most useful type at frequencies of 100 Mc/s and above is the expanded aluminium mesh obtainable from most radio supply shops, or even chicken netting which is cheaper and can at least be soldered easily. However, this latter type must be supported by a frame—a typical example is shown on page 407 of the RSGB *Amateur Radio Handbook* (Third Edition). Some results [11] have been published for mesh reflectors covering a range of 1 Gc/s–10 Gc/s and these are repeated in Fig. 6. The curves are extrapolated in the left hand region of the graph; the error will be less than an order of magnitude. A fairly well equipped amateur might be able to make some simple experimental measurements in this region using netting.

Feeding Arrangements

Methods of feeding the driven element of the Yagi-Uda are reasonably well covered in the handbooks. Further details on gamma matching will be found in the articles by Boss [*QST*, November, 1960] and those previously mentioned by Nose. By adding a reactive component across the input terminals of the driven element Gooch [*QST*, April, 1962] obtains what he calls the " hairpin " match. In cases where a folded element is used for the driven element a suitable balun is formed by passing the feed cable inside one half

(Continued on page 231)

AR88 Modifications for S.S.B. Reception

*By R. A. E. GERMAN, G3OZT

THE AR88 is still, even by present day standards, an efficient receiver, and modifications to it are not to be undertaken without careful consideration. It does, however, have one serious shortcoming—the ability to resolve s.s.b. easily. A fair amount of adjustment of the r.f. gain and b.f.o. controls is required to resolve signals satisfactorily, the a.v.c. no longer being effective with the r.f. gain backed off. Some improvement can be obtained by increasing the amount of b.f.o. injection, but a point is reached where the receiver is blocked by the direct action of the b.f.o. on the a.v.c. circuits and it becomes necessary to short out R42 in the AR88 circuit diagram and operate the receiver in the MANUAL mode, i.e., with the a.v.c. off. The modifications to be described have gone a long way towards overcoming these problems and with a minimum number of wiring changes have resulted in easier reception of s.s.b. with a.v.c. effective on all modes, while retaining the original a.m. detector together with its excellent noise limiter. The work involved falls into two sections:

(i) Changes to the a.v.c. circuits, and
(ii) the addition of a product detector.

A final note is included describing a simple panel-controlled muting system used by the author. References to numbering and values of existing components are in accordance with the official AR88LF handbook.

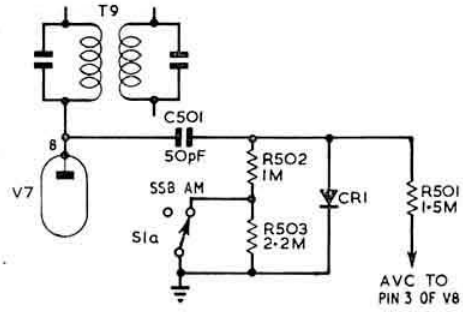

Fig. 1. The new a.v.c. circuitry operating from the anode of the last i.f. amplifier.

Modification of A.V.C. Circuits

In the original circuits, a.v.c. is derived from the detector diode load resistors R48 and R49 via R47, 2·2 Mohms. R47 is removed and the circuit of Fig. 1 is installed to enable the a.v.c. to be derived from the anode circuit of the final i.f. amplifier, V7. Two points arise from this. First, the diode CR1 should have as high a reverse resistance as possible so that the time constant of the a.v.c. line will not be affected unduly by any shunt resistance introduced by the diode. No type number has been specified as, in the writer's case, a number of silicon diodes were measured and the one finally selected carried markings which were not recognizable as belonging to a commercially available product. Possibly a GEC type SX641 would be suitable. By returning the grounded end of CR1 to a small positive voltage it should be possible to provide delayed a.v.c., but this has not yet been tried on the writer's receiver. Second, R503 is brought into circuit by one section of the A.M./S.S.B. switch, S1a, to increase the a.v.c. time-constant on s.s.b. and c.w. operation. The final values of both R502 and R503 can be varied to suit individual requirements. The longest time constant is obtained with R503 omitted and S1a open, i.e., R502 has no return to ground. In this condition it was found that with the muting system later described, the receiver remained "dead" for about 5 seconds after the transmit relay had returned to the RECEIVE position. R502 and R503 were therefore selected to give a reasonable a.v.c. action together with a suitable recovery time after mute. The normal functions of the A.V.C./N.L. switch are unchanged, although in the writer's receiver, R42 has been shorted out to provide full manual control in the MANUAL positions.

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The Product Detector

The circuit employed for the product detector is conventional and has been described in several of the available handbooks, hence these notes will be devoted entirely to the fitting and the problems which arose.

The 12AU7, V20, and its associated components are mounted on an aluminium bracket measuring approximately 2 in. × 3 in., which is located under the AR88 chassis as shown in Fig. 2. The holding screw for C48 makes a convenient fixing point and enables the interconnections to be kept short. Switch S1 is mounted on the front panel, placed above the selectivity control and to the left of the b.f.o. control. The AR88 front panel is very substantial and it is a wise precaution to ensure that the threaded portion of the switch will protrude far enough for the fixing nut to be tightened adequately. It will be noticed that the grid of V20a is connected in parallel with the anode of V8, the a.m. detector diode. An attempt was made to switch the secondary of IFT9 between the two detectors but this resulted in an objectionable loss of a.f. gain on a.m., due to the length of leads involved, and hence a direct connection was tried and found to be satisfactory. IFT9 must be re-peaked although the tuning was always found to be very flat in the writer's receiver. The trimmer C502 is mounted directly on pin 5 of V8 valvebase and adjusted for best s.s.b. resolution; just over half-mesh was found to be optimum. Starting from minimum capacity, volume will increase as the trimmer is screwed inwards until a point is reached where it becomes necessary to reduce the r.f. gain to maintain intelligibility of the s.s.b. signal. The final setting is mainly one of personal preference. C505 is mounted between pins 3 and 4 of the b.f.o. valve V12, the original wire on pin 4 having been removed and folded back in the cable form. Connection is then made directly to the grid of V20b by means of a short length of coaxial cable, and it will then become necessary to readjust the b.f.o. coil for zero beat. The a.f. output lead to

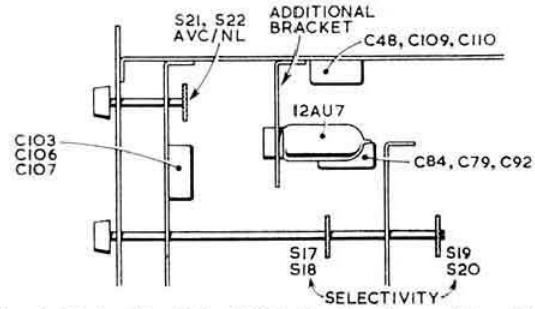

Fig. 2. Underside of the AR88 showing the position of the 12AU7 product detector.

C116 is most easily broken at terminal 9 of S21, the A.V.C./NL. switch and the wiring for S1b connected at this point. Convenient points for the connection of S1c are pin 6 of V6, and the main +150 volt line and C84 in the b.f.o. anode circuit.

Operation

The power switch of the AR88 is left in the REC. MOD. position, the functions of A.M./S.S.B. and C.W., A.V.C. TIME CONSTANT and B.F.O. ON/OFF all being performed by S1. In the A.M. position, a faint b.f.o. beat can be heard with the power switch turned to REC. C.W., due to direct radiation from the b.f.o. wiring. However, the level of the signal is far too low to affect the a.v.c. circuits and it was not considered worth attempting to improve the screening.

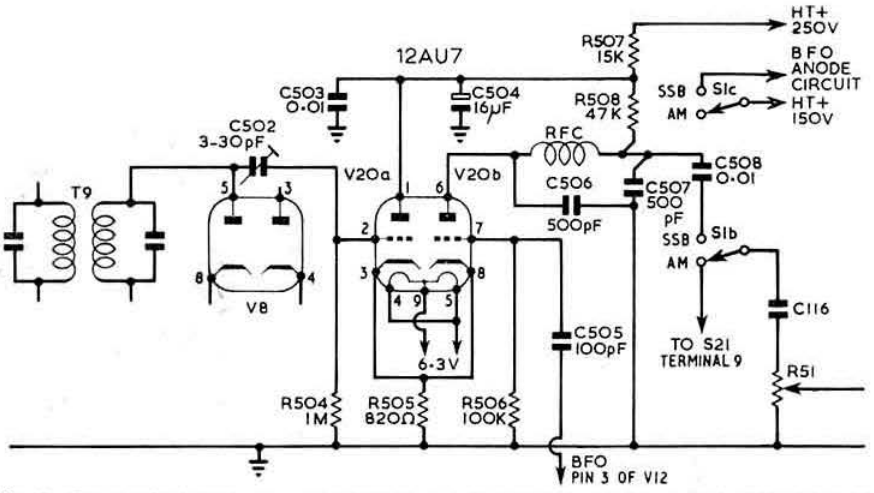

Fig. 3. The product detector and switching to retain the original a.m. detection facilities.

Panel Controlled Muting

The circuit shown in Fig. 4 enables the AR88 to be completely muted or used to monitor the signal from the transmitter, depending on the setting of a control on the front panel. The existing tone control is of little real value, in the author's opinion, and a simple modification enables it to perform a much more useful function. The lead from C117 is disconnected from the potentiometer R52, R55 is disconnected from ground and connected to the now free tag on R52. The lead to the DIVERSITY terminal on the rear terminal strip is removed and a wire from the junction of R52 and R55 taken there instead. This lead is, in turn, connected through a normally closed point on the transmit relay or switch to ground. In the transmit mode, this point is open and the monitoring level may be set by R52, the receiver being completely muted at just over half-travel of the control. Should the receiver subsequently be operated away from the transmitter, it is only necessary to turn R52 fully anticlockwise to remove its muting effect from the circuit.

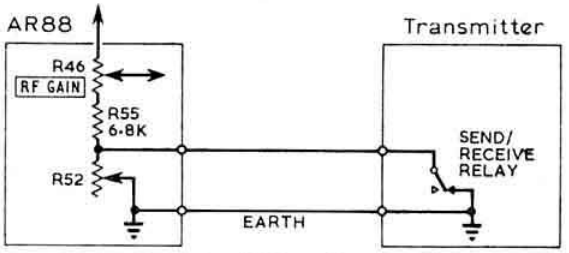

Fig. 4. A suitable muting circuit.

Conclusion

Of course, one could carry on and modify the AR88 almost beyond recognition, and there is no doubt that the receiver could be significantly improved, especially its selectivity shape factor. But, despite its vintage, this model is still adequate for most purposes, it is particularly rugged, and, perhaps of even more importance, new spares are still available.

A Review of the Yagi-Uda Aerial

(Continued from page 229)

of the element to the input terminals of the dipole [*QST*, November, 1958].

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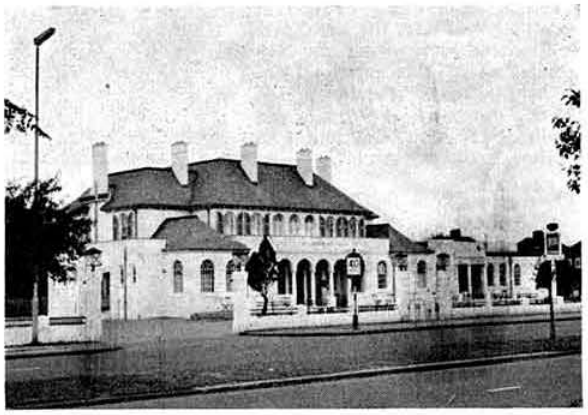
[9] " Technique for Arraying Large Numbers of Yagi Disc Antennas," F. B. Beck, *IEEE Trans*, AS-2, April, 1964. " A Method for Arraying Yagi Disc Antennas," N.A.S.A. (USA), TN D-2683, March, 1965.

[10] " A New Type of Endfire Antenna," J. C. Simon, G. Weill, *Ann. Radioélectricité*, 8, p. 183, 1953; see also *L'onde électrique*, p. 883, 1954.

[11] " Aluminium Mesh in R.F. Reflectors," L. J. Ricardi, M. E. Devane, *Tele-Tech* and *Electr. Ind.*, p. 72, March, 1956.



This is The Winning Post Hotel at Whitton, Twickenham, to be the home of the Thirteenth International V.H.F./U.H.F. Convention on Saturday, 13 May. There is an ample car park. There is good rail access as well: book to Whitton on the Southern Electric, and on leaving the station turn left. About 350 yards down Percy Road on the left is the rear entrance to the hostelry car park. " Plan of the camp " next month.

FOUR METRES AND DOWN

By JACK HUM, G5UM*

Triple Foregathering

THREE weeks and three days from now the Midlands V.H.F./U.H.F. Convention and Dinner: and if you have yet to act on the invitation extended to you in the big panel on page 159 last month, now is the time to do so. In particular, dinner reservations are limited to one hundred places, all of which may well be taken up in the next few days.

Guest of honour at this the second Midlands get-together to be organized at Wolverhampton, will be the Society's President, GI3KYP, himself a prominent v.h.f. operator and much in demand, especially from across the water, when he appears on the bands. He will be supported by what promises to be a record turnout, judging from the large number of people who, within a few days of the appearance of last month's announcement, declared their intention of going along on 29 April.

* * *

A week later comes the Scottish V.H.F./U.H.F. Convention in Edinburgh, and here the Society Representative will be V.H.F. Manager Geoff Stone, G3FZL (to whom go the congratulations and well wishes of all upon his marriage on 18 March to G3SGN . . . we hope Ceri will be able to get along to Edinburgh with Geoff).

Organizer George Millar, GM3UM, has the arrangements for the Scottish Convention well and truly tied up by now, but he does ask for early bookings, as there is not much time left between now and Saturday, 6 May. See panel on opposite page.

* * *

Thirdly, 13 May brings London's turn in the v.h.f. triple bill. Although most of the needful information about "The Thirteenth on the Thirteenth " is to be found in the panel overleaf several "extra items " can be expected on the day. More about them in " Four Metres and Down " next month; but don't wait until then to book up: *do it now*! Those members who are minded to bring their ladyfolk along to the dinner will be pleased to know that there will be ample space in the dining room at The Winning Post hotel to accommodate a goodly crowd; and as may be seen from the announcement panel, a special price is quoted for those who wish to go to the dinner only.

" Contest Man's Dream . . ."

As was remarked here the other month, you never know how much activity is going on in remote places until an opening occurs to expose it. During the March 144 Mc/s Open Contest, most appropriately, such conditions *did* present themselves, to produce Continental signals by the score to delighted UK listeners.

The opening was not wholly unexpected. Reports of gathering sunspots had alerted many operators to the possibility of auroral contacts, and their vigils were rewarded by the appearance of several French stations on " Two " during the first week of March, followed by a sudden change of direction of the opening round to further east.

The situation appeared to be pressure-induced and independent of sunspot phenomena. The barograph trace for the period kept by BRS15744 (R. A. Ham of Storrington) showed a significant droop just at the peak of EDX conditions on the Contest Saturday. These conditions filled the log at Storrington with something like 150 British and a large clutch of Continental stations. Summing up, BRS15744 rates the March 144 Mc/s Open as " a contest man's dream, the band opening up at just the right time with plenty of active stations to eat up the DX."

It is openings like the March one that help the less fortunately sited operators to break out of their environment. For example, G2CDX of Cambridge hoisted his signal out

* 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester. Please send contributions for the May issue by 12 April, and the June issue by 17 May.

SCOTTISH V.H.F. CONVENTION

CARLTON HOTEL, NORTH BRIDGE, EDINBURGH

Saturday, 6 May, 1967

The exhibition will open at 2 p.m. and the convention will start at 2.30 p.m. The speakers will include Mr. T. P. Douglas, G3BA, and Mr. G. M. C. Stone, G3FZL. A dinner will be held in the evening.

Tickets and further information may be obtained from Mr. G. P. Millar, GM3UM, 8 Plewlands Gardens, Edinburgh 10.

Convention, dinner and tea 30/-

Convention and tea 7/6

Organized by the Lothians Radio Society

of the flat lands to work DL stations as far away as the Czech border—and this with no more than the popular 25–30 watt input level.

Associate " Stroke P "

Now a special paragraph to himself for Tony Goacher, A3942, who is rapidly on the way to becoming the " compleat (v.h.f.) angler." He took his electronic rod and line in the form of an FET converter, EC10 i.f. strip and 4-element Yagi to the top of the South Downs near Worthing to see what could be pulled in during the 144 Mc/s Open Contest. The catch included 86 stations (and those DJs) and a good hamper-full of c.w. stations: it is Tony's ability (among other things) to read contest-speed c.w. that helps give him that " compleatness " where v.h.f. is concerned.

The FET converter (two 2N3819 in the r.f.) was loaned by his friend and neighbour, the redoubtable BRS15744.

A3942 is within two QSL cards of being able to claim his " Four Metres and Down " Listener's Award. Next he hopes to net enough cards to claim an A3942/P certificate, and to make sure he always sends an s.a.e. with his reports. His perspicacity deserves to be well " awarded."

Verifications

To get the RSGB " Four Metres and Down " operating certificates you have to get the cards in. Because this is difficult, either through slowness in sending vital cards or because so many v.h.f. men have long given up the habit of QSLing, members have suggested using RSGB contest logs to provide the required information. So it is gratifying news that this proposal has been noted by the V.H.F./U.H.F. Contests Committee and was due to be discussed at its last meeting.

This is not to say the idea will be ratified, but it does confirm once again that positive suggestions sensibly made do not go unnoticed.

Apropos verifications, the Worcester members who helped put G3NUE/P on the air in rare counties during recent 2m and 4m contests worked enough countries and counties *in one weekend* to rate for the appropriate " Four Metres and Down " awards—as no doubt did several of the other groups who went portable during the last few contests. Members who receive QSLs from these groups would be a little churlish, in our opinion, if they failed to acknowledge them in some shape or form.

The verification debate threw up the question of 70cm " firsts " from the Isle of Man. From G3COJ comes the observation that the answers are to be found in a *Short Wave Magazine* list as long ago as May, 1955, which gives the following:

G/GD, 26 August, 1951, G2JT to GD3DA/P.
GW/GD, 29 July, 1951, GW5MQ to GD3DA/P.
GI/GD, 14 June, 1953, GI3GQB to GD3DA/P.
Thanks, Brian; and acknowledgments, " A. J. Devon."

How G3OUL went " Sideband "

Another powerful signal to add to the s.s.b. throng on 145·41 Mc/s is that of G3OUL, the Liverpool University ARS station. They use, in the words of Alan Clemmetson (he has recently been translated from G8 to G3VZJ, by the way), a KW2000, a modified TW2, modified G. & D. converter, and a 4X150 p.a. giving 100 watts p.e.p., fully transceive on 145·41 Mc/s.

Says Alan: " Actually, the whole project came about when G3SHK and G3MED came up for the weekend and decided to attack our beautiful gear with drills and soldering irons. Anyway, we are very grateful to them. However, when we operated during the 144 Mc/s Open Contest we used our customary 20 watts a.m./c.w. . . . it was considered too difficult to carry all the sideband gear up to the top of the Physics Tower . . . 150 ft."

Beacon News

To the numerous members who took the trouble to listen out especially for the GB3GI and GB3GW beacons and to send in reports of the reception of them, go the thanks of the V.H.F. Committee. Some very useful information about the service areas of these two markers is now on file.

Reports continue to come in about the effectiveness of the 4m beacon at Gibraltar. Peter Martinez, G3PLX, one of the South Coast team who helped to bring it into being, expresses the view that if the beacon's recent high level of signal strength is anything to go by, it should indeed prove to be a potent indicator of sporadic-*E* conditions on " Four." Then will be the time to look out for ZB2AP (he is the ZB2VHF beacon keeper), who is ready and waiting to chalk up the first UK-to-Gibraltar contact on this band.

Although ZB2VHF has now been moved to the base of The Rock, it is still in a very good location for propagation towards the UK.

Important 2m beacon news comes from Germany. Under the auspices of the Max-Planck Institute for Ionosphere Physics, two v.h.f. beacons with aerials beamed on the north west auroral region are to be established shortly, one in Schleswig-Holstein (northern Germany), the other near Falun, 100km north west of Stockholm. The respective call-signs of DL0PR and SM4MPI are self-evident ones based on the phrases " Polarlight Reflections " and " Max-Planck Institute." The call-signs will be sent once a minute from 175 watt transmitters operating into aerials with 13db gain.

In conveying the news Dr G. Lange-Hess, DJ2BC, of the Max-Planck Institute, says that British Isles reports of

THIRTEENTH INTERNATIONAL V.H.F.-U.H.F. CONVENTION

WINNING POST WHITTON TWICKENHAM MIDDLESEX

SOUTHERN ELECTRIC TO WHITTON STATION.

Organized by the RSGB V.H.F. Committee

GUEST OF HONOUR

Dr J. A. Saxton, Director of the Radio and Space Research Station, Slough.

SATURDAY, 13 MAY, 1967

MORNING

An exhibition of commercial and home-constructed equipment will open at 11 a.m.

AFTERNOON LECTURES

Arnold Mynett, G3HBW, will talk on field-effect transistors, followed by Mr J. E. Saw, of Mullard Ltd., on varactor multipliers. The AEI film "The Radio Sky" will be screened. After the tea break there is to be a lecture on overlay transistors and Heath Rees, G3HWR, will talk about "the next band up"—2400 Mc/s.

EVENING

The dinner, and presentation of prizes.

TICKETS

Convention 4s. 6d., Convention and Dinner 30s., Dinner 25s. 6d. Apply to Mr F. E. A. Green, G3GMY, 48 Borough Way, Potters Bar, Herts.

aurora backscatter reception of either of these beacons will be most welcome. They should be sent to him at the Institute, 3411, Lindau, West Germany.

The advent of beacons such as these—they are to be set up as the result of cordial co-operation between the Institute and the SSA of Sweden—is timely now that increased auroral activity may be expected.

The frequency of DL0PR will be 145·971 Mc/s and that of SM4MPI 145·960 Mc/s. Each is well situated at a television transmitter site.

Xtalxchange

By G3UUT, 22 Askham Lane, Acomb, York: one FT243 crystal for 7850 kc/s (70·65 Mc/s) on offer. Will exchange for FT243 crystal between 7789 and 7816 kc/s.

Recrystallization on "Four"

Picking up last month's suggestion that operators who wish to obtain crystals to put them on fresh channels in the 70·1–70·7 Mc/s band should state their needs here, Ray Martin, G3RWM, makes a practical offer of help. He tells "Four Metres and Down" that he is prepared to set up an Xtal Xchange Bureau where he will keep lists of crystals wanted and crystals available for exchange.

Members who wish to dispose of 4m crystals should send him details of actual crystal frequency and multiplication factor, and holder type.

Members wishing to *acquire* 4m crystals should send him a list of their wants, and of course a stamped addressed envelope. Ray will put them in touch with anybody who has crystals that will meet their needs.

Those who wish to accept this generous offer of help should communicate direct with G3RWM at 76 St. Pauls Crescent, Coleshill, Warwickshire.

"Weak Unmodulated Carriers . . ."

Still on the subject of 4m, a trenchant comment comes from G3PLX who has recently moved to South Hampshire. Referring to the oft heard remark that v.h.f. is characterized by lots of weak unmodulated carriers that would be intelligible if keyed, Peter doubts if their owners could be persuaded to plug in keys to get a few distant c.w. contacts when they can get all the local *phone* QSOs they want.

This seems to us to have a bearing on an opinion expressed here some months ago that our techniques on "Four" are not as good as they *should* be, and one of the primary causes for this situation is the use of adapted commercial equipment. Some of these "boxes" were designed for operation under far from amateur conditions, but because they can be persuaded to give a "signal of a sort" on 4m, and to pull in the louder local stations through an indifferent receiving strip, they find a certain amount of favour. The result, capped by the use of an indifferent aerial as well, is a fairly inefficient use of the band.

Our advice—and mind you, we are still writing in a personal vein—to those who ask how to modify Service (or semi-Service) gear for "Four" is: Strip the lot and rebuild, to a good amateur standards design, with a decently sensitive crystal controlled converter on the receive side. And don't forget to include a keying socket.

Which brings us back to where we came in on this particular topic: all who are in search of c.w. contacts on "Four" should scan the bottom end of the band as a matter of routine. Almost certainly any Sunday morning you will find G3PLX and his several 4m colleagues down there in South Hampshire waiting to work you. And from very much farther north you will probably also hear G3RIK/P operating at 1250 ft. a.s.l. near Rochdale, with a 4-over-4 aerial, no less. He is there most Sunday mornings and/or afternoons.

keen to work c.w. as well as phone. Those who wish to prearrange schedules with him for these "Four Metre Forays" should drop him a note at 58 Beechfield Road, Milnrow, Rochdale.

Expeditionaries

Just three days from now a DXpedition of more than usual interest will open up from the rare county of Westmorland on 70cm, timed to coincide with the Cumulative Activity Contest this coming weekend. Look for G8AHE/P on 433·26 Mc/s as from 19.00 GMT Saturday, 8 April, operations to continue until activity on the band ceases.

Already the G8AHE/G3OVA team have put half a dozen rare counties on to 70cm, to the great satisfaction of members anxious to collect for their "Four Metres and Down" awards. What is more, the two state that they are prepared to activate other "rarities" if 70cm operators will suggest to them where they can profitably go. Contact John Lockyer, G3OVA, at 23 Beechwood Road, Kings Heath, Birmingham 14.

* * *

Last year the G3OHH, G3OUF, G3PLX and G3TEY team created quite a stir on "Four" and "Two" by a short spell of operating from Sark. This year they plan to be in Jersey on the same bands, but with 70cm added, if the necessary gear can be obtained. More of this DXpedition later; meanwhile, book the dates, 22 July to 5 August.

* * *

Mike Dransfield will be back this month—and if you are new to v.h.f. so that this statement means little to you, we will just add that during his previous spells of UK leave from his job with the Institute of Agricultural Research in Nigeria he enlivened things on 2m no end as he journeyed from county to county in Britain, putting each one of them on the air in turn.

Known to h.f. men as 5N2AAF, Mike holds the British call-sign G3JKO, which he will be using on "Two" during the latter part of April and during May. He will be concentrating on the northern counties, Scotland and possibly Wales: but his itinerary is fluid and he would be happy to arrange visits to as many other mainland counties as he can manage to fit in during his spell of UK leave if members will write G3JKO, QTHR.

Although he has no 4m or 70cm gear, G3JKO would be prepared to operate on those bands if some could be rustled up.

Video-DX

In his letter telling of his forthcoming UK tour, Mike Dransfield imparted some revealing information about television reception in Nigeria that has a bearing on our earlier comment that you don't know what goes on in other places until there's a lift.

In the warmer parts of the world it seems that what we in these islands would regard as "good conditions" on v.h.f. exist nearly all the time, as exemplified by this order of TV reception reported by Mike:

"Although all the v.h.f. bands have been deleted from our 5N2 licences we get all the v.h.f. interest we want from DX TV on Channels 2 and 3 (European bands). Just recently Channel 2 has been a mess of about ten stations at once, but Seville and Barcelona—I do not know which—is by far the strongest. On Channel 3 the Canary Islands station gives pretty good pictures at times. . . ."

The path distances? Not far short of 2000 miles.

Skeds Operative

By G3OUL, Liverpool, with G3SHK, Middlesex, Mondays 20.00 hours clocktime on 145·41 Mc/s, single sideband. Subsequent contacts will be welcomed.

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

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG*	Craigowl Hill, Dundee	145·985 Mc/s	A1	
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3GI	Strabane, N.I.	145·990 Mc/s	A1	N/SE
GB3GW	Swansea	144·250 Mc/s	A1	E.N.E.
GB3LER	Lerwick	145·995 Mc/s	A1	S
GB3LER	Lerwick	70·305 Mc/s	A1	N/S
GB3LER	Lerwick	29·005 Mc/s	A1	N/S
GB3VHF	Wrotham, Kent	144·50 Mc/s	F1	North-West

*Not operational

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
8 February	10.00 GMT	52 c/s high
15 February	12.11 GMT	50 c/s high
22 February	11.30 GMT	150 c/s low
28 February	11.00 GMT	160 c/s low

By the Mid-Lanarkshire Group every night on "Four," starting at 22.30 hours, clocktime, and on Sunday mornings. No fewer than ten GMs already participate, reports GM3MXN, and another four are building.

By G3EKW (Nottingham Amateur Radio Society), Tuesday evenings on 70·26 Mc/s, looking out especially for mobiles.

By Leicester Net, Fridays 20.00 clock time, 145·15 Mc/s.

Skeds Wanted

By G3OUL with any GC, GD, EI, GI or GM stations on 2m, either s.s.b. or c.w. Write Alan Clemmetson, Liverpool University Amateur Radio Society, 2 Bedford Street North, Liverpool 7.

By G3PLX (QTHR), temporarily located at Havant, Hants., with any north of England station on 4m c.w., week evenings or weekends.

By G3RIK on 4m any evening after 22.00 GMT, or 4m portable any time during Sundays. Write D. Carden, 58 Beechfield Road, Milnrow, Rochdale, Lancs.

Tech Corner

From **G8ACC** (Sven F. Weber, London S.W.18):

I was most interested to see in "Tech Corner" two of G3NNG's FET amplifiers. I am fully in agreement with him about the device's stability when used either as grounded source or grounded gate. What I am not so happy about is matching into the source in grounded gate. True, the gain and noise figures are better than anything else save a parametric amplifier, but could they not be made better still?

Both the G3NNG 70cm design and the G3HBW pi-front end have the same difficulty: the device lead inductance and capacitance. A pi-filter can either be low-pass or high-pass depending on the circuit configuration: why not use a band-pass of the type where the FET lead inductance and capacitance are cancelled out? I have used the circuit in Fig. 1 for some time, and although no noise measuring equipment has been used on it, the amplifier subjectively seems to be better than the plain or pi-circuit.

I use a 2N3823, grounded gate, with the case at r.f. earth. The input circuit can be tuned on noise alone, and has a bandwidth (as far as I can tell) of 10 Mc/s. If there is *no* coupling between the input and output circuits the latter

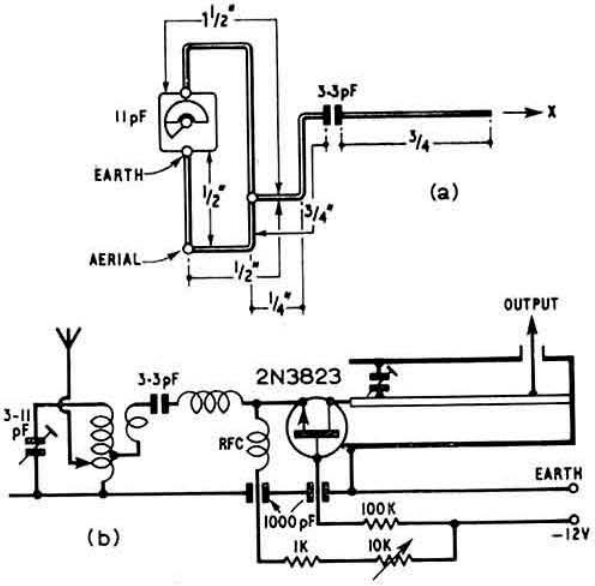


Fig. 1. Details of the G8ACC front end for 70cm using an FET. It was built on a printed circuit board. The main inductor consists of 20 s.w.g. brass or copper wire to a total length of 1½ in., including the 3·3 pF capacitor and the source lead of the FET. The associated r.f. choke consists of 10 turns of enamelled wire close-wound on a ¼ in. former. Details of the input circuitry are shown in the mechanical diagram (a).

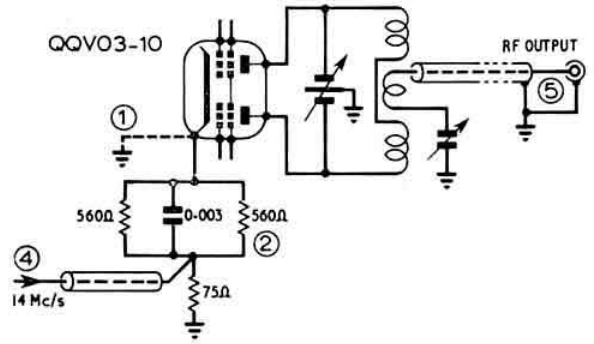


Fig. 2. Modifying a low power v.h.f. p.a. stage to become a balanced mixer for s.s.b. use, as described by G3BA. The sequence of operations is: (i) Disconnect earth strap on cathode; (ii) Add two 560 ohm resistors in parallel together with a 0·003 μF bypass capacitor, and a separate 75 ohm *un*bypassed resistor to earth; (iii) change the existing crystal for one of 7300 kc/s, and tune up the multipliers to drive the QQV03-10 to 25mA anode current; (iv) modulate cathode with s.s.b., 1 watt p.e.p. maximum; (v) take out 145·41 Mc/s r.f. as normal from anode circuit of QQV03-10.

circuit has a bandwidth of about 6 Mc/s. Gain is controlled quite simply by altering the source resistance.

From **G8ANQ** (Bill Burton, Whitby):

On the market there have appeared (Worthing Radio, Sussex) some r.f. power meters type ME11A/U which will measure 0-60 watts in two ranges of 0-15 watts and 0-60 watts. The calibration seems to be accurate up to 600 Mc/s and they will still indicate beyond this (1200 Mc/s) but at these higher frequencies calibration errors of up to 20 per cent must be tolerated.

This instrument, which has an input impedance of 51·5 ohms, can be used as a dummy load for 70cm. Another useful point is that the meter itself can be operated remotely from the rest of the device.

The instrument has been used at G8ANQ to check r.f. output at the end of long co-ax runs, and in addition to optimize the r.f. output from the 2m driver. It would of course be equally useful on the lower frequency bands—though it's the v.h.f./u.h.f. fraternity who are not so well catered for.

I understand the price of the ME11A/U is £2 10s. untested to about £5 tested.

Again from **G8ANQ**.

A simple method of generating n.b.f.m. is to use a 12AT7 fed by a crystal microphone to swing the screen of the transmitter's crystal oscillator by a small amount. At G8ANQ this oscillator is an EF91 with 12 Mc/s input and 36 Mc/s output. The end of the chain is a GL6283 in cavities taking 150 watts input at 432 Mc/s and driven by a BAY96 tripler.

I find that the above arrangement gives excellent n.b.f.m. at 70cm.

From **G3BA** (Tom Douglas, Sutton Coldfield):

An excellent basis for a sideband translator is the TW2 transmitter for 2m. The following adaptations can be done in about three hours.

This transmitter uses a QQV03-10 as its p.a., and its cathode circuit is taken to earth directly at the cathode pin. If a small 75 ohm resistor and a biasing resistor with parallel capacitance are introduced into this circuit we have all the requirements for a balanced mixer (Fig. 2).

After wiring in these components try out the transmitter with normal 2m drive. About one watt less output will be obtained, but this is acceptable in view of the TW2's versatility in doubling as a balanced mixer.

To convert to the translator mode all that is required is to change the 6 Mc/s or 8 Mc/s crystal for one of 7300 kc/s and tune up the two multipliers to give about 0·5 mA grid current into the QQV03-10 grid circuit. The anode current will be about 25mA in this condition. With the 3-10 output anode circuit still at 144 Mc/s no output should be detectable.

Finally, 14 Mc/s drive in the form of one watt p.e.p. may be applied to the cathode 75 ohm resistor from a dummy load attenuator driven by a KW2000 at normal settings and power output. Just about one watt p.e.p. output will be obtained from the 3-10 with good linearity. This can be fed into the usual buffer and linear p.a. configuration.

In case anyone is worried at the thought of 131 Mc/s getting through from the drive, have no fear: the multiple tuned circuits in the class A buffer and AB1 linear will be more than adequate to suppress this down to better than the carrier suppression of any good s.s.b. transmitter. Generally, the figure would be around the minus 60db mark, which is good enough for anybody.

There must be many small transmitters about similar to the popular TW series which could easily be changed to the balanced mixer arrangement just described. If normal operation is required this takes only a few seconds to achieve;

indeed, you have virtually a choice of "straight" or "translate" operation at will.

For perfect stability, of course, the crystal oscillator should be kept running all the time, but even with on/off operation the frequency shift is reasonable for non-VOX contacts.

There is adequate room at the rear of the TW Communicator receiver chassis on which to mount any co-axial sockets needed for drive, output, and relay transmit output, and the cabinet can be cut neatly and tidily to accommodate them. Of course, the manufacturer's guarantee will be void if you do such a thing, but this is a small risk to set against the great convenience of the arrangement described.

From G3MTI (Alan D. Smith, Great Malvern):

There are those of us who mentally juggle with crystal frequencies in the wakeful hours! I wonder if the single-crystal arrangement shown in Fig. 3 has been tried by anyone venturing on a three-band v.h.f. receiver?

Of course, an existing 2m receiver can be used, the single crystal then serving the 70cm and 23cm ranges.

The overtone crystal is available from Cathodeon Crystals Ltd., Linton, Cambridge, for 45s.

From G8ANY (Dave Woodhall, Blackpool):

Here are details of a quite simple converter for 70cm which does not use lecher lines. It was helped along in the building stage by G8AGG, now G3VYB, who suggested most of the circuit, seen in Fig. 4. It is ideal for the newcomer to 70cm.

There are four transistors in the oscillator chain, starting off with a 35 Mc/s crystal to give a tuning range of 12 to 14 Mc/s. The mixer shown is a GM0290 but a TIMX10 could be used a little more cheaply at negligible loss in performance.

No preamp is shown: the type to be used is a matter of personal preference. One could be fitted at the head of the mast if desired. Some juggling with the values of the emitter resistors in the oscillator chain may help increase overall performance.

Mechanically, this converter can be accommodated in an Eddystone die-cast box 4½ in. × 3 in. × 1½ in.; the oscillator chain along one half of it and the mixer and i.f. head amplifier occupying the other half, with a screen between the two sections.

If anyone requires further information an s.a.e. to me (QTH in the 1967 *Callbook*) will bring all the help required.

Here and There

Another useful acquisition of seventy-centimetric strength to the North East: BRS27650 has just obtained the call-sign G8AXC. He is L. J. O'Loughlin, 3 Beacon Road, Eastgate Park, Seamer, Scarborough.

* * *

"The leading scores in all future v.h.f./u.h.f. contests organized by RSGB will be announced on GB2RS, normally three to four weeks after the contest date"—G3OUF, secretary, V.H.F./U.H.F. Contests Committee.

* * *

Good news for South Wales v.h.f. men: there is to be a

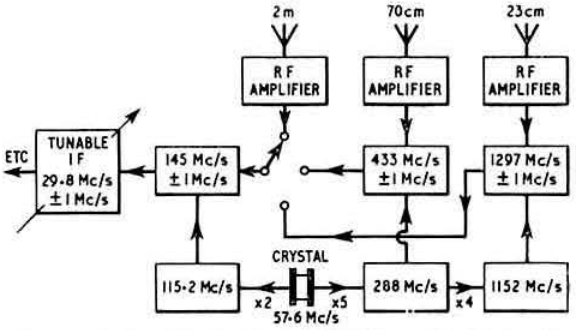


Fig. 3. How to make one crystal drive three converters. See accompanying note by G3MTI.

meeting of the South Wales V.H.F. Group on Tuesday, 23 May at 7.30 p.m. at 20 Austin Avenue, Porthcawl, Glam. All interested will be very welcome, says GW4CG, whose QTH this is.

* * *

Keep this coming Saturday free: it's the last Cumulative Activity Contest until September. On 2m it'll be c.w. only, on 70cm all modes. Re-read page 389 of the BULLETIN for December, *now*!

* * *

"With regard to the 4m bandplan, I must say that no-one I have spoken to seems to like it . . . the idea of open zones, as previously put forward, is better. . . ."—G3PLX.

"Congratulations to G3FDW and the V.H.F. Committee in producing at long last a workable 4m bandplan—with a c.w. zone"—G3UUT.

[*See also "Letters to the Editor"—Ed.*]

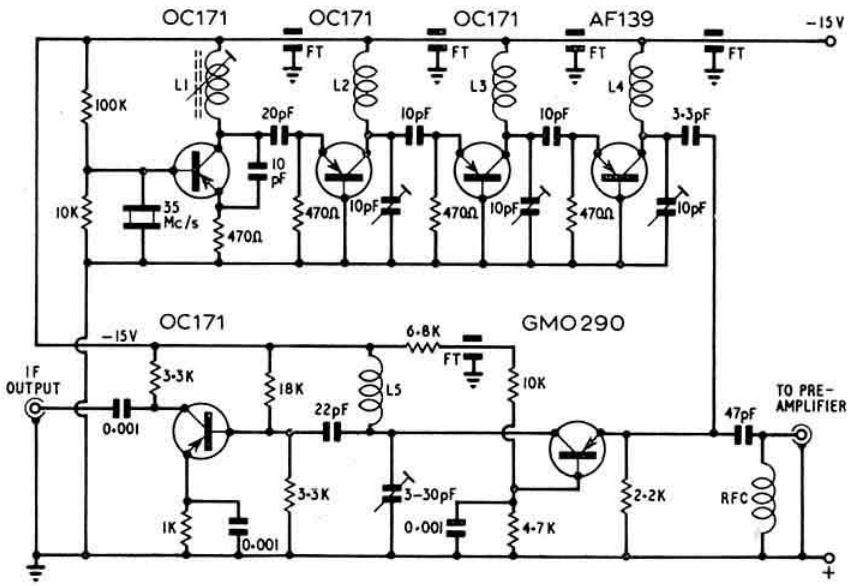


Fig. 4. The G8ANY transistor converter for 432 Mc/s. Component values are given on the diagram. Coil values are: L1, 35 Mc/s, 15 turns on a ¼ in. slugged former, L2, 70 Mc/s, 7 turns 20 s.w.g. on a ⅜ in. former, L3, 140 Mc/s, 5 turns, 20 s.w.g., on a ⅜ in. former, L4, 432 Mc/s, one turn to make a ¼ in. loop of 18 s.w.g., L5, 12 Mc/s, 30 turns, 28 s.w.g., on a ¼ in. former.

THE MONTH ON THE AIR

By JOHN ALLAWAY G3FKM

MANY readers will already be aware of the action taken by the American Radio Relay League concerning the recent activities of Dr. Donald Miller, W9WNV. A great deal of controversy is at present raging over the rights and wrongs of the affair, and the situation seems to be becoming more obscure daily. It is very unfortunate that ARRL's action, even if carried out in good faith, should have been done in a way which gave the appearance of trial and judgement in the accused's absence. A second statement by the ARRL Awards Committee was issued on 10 March. This stated that in spite of a five hour interview with W9WNV on 3 March they had not been able to clarify any of the points which needed clarifying before any of the suspensions could be removed. They also pointed out that a photocopy of a letter, alleged to have been written by a US Vice-Admiral to W9WNV, and stating that the US Coastguard did not object to the Navassa Is. operation, had been investigated and *that no Admiral with than name existed.*

Whatever the truth is, the actual suspension is under Rule 12 of DXCC. This states " Fair play and good sportsmanship in operating is required of all amateurs working toward the DX Century Club Award. In the event of specific objections relating to continued poor operating ethics an individual may be disqualified from DXCC by action of the ARRL Awards Committee." Much of the operating by " big guns " trying to contact Don at some of his stops left a great deal to be desired, and if Rule 12 were to be strictly observed there could be very few individuals who could honestly claim a DXCC Award! Forgery and dishonesty cannot be condoned, and it would be just of ARRL to invalidate *all* QSL cards from operators who have operated illegally from various DX locations during the past few years. It is to be noted that QSL cards from British Commonwealth areas issued for contacts with W9WNV will continue to be accepted by the Society for its awards, until further notice. [See also DXCC News opposite].

* * *

G3SDK will be operating as EI8BK from Tralee in Eire, between 16 and 28 July. He hopes to be on 160, 80 and 40m phone and c.w. Likewise G3USE, G3VES, G3VMK, and G3VOK will be on the air from Guernsey between 5 April and 11 April. They expect to be mostly on 20, 15 and 10m but if space permits they will also put up an aerial for 160 and 80m. All QSLs should be sent *via* G2MI.

SP6FZ (Jan Ziembicki, Bielawa, PO Box 30, Poland) is particularly anxious to arrange a weekend sked with a Shetland Is. station to give him the last contact for his WAE 1.

Your scribe is very anxious to obtain photographs of amateurs and things of amateur radio interest, and readers are earnestly requested to lend any such objects to the Society for possible publication. We will, of course, do our best to take care of them and return them after use!

* 10 Knightlow Road, Birmingham, 17. Please send contributions for the **May** issue to arrive by **12 April**, for the **June** issue by **17 May**, and the **July** issue by **14 June**.

News from Overseas

A recent letter from VR4CR, who is at present often to be found on the lower end of the 14 Mc/s c.w. band, gives the information that he is apparently the only amateur currently active from the British Solomon Islands. Arthur says that all the newcomers who get call-signs seem to be too exhausted by the effort and never get on the air. He says that the call VR4LN was never officially issued and was apparently used by an operator at the US satellite station suspected of using army equipment and power far in excess of that normally permitted in VR4. It was hoped to get VR4CR on 21 and 7 Mc/s but as the note produced left something to be desired this has been postponed for further transmitter modifications.

More information concerning the reciprocal licensing arrangements available to G licensees visiting South Africa has been received from ZS2H (who was formerly G3TDA). As an immigrant he was required to produce his current G licence, Amateur Radio Certificate, Birth Certificate, and Immigration Permit. All regulations are given in Part V of the South African " Post Office Guide " obtainable from all S. African Post Offices; or the Postmaster General, Amateur Radio Licences, Pretoria may be contacted for information. Interested amateurs would also do well to consider joining the South African Radio League, PO Box 3911, Capetown.

The latest bulletin from W2GHK, of DXpedition of the Month, gives an up to date list of all the stations from whom DOTM acts as QSL manager. This is now a very extensive list and includes over a hundred call-signs; our sincere thanks are due to Stu for this very excellent contribution to our hobby. Two points are made concerning delay in receiving QSLs from DOTM—one is that sending for more than one at a time may involve one delayed log which keeps the other cards waiting. The other is that unless s.a.e. and IRCs are sent with applications outgoing cards are sent via the world bureaux. Stu is hoping to receive logs from 9U5ID soon—this will be yet another on one his list.

The January issue of " 9G1 News " contains a list of current licensees in Ghana. This totals 44, four of which were issued last year, and two more will be added soon. 9G1ED was due to be on leave in the UK from 1 February and 17 April, and possibly using his G3BQH call. Certain matters pertaining to the working of the QSL Bureau are discussed, and it is pointed out that the income of a small society is insufficient to cover the despatch of cards received for non-members. It is therefore regretted that such cards are not delivered. Anyone who still needs a card from a Ghanaian station is advised to try the direct approach if considerable time has elapsed since sending his QSL. The GARS took part in the 1966 Jamboree-on-the-Air with considerable success. In all 37 different countries were contacted. 9G1RS will be in evidence again during the 1967 event.

9V1LK reports from Australia where he has been for a short period. He attended a meeting of the Wireless Institute of Australia in Adelaide when some 150 members were present, and was surprised to find that VKs are apparently interested most of all in inter-state QSOs on a.m.—s.s.b. and c.w. appear to be scorned by the majority. Dick thinks that this may be due to the very high cost of radio

equipment in that part of the world. Referring to his experiences before leaving Singapore he says that 7 Mc/s was very good to Europe in February, and that they can also be heard on 3·5 Mc/s but never seem to be listening for weak signals One might add that from listening to them from the European end it seems that some of them never even just *listen*!

Dr Mike Dransfield, 5N2AAF, has supplied up to date information on the licensing situation in Nigeria. There are now two Nigerians, two Dutch, seven American and seven British licence holders, and two Universities also hold calls —5N2AAA (Abadan) and 5N2AAU (Ahmadu Belle, Zaria). 5N2ABG is an old time SWL—BRS1579—who has taken the plunge at last! 5N2AAH will shortly be leaving for South Africa, and 5N2AAS will be retiring to the UK. 5N2AAL has already returned to Nottingham, and Mike says that he has heard that Angus, ex-ZD2AMS has now given up his hostelry in the Lake District and moved to Louth. Further details of this would be appreciated. Mike himself will be home for two weeks before 31 May and will be active on 2m with his G3JKO/P call. A correction to the information given last month concerning the operations in Dahomey by 5N2AAX and AAW. Their call is TY5ATD, not TY2BC, and due to transportation costs they are only able to make the trip about once a month. Conditions in Nigeria currently seem to be very similar to those in the UK and the increased activity is causing the QSL Bureau to be worked overtime!

QRP News

Now that 28 Mc/s is opening up a golden opportunity is available to work DX with very low power. To prove this point G3TFX reports contacts with FM7, MP4, OD5, LU, VP5RB, UA0, ZE and over 300 Ws (more than half of whom gave him S9 reports) with his 5 watt transmitter. His best DX was VK, and when in contact with VK3AKN Richard dropped his input power to 1 watt. This change was not noticed by the VK who was copying him at S7! The aerial used is a dipole. On c.w. G3SYC has been working W6s and South Africans with his 10 watt crystal controlled transmitter. It seems to be quite a good idea to try to find out just how little power is needed to put a signal around the world on 28 Mc/s, and further reports would be very welcome.

Top Band News

With the coming sunspot maximum and the dwindling hours of darkness reports of activities on 160m appear to be drying up. However further information concerning the claim by GM3IAA in last month's *MOTA* to have had the first GM-9H1 QSO on the band has now been received. A letter from G3NT states that what was thought to be the first contact in this category took place between ZB1AR and GM3ATV and GM2HIK on 12 March, 1950. ZB1AR has now become G3IAR.

G3VCS wishes it to be known that he is now home from Singapore, but that he has not yet been on 160m although QSL cards have been received. He hopes to be active in a few months time.

DXCC News

A brief summary of the ARRL Statement concerning W9WNV is as follows. 1. Dr. Miller's operations have jeopardized acceptance and support of Amateur Radio by agencies of the US Government and by foreign governments. 2. That Dr. Miller's operations have violated Rule 12 of the DX Century Club. Accordingly Dr Miller's membership in the DX Century Club is suspended. 3. Credits for contacts with K1IMP/KC4, Navassa Is, and VU2WNV " Laccadives " are suspended until the Committee is satisfied that the operations were properly authorized by the respective agency or government involved. 4. That because of evidence that at least some QSL cards have been transmitted by or on behalf of Dr. Miller confirming contacts which never took place, credits for contacts with VQ9AA/A Aldabra, FR7ZP Glorieuse, VQ9AA/D Des Roches, and 1M4A Minerva Reef are suspended. 5. That no credits will be given for future contacts with Dr. Miller operating from DX locations until further notice. 6. That investigation of the DXpeditions involving Dr. Miller will continue. In this respect, the Committee solicits the further co-operation of amateurs who may have first hand knowledge of any facts which may assist the Committee in its deliberations. The Committee is hopeful of later being able to prescribe a method, such as photocopies of logs and accompanying affidavits, which will permit the reinstatement of credit from locations where the DXpedition was properly authorized and suspension has been required due to discrepancies such as *improper QSL cards to a probably limited number of individuals* (Author's italics). Your scribe would be very grateful to receive any evidence of QSLs being received for non-existent QSOs as he has yet to hear of one.

Gill, ONL-495 (wife of London-born ON5LV), dressed as the Mayoress of Carrickfergus during a recent visit to Northern Ireland. Gill devised the idea for the International Ham Convention at Knokke in 1965.

(Photo by ON5LV)

Contests

Results of the **1966 OZ-CCA** Contest show the following UK scores: **G3IAR 82,186 points,** G3EYN 63,468 points, G3JFY 20,532 points, G3OXI 20,332 points. G3IAR and G3EYN were third and fourth highest non-Scandinavian entrants. The 1967 event will take place between 12.00 15 April, and 24.00 16 April. There are single and multi-operator sections, and all bands 3·5 to 28 Mc/s may be used. The usual RST plus serial number of QSO should be exchanged. Each correctly received report counts 1 point, each correctly received QSO number 2 points. Contacts with OX, OY and OZ stations count double points. Countries as per the ARRL DXCC list are counted as multipliers, and the final multiplier is the sum of all countries worked on all bands, W, VE, PY, LU, VK and ZL call areas count as countries for this contest. Contest entries must be mailed before 15 June, and should include a declaration that all rules and regulations established for amateur radio in the participant's country have been observed, and that the decisions of the EDR Contest Committee will be accepted.

RSGB WELCOME TO LONDON SCHEME

Overseas visitors to London who wish to meet British radio amateurs are invited to telephone any of the numbers on the right, so that suitable arrangements for their reception can be made. It would be of assistance if a preliminary letter, giving the dates of their trip and details of any special interests or needs, could be sent to the Publicity Officer, RSGB, 95 Collinwood Gardens, Clayhall, Ilford, Essex, England. We regret we are unable to undertake accommodation bookings, although we are able to advise visitors who have difficulty in finding hotel rooms. Visitors are advised not to come to London unless they have made definite accommodation arrangements. Direct enquiries from visitors to RSGB Headquarters will be re-routed to one of the numbers.

01-550 0882
COLINDALE 1443
LABURNUM 5733
COLINDALE 4770
WORDSWORTH 5723
01-SM8 5866

They should be sent to: EDR's Contest Committee, PO Box 335, Aalborg, Denmark. Certificates will be awarded to winners in each country.

The **1967 Helvetia 22 Contest** will be held between 15.00, 22 April and 17.00, 23 April. The object is to contact as many Swiss stations as possible on all bands up to and including 28 Mc/s. Any mode may be used but mixed QSOs are not permitted. Reports and QSO numbers should be exchanged, Swiss stations will send a two letter abbreviation indicating their canton. Each station may only be contacted once per band, and each contact counts 3 points. The final score is obtained by multiplying total QSO points by the sum of cantons worked on each band. Logs should be kept for each band and only one side of the sheet should be used. They should be sent within 30 days to: Marius Roschy, HB9SR, Chemin Grenadiers 8, 1700 Fribourg, Switzerland. A declaration that contest rules have been observed should be included. Winners will receive a certificate. In connection with this contest readers are reminded that this is a very good opportunity to contact stations for the Helvetia 22 Award—this is one of the most beautiful awards available to the sheepskin hunter.

A reminder that entrants for the **1966 IOTA Contest** should send a list of the QSLs and Islands claimed as contacted during the period 1 January—31 December, 1966, with IOTA reference number indicated against each not later than 30 April to: Geoff Watts, 62 Belmore Road, Norwich, NOR.72.T. The score is the number of island groups multiplied by the total number of continents worked and potential winners will be asked to forward their QSLs for checking.

Late information received concerning the ***CQ* WW SSB Contest** (see page 167, March BULLETIN) is that a special WPX certificate is being issued to anyone working 200 or more prefixes during the contest. More details will be available later.

The **" One Land QSO Party "** run by the New England Chapter of CHC will take place between 00.00, 29 April and 24.00, 30 April. The object is to contact as many New England stations as possible. Exchanges should consist of QSO number, RT(T), county, operator's name, and preferred frequencies 3520, 7060, 14080, 21050, 28020, 14260, 21380, and 28260 kc/s. Each QSO counts 3 points and total QSO points should be multiplied by the number of counties worked, and then this total again multiplied by the number of N.E. states worked. A minimum of 28 QSOs is required for winning a certificate. This contest is open to SWLs and double points are given for logging both ends of a QSO. Logs to Carl Porter, 19 Penniman Terrace, Braintree, Mass, USA 02184 before 15 June.

Awards

The **Helvetia 22 Award** is a most attractive certificate awarded to those who can produce evidence of having made contact with all 22 Swiss Cantons, since 15 April, 1945. All 22 QSLs plus a check list and return postage should be sent to: USKA, Sursee, Lu, Switzerland. Cantons and abbreviations are as follows: Appincel (AP), Argovia (AG), Basle (BS), Berne (BE), Fribourg (FR), Geneva (GE), Glaria (GL), Grisons (GR), Lucerne (LU), Neuchatel (NE), Scheffhouse (SH), Schuys (SZ), Soleurs (SO), St. Gall (SG), Tessin (TI), Thurgovie (TG), Unterwald (NW), Uri (UR), Valais (VS), Vand (VD), Zoug (ZG), and Zurich (ZH). During the Helvetia-22 Contest many of these are activated by portable stations and this is an excellent opportunity to contact Cantons such as Appincel which are otherwise little populated by amateur activity.

An award which does not in any way depend on the individual interpretation of a national society as to what constitutes a " country," and is therefore worthy of consideration is the **Worked 75 Zones (P 75 P)**, issued by the C.R.C. of Czechoslovakia. This award is issued in three classes, based on the number of official ITU communications zones (as layed down by the 1959 Geneva Conference) contacted. The first class requires 70, second class 60, and third class 50 zones confirmed. Contacts must have been since 1 January, 1960, and minimum reports of 337 or 33 must be shown on all cards which should be sent, together with 10 IRCs to: Central Radio Club, Box 69, Praha, Czechoslovakia. A full list of zones, and a zone map may be obtained from this address in return for an IRC.

The new DX Editor of *CQ* Magazine is K4IIF, who is also responsible for the issue of WAZ, WPX, and other awards. In a letter to your scribe he asks for patience from those still awaiting results from applications sent in long ago and promises to do his best to straighten things out as soon as possible. He has not yet received the records from his predecessor, W2DEC. John wishes it to be known that they are now issuing a Novice WPX—the WPNX—available to American novices who confirm 100 prefixes after 15 May, 1967. They are usually to be found between 21,100 and 21,250, and use 75 watts or less. The co-operation of DX stations would be very much appreciated in giving these beginners their first taste for DX, the prefixes to look for are WN (USA), WP4 (Puerto Rico) and WV4 (Virgin Is).

An arrangement has now been arrived at with DARC whereby it will no longer be necessary to send QSL cards to Germany when applying for WAE or EU.DX.D. Cards should be sent to the Society's Certificate Manager, G5GH, who will certify them and send confirmation to DARC. Similarly, cards from German applicants for RSGB awards, except C.DX.A, will be certified by DJ3VC. This is a very welcome move, and one which could sensibly be adopted by many of the organisations which require applicants to post large numbers of QSL cards to addresses outside their own country.

ZS4MG, who is now on a three year posting to Zambia, apologizes to all who have experienced delay in receiving their " 6 in 6 " Award. The Kroonstad DX Club is no longer in existence, but Sid now has the club's files and is

able to deal with applications. His address is PO Box 1928, Kitwe, Zambia.

DXpeditions

Iris and Lloyd Colvin have now begun their African trip with a spell of operation from Senegal with the call 6W8CD. Their schedule was originally to open up from **Mauritania** but it is believed that they will be going there next and they will probably be on the air with a 5T5 call around the time this is being read. All QSLs with s.a.e. and IRC to the address in *QTH Corner*.

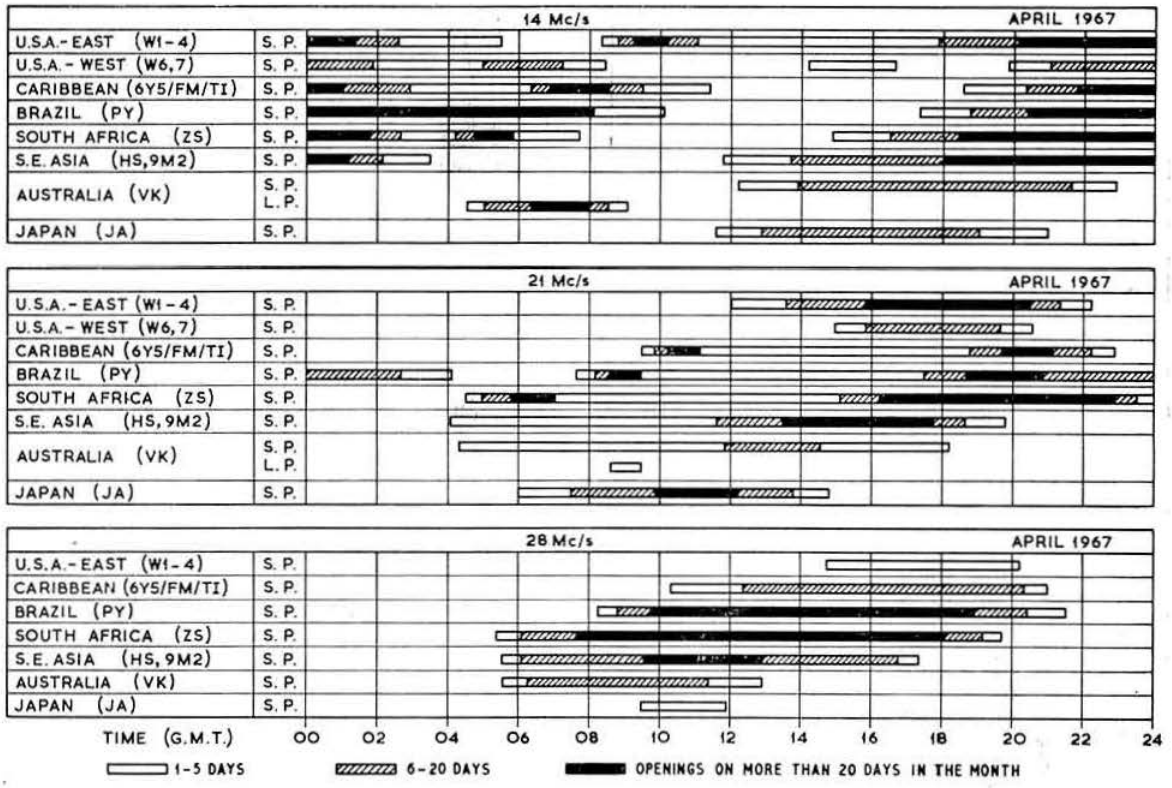
Brian Levett, VS9ABL, hopes to operate from **Socotra Is.** during the last two weeks of April. His frequencies will be around 14,185 kc/s (listening 5 to 10 kc/s higher) and 14,197 kc/s (listening 14,200 to 14,205 kc/s). Although not separate for the DXCC Award (it counts as Aden) this island does count for IOTA. QSL to B. G. Levett, Signals, RAF Khormaksar, BFPO 69.

K6KA and his wife are travelling around the world, and hoping to operate as guests from stations which they visit on their journey. 9M6, VS5, 9MB, 9V1, HS, VU, YA, UI8, EP, OD, YK, SU, 5Z4, 5X5, 9M2, SV, and OE are amongst the countries to be visited. They will use 7004, 14,044, and 21,044 c.w. and 7194, 14,140, 21,404 and 28,544 kc/s s.s.b. QSLs should be sent *via* Elmir Conklin, 402 Oliveta Place, La Canada, Calif., USA.

Vlad, UA1CK, hopes to be making a trip to Mongolia during the latter half of April. At the time of writing no definite dates or call-sign were available, but UA1CK/JT or JT1KAA should be heard on s.s.b. during his visit, His equipment will probably consist of a v.f.o. controlled 120 watt transmitter to a ground plane. QSL details will be announced later.

Band Reports

Conditions as a whole seem to have been as predicted, and a noticeable increase in the number of hours which the h.f.



The seasonal decline in the F2 m.u.f's which begins gradually in March continues at a faster rate in April. At the same time there is a steady increase in the m.u.f's as a result of the increasing sunspot activity. However, the effect of the seasonal decline as summer approaches is greater than that of the increase in sunspot activity, so that the coming months will see a worsening in conditions on the h.f. bands (especially 28 Mc/s) with August the worst month. With the seasonal drop in the daytime F2 m.u.f's there will also be an increase in the night-time F2 m.u.f's as summer approaches and the nights become shorter. For this reason the propagation conditions at night on 14 Mc/s will steadily improve in the coming months reaching their peak in June and July. On 28 Mc/s there will be fewer opportunities for working North America and Japan especially towards the end of the month. On 21 Mc/s also during this month, the seasonal fall in the F2 m.u.f's during daytime will be unfavourable. The East Coast of the USA will therefore probably only come through reliably between 16.00 and 20.00 GMT and Japan from about 10.00 to 12.00 GMT. Australia and Western North America will only come through on favourable days (i.e., with above average F2 m.u.f's). On favourable days the band may remain open to Brazil and South America until around morning. Compared with the previous month 14 Mc/s will be mainly a night-time DX band. On the other hand the distances covered in daytime on this band will decrease with the approach of summer. On 7 and 3·5 Mc/s DX possibilities will be markedly worse in the coming months with the increase in static as the nights shorten. Local traffic on 3·5 Mc/s will hardly ever be interrupted by the dead zone in the early morning.

The provisional sunspot number for February 1967 was 92·4 with the period of greatest activity occurring during the last week of the month. On 27 February the daily number was 186, the highest recorded for many months. The predicted smoothed sunspot numbers for June, July and August 1967 are 88, 92 and 95 respectively.

QTH Corner

AP5NQ	via DJ3KM, Martin Luther Strasse 29, 6507 Ingleheim Germany.
EP2GI	(GI3CDF in Tehran) via GI3HXV, 45 Erinvale Avenue, Finaghy, Belfast 10.
FB8WW	via Dorothy Strauber, 10 Carjen Av, Asheville, NC USA 28804.
FO8BS	BP 376 Papeete, Tahiti.
FR7ZL	Stn. on Tromelin Is. QSL via FR7ZD, Guy Hoarau, 10eme Km, Tampon, Reunion.
KS6BZ	L. Rector, c/o Dept. of Education, Pago Pago, American Samoa.
KH6CH/KW6	Box 365, Wake Island.
MP4BFK	via W2CTN, 159 Ketcham Avenue, Amityville, NY USA 11701.
ON6HC	via ON4LV or ON5LV.
VK3AHI/VK9	via VK3ACW, E. R. Hake, 543 High St, East Prahran, Victoria, Australia.
VP2VV	via KV4CX, PO Box 2126, St Thomas, US Virgin Islands.
VP6PJ	now via WB2UKF, 50 James Street, Shrewsbury, NJ, USA (formerly via W2CTN)
VP8IE	vai CX3BBD, US Embassy, Montevideo, Uruguay.
VR2FF	PO Box 184, Suva, Fiji.
VR4CR	PO Box C 19, Honiara, British Solomon Islands.
YS1DHE	Box 1184, San Salvador, San Salvador.
ZF1GC	via VE4DQ, Dr James Hendry, 103 Clark Drive, Brandon Manitoba, Canada.
ZK1AR	via K4SHB, Victor Dubois, 423 Palermo, Coral Gables 4, Fla, USA.
ZL1AI	via K6UJW, Joe Fischer, 4825 Regalo Road, Woodland Hills, Calif. USA 91364.
ZS9B } **ZS9D** }	via W4BRE, Don Whitsett, 1207 Locust Av, Huntsville, Ala. USA 35801.
4W1G	via HB9NQ, Rene Schelling, Romerstrasse 22, Aarau AG, Switzerland.
5N2ABB	Fokke Mulder, PO Box 68, Kaduna, Nigeria.
5N2ABG	Eric A. Lomax, PO Box 68, Kaduna, Nigeria.
5N2ABF	F. L. Inks, PMB 2469, Lagos, Nigeria.
5N2ABI	Mrs. Mickie Inks, PMB 2469, Lagos, Nigeria.
5N2AAV	Marinus Verhoeven, PO Box 14, Minna, Nigeria.
6W8CD	via YASME, PO Box 2025, Castro Valley, Calif. USA 94546.
9U5ID	via DOTM PO Box 7388, Newark, NJ, USA 07107.

* * *

RSGB QSL Bureau, G2MI, Bromley, Kent.

bands are open has been accompanied by the appearance of short path Pacific DX in the early mornings. Occasionally 14 Mc/s has remained open all night, and West Coast Ws have been reported on 28 Mc/s as late as 20.30. No reports have been received of W0VXO being heard on 1·8 Mc/s from the Caribbean area during his recent trip, although W stations were heard calling him.

Many thanks are due to the following contributors, without whose assistance it would have been difficult to compile this section: G2BOZ, GM2HCZ, G2LB, GW3AX, G3HCT, G3HDA, G3IAR, GM3ITN, G3KSH, G3PQF, G3PUF, G3SML, GM3SVK, G3SYC, G3UMV, G3UOL, G3URX, G3VJG, G3VMQ, G4MJ, G8JM, G8VG, BRS20317, BRS25429, BRS26737, BRS27806, BRS27358, BRS28198, A3942, A4038, A4182, A4552/VK2, A5105, A5125, A5126, A5182, and A5224.

1·8 Mc/s C.W.: OL0AFQ (23.53), VO1FB (23.08), W1BB/1 (05.32), W1HGT (23.00), K7DEK/1 (04.55), WA6ATY (06.16), W6STR (06.25), W7DOL (06.29), ZB2AM (06.27).

3·5 Mc/s C.W.: HK0AI (06.17), KP4BFF (06.13), UA0AG (23.28), ZB2AM (00.26), ZD8J (06.03), 6W8CD (00.20).

3·5 Mc/s S.S.B.: 3C3FZJ/SU (22.35), HS4AK (21.15), HZ1ZB (22.30), W1FZJ/KP4 (05.13), MP4MAW (22.15), MP4TBO (20.45), PJ2MI (23.50), TI2NA (06.45), VS6FS (23.00), VS9ALV (01.52), YV5CIL (23.48), ZC4RM (22.45), ZD3F, ZD3G (23.30), K7UIT/9A1 (20.55), 9M2DW (23.00).

7 Mc/s C.W.: CM2QN (06.25), MP4TBQ (19.17), VK7SM (08.40), VP1MW (09.01), VP7DX (22.45), VP9BK (01.47), W7SFA (03.40), 9V1NV (22.45).

14 Mc/s C.W.: FL8RA (23.15), FO8BL (08.50), FU8AG (09.50), HM9DH (11.05), KH6FRI (18.45), KX6ER (08.15), LU2ZI (09.06), ST2SA (11.25), SU1IM (15.00), UA1KED (Franz Josef Land, 03.30), UA0KYB (Zone 23. 08.05), VK2BRJ/9 (Norfolk Is. 09.55, 12.35), VK9RF (08.14), VK9TB (08.00), VP8JD (22.40), VR2FF (09.30), VR4CR (08.30), YK1AA (06.30), YJ8BW (08.45), ZD7IP (18.45), ZP9AY (00.14), WA2DIJ/3V8 (17.40), 4S7EC (15.50).

14 Mc/s A.M.: ZL1AI (Kermadec Is. 07.00).

14 Mc/s S.S.B.: AP5NO (14.45), FB8YY (16.52), FH8CE (19.05), FK8AU (22.03), FO8s AB, BL (07.45), FR7ZL (Tromelin. 17.55), FY7YM (19.34), HR9EB (22.50), KC4USV (08.50), KC6BW (07.10), KG6SB (08.20), KJ6BZ (08.30), KM6BI (08.50), KS6BT (07.12), KW6EJ (14.10), KX6AF (07.26), TN8AA (17.57), VK3AHI/9, VK9RH (Norfolk Is. 08.10), VK8OX (08.30), VK0CR (08.25), VP8HZ (08.00), VP8IU (21.15), VR2EK (23.00), VS6FS (11.00), XW8CC (15.50), ZD8DH (19.45), ZD9BE (22.21), ZK1AR (L.P. 17.33, S.P. 07.00), 8R1P (22.09).

21 Mc/s C.W.: FG7XJ (11.26), KL7FRY (07.45), SU1DL (10.20), TA2AC (12.05), UA0DA (Zone 19, 08.20), VP1MW (18.50), VR2EK (09.15), VS6EN (11.50), YJ8BW (10.30), ZD8TV (22.34), 6W8CD (12.00), 9L1TL (07.27).

21 Mc/s A.M.: EA9EJ (19.20).

21 Mc/s S.S.B.: CE3TS (22.09), FH8CE (15.20), FP8CY (14.30), HR1KAS (17.45), KL7DTH (20.40), KZ5JK (22.08), VK9GN (11.35), VK9OM (09.40), VQ9AR (17.15), VS6BS (10.30), ZD8CK (18.25), ZLs (08.30—09.30), 4U1SU (12.02), 6O1PF (19.13), 6W8CD (19.02), 9Q5FV (19.00).

28 Mc/s C.W.: DU1CL (11.55), FG7XX (16.00), HK0A1 (18.50), JA9BSK (09.21), TA2AC (12.16), VP2MK (13.12), W6/W7 (15.30—20.30), YN3KM (16.29), ZD7IP (12.52), 6Y5BS (14.10), 9L1TL (15.08).

28 Mc/s A.M.: 9Y4VS (19.00).

28 Mc/s S.S.B.: DU1FH (08.47), FG7XL (13.03), HC4TB (13.53), HK0A1 (19.40), KA7AB (09.05), KR6FF (10.55), TG8CJ (16.00), TI2HK (16.25), VK9DJ (Papua. 10.38), VQ9TC (17.58), VU2JM (10.36), K7YCH/MM (Off 3W8, 13.27), All W districts (12.30—18.30), YA5RG (12.08), ZD8CX (13.45), ZP5JB (14.50), 4W1G (08.30), 5H3JR (20.03), 6Y5UC (22.00), 9M2LO (10.58).

1967 Countries Table

	1·8 Mc/s	3·5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s	Total
G3IAR	10	48	35	76	51	24	244
G8JM	1	—	10	95	19	5	130
GM3SVK	11	10	23	74	55	5	178
9V1LK	—	3	20	73	21	22	139
G8VG	1	15	17	32	27	30	122
G3KSH	—	13	17	31	20	27	108
G3OJV	—	1	7	20	3	6	37
G3PQF	1	16	9	8	6	8	48
9J2BC	—	—	—	17	2	18	37
G3LNS	1	9	—	16	9	8	43
G3ING	3	11	6	4	6	1	31
G3VJG	—	2	4	5	9	35	55
G3JVJ	14	10	2	1	2	4	33
A4568	3	33	26	104	68	28	262
A3942	12	41	36	75	26	22	212
A5004	4	46	21	68	32	29	200
BRS28198	1	40	19	66	21	21	168
BRS27806	3	18	15	69	72	54	231
A5105	1	25	10	72	39	20	167
A4552/VK	1	1	2	80	10	2	96
A4038	5	12	13	56	82	39	187
A5273	4	34	16	45	28	18	145
A4182	1	27	12	40	22	1	103
A5126	—	11	2	16	10	6	55

This table is in order of 7 plus 14 Mc/s totals.

(Continued on page 245)

THIRD LONDON S.S.B. DINNER

Saturday, 20 May, 1967

Organized by:
Joe Steele, G3KZI,
Norman Fitch, G3FPK
Jim Farlow, G3BXI

The Royal Garden Hotel
Kensington High Street
London W8

• • •

- The Palace Suite, an entire floor, has been reserved for this event.
- From 3.30 p.m. a Trade Show—All the latest s.s.b. equipment.
- 7 p.m.—Dinner.
- Dancing to the famous Stapleton-Lipton band.
- Spot prizes.
- Grand Raffle for s.s.b. equipment and mink tie for the ladies.
- 11 p.m.—Late night refreshments.
- 11.15 p.m.—THE REX GREY CABARET—London's leading floor show.
- Licensed to 1 a.m.
- Ample, two-storey underground car park beneath hotel.
- Many well known overseas amateurs will be attending so don't miss this biennial event—GIVE THE WIFE A TREAT!

• • •

Tickets, 75s. each, from
N. A. S. Fitch, G3FPK
79, Murchison Road
London, E10
(01-539 6700)

Hotel reservations to hotel direct or:
J. C. Farlow, G3BXI
49 Mount Pleasant Road
Chigwell, Essex
(01-500 4546)

H.F./L.F. Crystal Test Oscillators

By R. H. MUNRO, VS6EL/G3PZD*

SURPLUS FT241A and FT243 crystals which find their way into the hands of amateurs often show signs of age, and in many cases it is essential to test them before proceeding with design of equipment. The writer was very aware of this, and acted accordingly, but it soon became evident that more time was being devoted to devising an efficient test oscillator than to testing the crystals themselves. Therefore, as there is more to this subject than is apparent at first sight the results of these experiments are now written into an article. It is hoped that the circuits to be described will be found of use to those who wish to use crystals of these types on their fundamental mode.

The construction of the units does not require abnormal feats of engineering and the method of assembly should be apparent from the illustrations. Alterations to the layout are quite permissible.

Circuit Arrangement

Both oscillator circuits are essentially the same, the differences being in component values to accommodate either h.f. or l.f. crystals. Positive feedback is applied to the transistor via the low-impedance path offered by the crystal at its series-resonant frequency.

The l.f. arrangement, shown in Fig. 1, incorporates a Wearite b.f.o. coil in the collector tuned circuit. The tap on this coil, (designed to operate in a Hartley circuit), is used as the connecting point for the collector of the transistor. This reduces the damping and materially assists sluggish crystals to oscillate. Output is taken from a link winding, L2, positioned at the earthy end of the coil. The link consists of 50 turns of 34 s.w.g. enamelled copper wire scramble wound.

The performance of the l.f. oscillator, when working into a resistive load, may be seen from Table 1. The figures were obtained from a valve voltmeter capable of reading down to 10 mV using an FT241A, 25·1 Mc/s overtone crystal operating on its fundamental frequency of 464·8 kc/s. The Table shows there is ample r.f. for a variety of applications.

The h.f. arrangement is shown in Fig. 2, the collector tuning coil in this case being hand wound and consisting of 28 turns of 28 s.w.g. enamelled wire close wound on a $\frac{5}{16}$ in. diameter former. The link winding, L2, consists of seven turns of the same gauge wire wound over the earthy end of the main winding. In view of the high level of radiation which can be caused by this coil, and bearing in mind the frequencies involved, it is advisable to fit the coil with a screening can.

It should be noted that in the case of the h.f. oscillator no tap is required on the collector coil. Most FT243 crystals are sufficiently active as not to require a specially provided low impedance feed-back point on the coil. This also applies to other crystals in the frequency range checked in the circuit of Fig. 2.

In the units upon which the measurements were taken a Japanese 2SA82 transistor was used. This was suffering from excessive leakage, due to receiving more than its fair share of abuse in an experimental transmitter. From this it would seem fair to comment than an OC170 or OC171 would be more than likely to give a worthwhile improvement upon the figures tabulated.

Results

Both oscillators are evaluated in Tables 1 and 2 respectively, from which it can be seen that the performance of the l.f. oscillator may be described as reasonable, and that of the h.f.

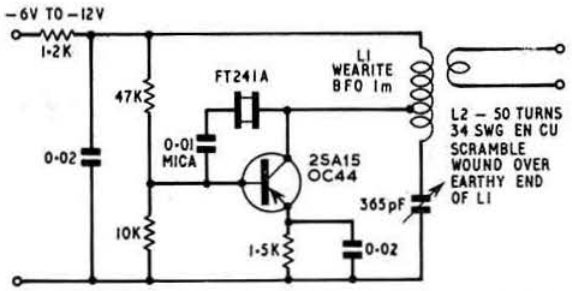


Fig. 1. The low frequency oscillator using a commercial coil

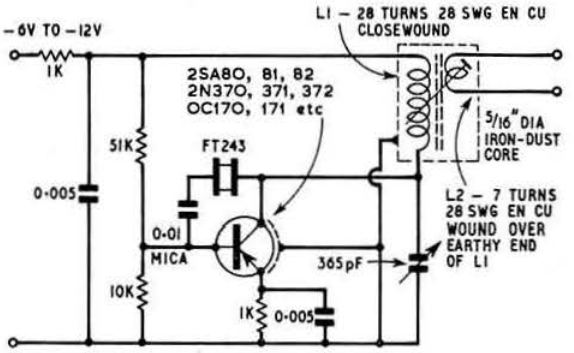


Fig. 2. The high frequency oscillator.

oscillator as excellent. In respect of the h.f. oscillator, reasonably smooth control of the output voltage is possible by adjustment of the tuning capacitor, but for a linear reduction, down to a very low output, alteration of the position of the core in the coil is preferred. The versatility of this particular oscillator is well demonstrated by its ability to retain an r.f. output of 0·4 V r.m.s. when feeding a load of 10 ohms.

The reason for showing figures to two decimal places in Tables 1 and 2 is largely for comparison purposes, for although the measuring instrument was capable of reading to this order of accuracy the 5 figures should not be taken as absolute. Of some greater importance is the fact that Morganite ½ watt 10 per cent resistors were employed for the loads, and this should be borne in mind when deducing power output. However, whatever error was introduced by these resistors would be constant because the same samples were used throughout the tests.

For convenience, Table 3 has been adapted from Table 2 to show the power absorbed by a resistive load with supply voltages of 6V, 9V and 12V. Although not reproduced with this article a graph was constructed from Table 3 and from which the optimum load for L2 was determined. This was found to be in the region of 135 ohms.

An interesting point indicated by Table 3 is that a mismatch of the load with the h.f. oscillator has less influence on the output when the supply is 12V. Even more puzzling is the fact that there is a slight increase in power output with a 10 ohm load compared to that with a 22 ohm load for supply voltages of 6V and 9V. With a 12V supply the drop in power from 22 ohms to 10 ohms is not as much as would be

* "Hollenden," Foxholes Hill, Exmouth, Devon.

expected. Originally the discrepancies were assumed to be due to having to extend an Abac when transferring figures from Table 2 to Table 3. However further measurements and calculations dismissed this idea.

From the foregoing, more experiments with low-loading resistors would appear to be an interesting line of investigation.

Conclusion

The construction of these oscillators can be confidently recommended and there should be no difficulty in duplicating the results. The simplicity of design and ease of construction will be a pleasant surprise to those who have previously only built valve oscillator circuits.

TABLE 1

Performance of l.f. oscillator. This table shows the r.f. voltage developed across the resistive load specified.

	LOAD (ohms)									
	Infin.	3·3K	2·2K	1·0K	470	100	47	33	22	10	Voltage
r.m.s.	0·42	0·40	0·40	0·34	0·30	0·10	0·05	0·03	0·02	Trace	6V
volts	0·75	0·70	0·70	0·62	0·50	0·22	0·12	0·10	0·08	Trace	9V
out	1·17	0·85	0·70	0·70	0·06	0·28	0·15	0·10	0·10	Trace	12V

TABLE 2

Performance of h.f. oscillator. This table shows the r.f. voltage developed across the resistive load specified.

	LOAD (ohms)									
	Infin.	3·3K	2·2K	1·0K	470	100	47	33	22	10	Voltage
r.m.s.	1·32	1·30	1·30	1·27	1·23	0·70	0·37	0·22	0·16	0·13	6V
volts	2·23	2·20	2·20	2·18	2·00	1·27	0·68	0·47	0·32	0·22	9V
out	3·00	3·00	2·97	2·90	2·75	1·78	1·07	0·82	0·62	0·41	12V

TABLE 3

Performance of h.f. oscillator. This table has been adapted from Table 2 to show power absorbed by various resistive loads with three different supply voltages.

	LOAD (ohms)								
	2·2K	1·0K	470	100	47	33	22	10	Voltage
Power	0·5	1·6	3·2	4·9	2·9	1·5	1·2	1·7	6V
in	2·1	4·7	8·5	16·2	9·7	6·7	4·5	4·8	9V
mW	4·0	8·4	16·1	31·6	24·3	20·4	17·5	16·9	12V

The Month on the Air

(Continued from page 242)

DX Briefs

Dorothy Strauber, ex-K2MGE, now W4MYE announces that QSL cards for 1967 s.s.b. contacts with **FB8WW** will not be forthcoming for quite some time as the logs will not reach her until the 1967 operation is over.

It is rumoured that VK2BRJ/9 will leave Norfolk Island soon *en route* for **Nauru.** This seems to depend on transport availability.

WA6ZZD/KP6 has been active around 07.00 on 14,215 kc/s s.s.b. complete with attendant horde. QSL via K6UJW (see QTH Corner).

WA6SBO is rumoured to be interested in making the trip to **Clipperton Is.** This is hoped to materialize about mid-May. K6KA, who is travelling around the world, has been given UI8KAA/K6KA and UI8KBA/K6KA licences for use whilst in Tashkent and Samarakand between 27 April and 3 May.

Guy, FR7ZL, will be returning to **Tromelin** at the end of March. About a month later he is expected to be going to **Glorieuse Is.** for one month, followed by **Europa Is.** for four months and then **Juan de Nova.** His home QTH is: Guy Petit de la Rhodiere, 7eme Km, St. Francois, Reunion Is.

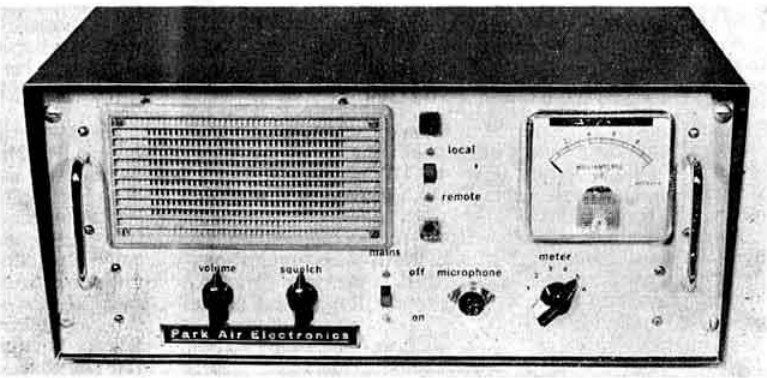
Thanks are due to all correspondents, and thanks and acknowledgements are particularly due to the following: The *LI.DX.A Bulletin* (WA2EFN), *The DX'er* (W6PHF), *DX News Sheet* (Geoff Watts), *The DX'er's Magazine* (W4BPD), *The West Gulf DX Bulletin* (W5IGJ), *Florida DX Report* (W4MVB), *CQ DX* (A.R.I.), *On The Air* (ON4AD), and *DX'press* (PA0FX). Please send all items for **May** issue to arrive by **12 April,** for **June** issue by **17 May**, and for **July** issue by **14 June.**

New Aircraft Base Station Transmitter-Receiver

" Fifty Zedd " is a type number belonging to a new ground to air base station equipment which has just been released by Park Air Electronics of Stamford, Lincs., a firm which, as many v.h.f. workers know, has Council Member Fred Parker, G3FUR, as its guiding light.

The 50Z delivers 8 watts of r.f. at any required frequency in the 118-136 Mc/s band, and complete with dipole aerial and all fittings it will be available for as little as £128 10s., a very attractive proposition indeed to aircraft ground station operators.

His many friends amongst the amateur v.h.f. fraternity will wish G3FUR every success in this new business venture.



QUA Associates

conducted by "JIX"

BEFORE going any further I must apologize for signing off the last "QUA. . . ." and not wishing you 73s. An oversight on my part I'm afraid.

Have any of you built the b.f.o. described in the February QUA. . . .? Your reports on its functioning etc. would be most welcome.

Many of you wish to start local SWL clubs and of course this is the best way to communicate your ideas with fellow SWLs. So if any of you have ideas along this line just drop me a letter and I will place any particulars in this page so that interested SWLs in your particular area can get in touch with you and perhaps a flourishing club will be the result.

Quite a number of you are becoming interested in the junior countries table suggested by Robert Gilchrist (A5094); a letter from Vernon Blackmore, G3VGK (ex-A4134) suggests what form this table might take. Have any of you any thoughts and suggestions on the subject—the more the better.

T. P. Wade, A5310, writes from his boarding school in Harrogate and says that he doesn't have much chance to do much listening on the bands as his school is some 40 miles away from his home and receiver. He makes up for it during the holidays though. On his receiver, a Trio 9R-59, A5310 has received much DX including he says, " pages of Ws and UAs, etc."

A5310 thinks that A5094's idea of a junior countries table is a good idea but feels that SWL's, like himself, away from home and receiver, would be at a great disadvantage. He would like to get in touch with any interested persons in his area. His address is Form L4B, Ashville College, Harrogate, Yorks.

F. T. Webster, A5166, one of our new associate members, writes from Leeds to tell us about himself. His receiver is a Marconi CR100 and the aerial is a 20m dipole. He took the RAE last year and hopes to have his ticket early this year. While studying for his RAE he found the *Examination Manual* most useful, but has the criticism that there did not appear to be enough on the subject of current electricity and magnetism or on the practical construction of transformers, capacitors, aerial tuning units etc. A5166 says there is no actual radio club at his school but there are several SWLs and a licensed amateur. How about getting together and forming a club? Good luck if you do.

A. Lattimore, A5004, writes with reference to A5094's letter in the last " QUA. . . ." and agrees that a junior countries table for " A " members would be a good idea. He hopes to take the RAE in May and his Morse is up to 9 w.p.m. A5004 is interested in forming an SWL club and would like to correspond with anybody interested in such a project. To contact him write to 124 Birchwood Road, Wilmington, Dartford, Kent. Good luck to A5004 and any others who contact him.

Martin Goodrum, A4798, writes from Norwich and unfortunately we did not meet at the Radio Communications Exhibition as arranged. Better luck next time Martin. Martin intends to make a mod. to his R1155 and get it going on Top Band.

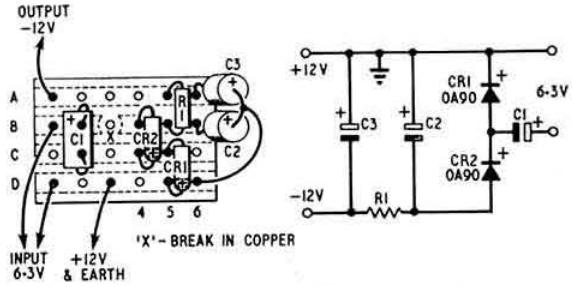


Fig. 1. The circuit of a rectifier/voltage doubler for deriving a d.c. supply from a 6·3 volt a.c. valve heater rail. C1, 50 μF; C2, C3, 500 μF; CR1, CR2, OA90; R1, 100 ohms. Layout diagram for the voltage doubler components on the Veroboard.

A Low Voltage Power Supply

If you have small transistorized accessories which are designed for use with valve equipment, such as the b.f.o. described in the last " QUA. . . . ," then there is a d.c. supply requirement. Batteries can be used, of course, but this is inconvenient. By rectifying the 6·3-volt heater line, and using a voltage doubler, a d.c. voltage of some 9 to 12 volts can be obtained. Only a few milliamps are required for the small devices such as the b.f.o. and ordinary signal diodes can be used. These are very cheap—there is no need for expensive silicon types in these very low current applications.

A small piece of Veroboard is again used. Wire the diodes in place, making sure that they are the right way round. In fact, most of the parts are polarized, and the correct way round is important.

This small unit can be powered by a small separate transformer (a bell transformer is suitable). The prototype unit was used to operate a phototransistor, and would also be suitable for operating a sensitive relay. A friend who built a similar unit used two faulty transistors of the OC71 type (one of the junctions of each being intact, of course). These were even better than the point contact diodes.

Construction

Using Veroboard, as in Fig. 2, the hole C2 must be cut away using a large twist drill. The diodes can then be connected, polarity as shown, with one between D2 and D3 and the other between E3 and E4. C1 is connected between B2 and B3, C2 between F2 and F4, and C3 between F1 and F4. The resistor R1 is connected between E1 and E2.

* * *

Have you noticed that the venue for the Radio Communications Exhibition (now to be called the International Radio Engineering and Communications Exhibition) is to be the New Horticultural Hall. This is to be welcomed, but don't you think that this will entail an even greater move away from a true Amateur atmosphere? If you think a stand could be mounted by and for " A " members and beginners at the Horticultural Hall, it would be essential to think of it now. By the way, couldn't we arrange a meeting again for " A " members around London—perhaps a visit to the Science Museum, with a chat and coffee afterwards? Cheerio for this time. Best wishes for the RAE (to whom it may concern!). 73 JIX.

* Ken Smith, G3JIX, 82 Granville Road, Walthamstow, London, E17.

Expedition to Drum Mountain

COLEG Y BRIFYSGOL, BANGOR, CYMDEITHAS RADIO AMATUR

The intrepid adventurers:

David Last, GW3MZY
John Lawrence, GW3JGA
Peter Symes, GW3SWL
Jon Hawkins, GW8AOH
Martin Briscoe, G8AOB
John Whitehouse, G3UEK
John Levett, G3VTL
Mike Dainton, G3TXR
Gary Lewis, GW8AXJ
Peter Skirrow, G3UJP
Geoff White, GW8APM

SWLs
Dave Dack
Dave Vickers
David Rowe
Capel Aris

The V.H.F. Group of the University College of North Wales Amateur Radio Society was formed by nine members in October, 1966 with the initial objective of taking part in the series of four 70 Mc/s contests during 1967. However, weekly meetings and hard work by a few members led to a trial entry for the c.w. contest on 4 December, 1966 (after some emergency Morse tuition by G3TXR!). The site was a snow covered hill in Denbighshire, and the chapter of mishaps began when two cars found themselves in a snow-filled ditch beside a Forestry Commission road. Our borrowed Land Rover proved its worth in extricating these from a snowy grave. In this contest we came twelfth, and so, after improving the equipment we set out with high hopes for the contest on 12 February, 1967.

A slight delay was caused when one of our members was half an hour late at the meeting point; we were informed that his alarm clock had been running backwards for part of the night! However, at 6.30 a.m. a convoy of vehicles left Bangor carrying 15 intrepid souls to the nursery slopes of Drum. Here, all the vehicles but the Land Rover were abandoned and the climb continued. Apart from a half mile detour along the wrong track all went well and the summit was reached at 9 a.m.

Battling against a freezing gale and flying ice one tent and the aerial were erected and the station was assembled in the Land Rover, which had been carefully manoeuvred to enable the beam to be rotated by the Armstrong method from inside. All minor faults were cleared and GW3UCB/P was on the air at 10 a.m. precisely.

Now, not having much else to do, five fearless amateurs decided to explore another possible site, Foel Fras, 563 ft. higher at 3092 ft., but it was decided that a marsh extending some quarter of a mile between the two peaks would prove impassable for a vehicle in all but the best weather.

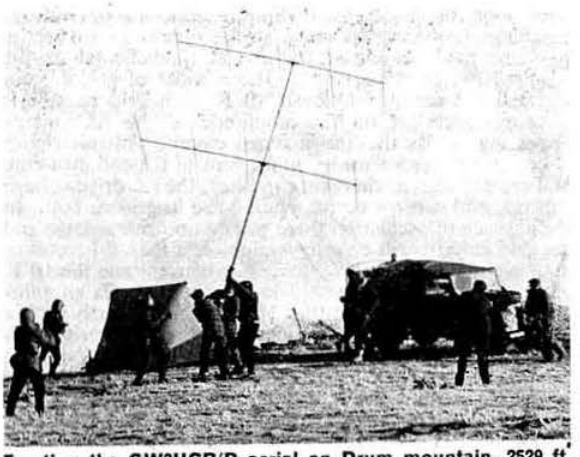
Shortly after our return to the site the peace was disturbed by shouts of " All Out " when one of the aerial guys was accidentally severed and the whole assembly was in imminent danger of collapsing. While two people held the mast vertical, the rest of the party considered various methods of catching the loose guy which was blowing merrily in the unabated gale 16 ft. up.

Another minor catastrophe occurred when the 6-over-6 slot fed beam reduced itself to two coincident six element arrays fed by a folded dipole. This repair took much less time than was anticipated, though there were a few anxious moments during the re-erection.

Late in the afternoon it was decided that the tent should be taken down, owing to wind force. One member was despatched to bring help for this operation, but before the help arrived the tent obliged on its own accord and was narrowly rescued from a flight into the valley a thousand feet below. The Land Rover was the only shelter available at this stage and so it was decided that eight people should go down on foot, leaving seven to operate and clear up. Soon afterwards it was thought that the Land Rover should be started again to warm the engine. However, although it had been running less than an hour previously, it now stubbornly refused to start. Various tricks were tried, including pushing round the summit (on soft marshy ground) without success. It was eventually decided to close the station two hours early, pack up all the gear, and attempt to start the engine by rolling the Land Rover down the track. With great difficulty and danger to the driver this was accomplished in a very spectacular fashion—resulting in a quarter mile " burn up " down a mountain track (in the dark) before the vehicle could be brought to a halt. After picking up all the pieces the descent was completed at a more modest pace and the equipment returned to Bangor.

After unloading, a hissing from the nearside front tyre was noticed. Normally it would have been a simple matter to change the wheel—spare wheel and jack were provided. Missing, however, was the handle for the jack, and the change was accomplished by one person sliding the jack under the leaf spring whilst the Land Rover was hoisted a little at a time by the other five using a " borrowed " scaffolding pole.

Not, you might think, a very successful day, but, on distorted and rather idealised reflection, a most enjoyable one. A reasonable score was obtained in the contest and a lot was learned by all—not only about radio, but on such diverse topics as reversed alarm clocks and wheel changing without a jack. The writer had previously been prepared to admit that radio amateurs were a little eccentric. He now believes that they, or this group at least, are completely and utterly mad.



Erecting the GW3UCB/P aerial on Drum mountain, 2529 ft. above sea level in the Snowdonia range, during a gale.

Single Sideband

By G. R. B. THORNLEY, G2DAF*

Alignment of a G2DAF-Type Receiver *Part 3*

THE work described in Part 1 and Part 2 of this series has been concerned with preliminary alignment and measurement necessary to ensure that (i) the v.f.o. was tuning correctly to give a tunable i.f. range of 5·0 to 5·5 Mc/s and that the two i.f. input circuits were correctly tracking thus giving a first i.f. image rejection of not less than 60db, and, (ii) a reduction in second mixer (V4) injection voltage and correct 455 kc/s i.f. alignment to give an acceptable overall receiver white noise output and a practicable signal-to-noise ratio. White noise adjustments had all been made with the band change switch at the 20m position and with the main tuning and preselector tuning at one spot frequency of 14,250 kc/s. The receiver was now in the condition necessary to enable the real work of the individual amateur band alignment and performance measurement to proceed.

Conversion Oscillator

The Marconi TF144G signal generator was connected to the receiver aerial input socket and after setting the output attenuator to a convenient value—100 μV—the signal generator was set to the mid-band frequency on each of the amateur bands, and the front end coils and the preselector tuning control adjusted for resonance (for this work it was convenient to use the receiver in the usual way with the R.F. GAIN control at maximum; AUDIO GAIN control reduced to give an acceptable loudness of audio output, and the A.G.C. SWITCH to the SLOW position so that the S meter was operative and could be used as an indication of correct alignment).

Preliminary checks on each range in turn showed that the signal generator signal could not be received at all—not even when the output attenuator was increased to the high level of 10 mV—on the 15m or any of the three 10m bands. It was suspected that this was most likely due to the conversion oscillator V3 not oscillating at all on these ranges.

This valve operates either as a fundamental or third overtone oscillator using an ECC85 double triode in a conventional Butler circuit with the first half of the valve operating as a grounded grid amplifier coupled to the second half of the valve operating as a cathode follower. The necessary feedback loop to sustain oscillation is obtained by cathode coupling via the crystal which always operates on its series resonant mode either at the crystal fundamental or the required overtone frequency. The amount of grid current through the cathode follower 10 K ohm grid resistor is directly dependent on the amplitude of the r.f. voltage appearing across the anode tuned circuit. As this circuit is brought to resonance by adjustment of the coil dust core and the associated trimming capacitor, the r.f. drive voltage will rise and cause a corresponding rise in grid current. In the absence of oscillation there will be no drive voltage and the grid current will be a low value—less than 0·1 mA—or may even be absent altogether. For convenience the 10 K ohms grid resistor is returned to chassis earth via an additional 1 K ohm resistor that is bypassed to earth with a 0·01 μF capacitor. The junction of the two resistors is brought out to an insulated stand-off pillar to form an easy-to-get-at " Test Point."

To check each range in turn the AVO Meter was switched to the 1 mA d.c. range, the positive meter lead connected to chassis and the negative lead to the " test point." The bandchange switch was set to the 160m position and the appropriate oscillator coil inductance and companion " in situ " capacitor adjusted to obtain the maximum possible increase in grid current. The bandswitch was then set to each of the remaining ranges in turn and the associated dust core and trimmer adjustment repeated. Table 1 shows the grid current values obtained.

TABLE 1

Conversion Oscillator (V3) Grid Current	
Band	**Grid Current Across 1 K ohm Resistor**
160m	0·56 mA
80m	0·48 mA
40m	0·32 mA
20m	0·18 mA
15m	nil
10m	nil
10m	nil
10m	nil

It will be noted that there is no grid current reading at all on the 15m and the three 10m ranges. This indicates that the valve is not oscillating at all in these three switch positions.

One possible cause of failure to obtain oscillation is an open circuit switch contact. Normally this can easily be checked by measuring the h.t. voltage at the valve anode pin (pin 6) with the AVO meter. Unfortunately in this particular case it was not possible to get the meter probe down to the anode pin—or in fact any other pins either—because of the method of assembly and wiring of the associated valve holder components. The method of assembly that had been adopted by G3OCX when he built the receiver is shown in Fig. 1. It will be seen that all the feed and bias resistors and the bypass capacitors are mounted in a vertical bunch around the 4 BA support rod and that the top connection wires are threaded through the existing holes in the moulded pin " protection cap "—those wires requiring to be returned to chassis earth are looped around the free end of the central support rod and soldered together. The physical bulk of the components and cap is such that when viewed from above it is not possible to see the valveholder pins, and further, if the valveholder is mounted in fairly close proximity to one or more cross-screens (as it invariably is) it is not possible to get the AVO meter connecting probe down to the required pin contact to check the operating voltages. Neither is it possible to get a valve voltmeter probe down to a valve pin if it is required to check oscillator r.f. output voltage. A further considerable handicap is the fact that it is not possible to read the resistor colour coding or to check for a possible wrong connection or dry joint; neither is it possible to get the soldering iron bit down to the valve pin to remove a faulty component.

An amateur should always build any item of electronic equipment on the assumption that he will make mistakes, that he may have faulty components, and that the equipment will not work correctly the first time it is switched on. He must also allow for unsoldering and removal of components, either because they are suspect, or to substitute other values to obtain improved performance. All valveholders should be wired so that the associated components are kept clear.

* 5 Janice Drive, Fulwood, Preston, Lancs.

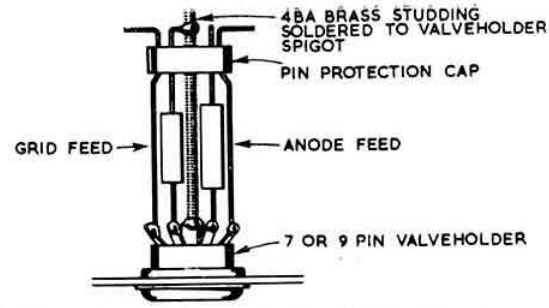


Fig. 1. Valveholder mounted sub-assemblies as used by the constructor of the G2DAF-type receiver. The protection cap fitted over the valve pins by the manufacturer as a protection in transit had been tapped 4 BA and screwed on to the rod to form a top support for grid and anode feed wiring. Connections carrying r.f. must never, however, be lengthened and brought into close proximity in this manner.

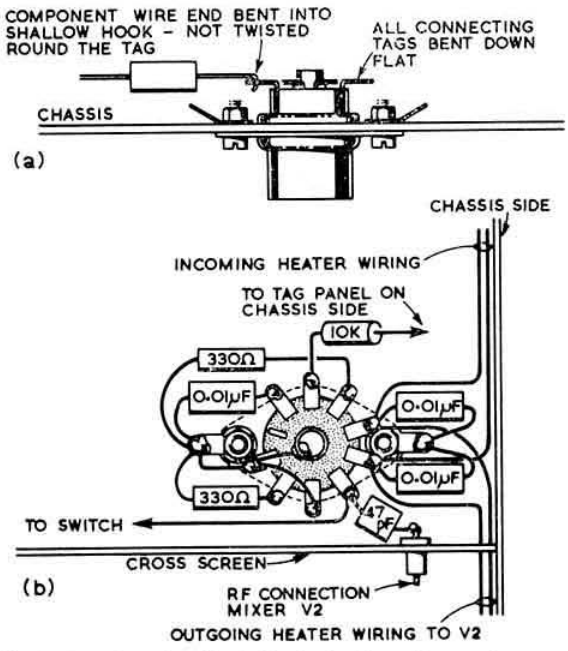


Fig. 2. A preferred method of valveholder wiring and component assembly. The connecting tags are bent down flat as shown at " A." This spreads them out giving a larger circumference to the soldering points and therefore better accessibility. The components are spaced around the valveholder flat against the chassis top face and are earthed back to two separate earth points as shown at " B "; this layout ensures short connections, the minimum of intercoupling between components, and excellent accessibility for voltage testing or for removal of any parts. Heater wiring is run parallel (not twisted) close in against the chassis lip and through a hole previously cut in the chassis cross-screen.

It must always be possible to get the soldering iron bit down to the valve holder connecting tags and finally it is most important that wires are looped into the soldering tag so that they can be withdrawn. They must never under any circumstances be connected up in the manner of the television set manufacturer where all connecting wires are threaded through and looped twice round the tag before they are soldered making subsequent removal to change a faulty component impossible.

It is also quite unnecessary—with apparatus operating at 30 Mc/s and below—to try to return all earth connections to a common single earthing point. Attempts to do this often results in earth leads longer than they would be using some other method. A simpler and much more rational approach is to use two earthing tags—each held to the chassis by the screw already in position through the valveholder mounting lugs. The recommended method of assembly that has proved its worth in the G2DAF workshop in many different items of equipment and over very many years is given in Fig. 2. This shows, as an example, the components associated with the conversion oscillator V3 and the way in which they may be arranged to give the shortest possible connections, the least r.f. interaction and direct point-to-point wiring together with maximum accessibility for subsequent voltage check and component replacement should this be found to be necessary.

Unfortunately the valveholder layout of Fig. 1 had been used throughout the signal frequency stages, and for the second mixer and the v.f.o. valves. The bunched component assembly and the long grid and anode leads were obviously adding too much stray circuit capacitance that was making it impossible to tune correctly the conversion oscillator anode coils on the higher frequency bands. Any difficulties with this stage were likely to re-occur in the r.f. and mixer stages (V1 and V2) and the bunched assembly made it impossible to check voltages or substitute other component values in the second mixer and the v.f.o. stages. Accordingly the decision was made to completely strip out the conversion oscillator valveholder with its associated resistors and capacitors and re-wire using the " flat down to the chassis " technique of Fig. 2. At the same time the assemblies of V1, V2, V4 and V6 were removed and these stages were re-wired in the approved G2DAF manner.

When this work has been completed the conversion oscillator was again checked for correct operation and alignment on all the ranges. This time the valve oscillated on all switch positions, the grid current figures being given in Table 2.

TABLE 2

Conversion Oscillator (V3) Grid Current

Band	Grid Current Across 1 K Resistor	Remarks
160m	0·56 mA	
80m	0·48 mA	
40m	0·32 mA	
20m	0·18 mA * (0·31)	*0·31 after adjustment (see text)
15m	0·34 mA	(AVO on 1 mA range)
10m	0·3 mA	For all readings
10m	0·33 mA	
10m	0·32 mA	

It will be noted that the grid current on the 20m range is low at 0·18 mA instead of the expected 0·3 to 0·35 mA. A low reading on one range could be caused by an inactive crystal but in this case as all the crystals were new current production types this was unlikely, the more likely cause being " suck out " by one of the unused coils in a lower frequency range. The term " suck out " is the engineer's graphic description for the absorption of r.f. energy from one circuit by the self resonance of a second circuit—the coupling medium generally being the capacitance across the contacts of the coil switch bank. If suck out is suspected it can easily be verified by watching the grid current while all other lower frequency (160, 80 and 40m band) coils are

(Continued on page 251)

The Cyprus Beacon Station

By R. A. WHITING, G3UYO*

THE first Cyprus beacon station on 29·008 Mc/s was activated from the town of Limassol, under the writer's call sign 5B4WR, in September, 1963. Its purpose, like that of its successor, was to facilitate the study of Transequatorial Propagation (TEP) between Cyprus and Southern Africa.† In September, 1964 the Government of Cyprus withdrew all amateur licences and, in company with the other 5B4s, the beacon closed down.

However, amateur operation was still permitted within certain areas on the island, and stations which are operating from within these areas used the prefix ZC4. In January, 1965 permission was obtained to reactivate the beacon from one of these areas, and on 5 February, 1965, the beacon came back on the air with the call-sign ZC4WR. It was located on the transmitting site of a radio relay station on the south coast of Cyprus, about 18 miles east of Limassol. It closed down on 3 January, 1966, after nearly a year of continuous operation, with only minor outages. It is with this later period of operation that these notes are concerned.

Equipment

Since the previous beacon transmitter had been withdrawn a degree of improvization was necessary to reactivate the beacon from its new site.

Transmitter. The transmitter used was a Heathkit DX-40U operated at a constant power input of 60 watts. To reduce the heating and power loss the modulator valves were removed. A 7·252 Mc/s crystal was used to control the transmitter output frequency, the crystal being housed in a temperature controlled enclosure. Frequency shift keying was employed to give a steady signal for the operation of the pen recording equipment installed in Salisbury, Rhodesia, by ZE2JV. The crystal frequency was pulled to give the required shift by switching in series with it a small capacitor, using crystal diodes as the switching elements (ARRL *Radio Amateur's Handbook*, 1961, page 335). The frequency shift was adjusted to give a downward shift on mark of 300 c/s. The keyer and crystal unit were constructed in a small metal box which plugged into the back crystal sockets of the DX-40U, thus avoiding modifying the transmitter proper.

Aerial. The aerial chosen was a vertical radiator driven against ground and 0·625 λ in length. The transmitter was housed in the unused aerial tuning house for a medium wave mast radiator which had been dismantled. There was thus available the excellent earth system originally used with the medium wave radiator. This consisted of 120 buried radial earth wires centered on the building and some 300 ft. in length. A good earth system is most important in the operation of a vertical radiator of this nature, and we had the best. The aerial length was chosen on the basis of the broadcast engineer's " Anti Fading Radiator." This length of vertical radiator has been found to be optimum in minimizing high angle radiation and propagating mostly at the low angles of vertical incidence, hence its name. This latter characteristic of the aerial was an important factor in the study of the long range *F* layer propagation for which the beacon was set up. The strong signals received from the beacon over the 3500 mile path to Rhodesia amply confirmed the effectiveness of the radiating system.

The base impedance of the radiator, in its series aspect, agreed closely with the calculated value and was in fact measured as: resistive component 85 ohms, reactive component *j* 200 ohms. It is interesting to note in passing that it had very nearly the same radiation resistance on 14 Mc/s. An *L* network was designed and adjusted to provide a match to the 72 ohm coaxial feed from the transmitter. An s.w.r. bridge and indicator unit were connected in the feeder to monitor power output and system match. The aerial was mounted on the copper sheeted roof of the building, with the metal box containing the matching components alongside it. The aerial was constructed from 1 in. diameter copper tube and guyed with terylene rope.

Keyer. The keyer unit, hastily and badly constructed by the writer, used as motive power an old 78 rpm gramophone motor driving a serrated aluminium disc with a contact operating arm running on its rim. The contact was opened and closed by the serrations on the rim of the disc to key the transmitter with the code, " TEST DE ZC4WR." By means of a hand cut train of perspex gears the transmitter was switched off for 15 seconds every 75 seconds to provide signal strength measurement and identification on the pen recorder records. The majority of outages on the beacon were caused by keyer unit failures, which is no tribute to the writer's mechanical engineering ability!

The beacon was monitored continuously from the writer's QTH in Limassol, a receiver being kept permanently tuned to its frequency. The ground wave signal at this range was sufficient to activate a pen recorder to provide a local record of beacon operation as a comparative check on reception reports.

Reception in the UK during June, July, August and October 1965

Because of the omni-directional aerial system regular reception of the beacon in the UK, was reported by observers associated with the RSGB Sporadic E programme run in conjunction with the IQSY. It has now become possible to study these reports in some detail thanks to the help extended by Mr R. F. Stevens, G2BVN and the RSGB Scientific Studies Committee.

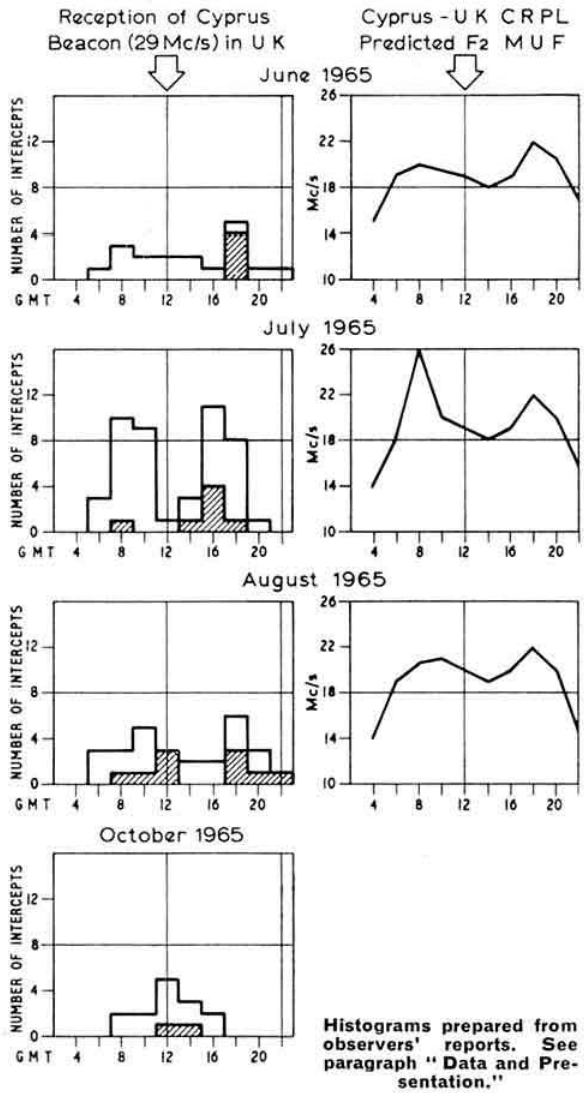
Data and Presentation. The data from the observers' reports was transferred to file cards which were sorted in various ways to isolate any significant trends. The significant data has been summarized in the accompanying histograms where hourly reception of the beacon is shown on a monthly basis. The areas shaded on the histograms indicate the number of signal intercepts which displayed the characteristic normally associated with E_s openings i.e., short duration signals (15 minutes or less) displaying rapid fluctuations in signal level and accompanied by the reception of signals from European stations. The latter were principally from Italy and Germany. It should be noted that the distance over the great circle path from Cyprus to the UK precludes the possibility of one hop E_s at the height this phenomena is known to occur. The distance, which is approximately 3,600 km, is a one hop F_2 path and a two hop E_s path.

Data Analysis. The best month for reception was July, one of the poorest from the TE circuit point of view. For July and August there are definite peaks in reception centred around 08.00 and 18.00 GMT, though less definite in June particularly for the earlier hour. By October the pattern has changed with best reception centred around midday. In general the results are 180° out of phase with those achieved over the TE circuits. What is significant about these results is that in general they follow the known *variations* in f_0F_2 critical frequencies on a diurnal and seasonal basis at these

* Pende, Hurtis Hill, Crowborough, Sussex.

† "Transequatorial Radio Propagation During the Years of the Quiet Sun," Cracknell and Whiting. RSGB BULLETIN, June 1965.

latitudes and this point in the solar sunspot cycle. This is borne out by a comparison with the predicted F_2 m.u.f. derived from CRPL ionospheric data for the Cyprus-UK path during this period reproduced graphically alongside the signal intercept histograms. These graphs have been deliberately drawn on a linear scale instead of the more usual logarithmic one to emphasize the *variation* in m.u.f. There was no data to hand for October, 1965. Of secondary significance perhaps is that the shaded areas on the signal intercept histograms which can be associated with E_s are at a maximum during the sunnier months when this type of propagation is known to be most prevalent. An analysis of signal strength reports showed that these tended to be influenced by equipment and aerials used. It is also worth noting that during July reception of GB3LER and DL0AR in Southern Africa, on the few occasions they were heard, occurred about the key times of 08.00 and 18.00 hours GMT.



Histograms prepared from observers' reports. See paragraph "Data and Presentation."

Conclusions. The conclusion which has been drawn from an examination of the data is that the majority of signals were propagated via the F_2 layer of the ionosphere. The fading pattern reported on the majority of signals tends to bear this out, i.e., slow fading and gradual changes in signal level. The minority of signal intercepts indicated by the shaded areas on the histograms could have been two hop E_s, borne out perhaps by the fact that these short duration signal intercepts were accompanied by the reception of signals from other parts of Europe. If these conclusions are true then it does mean that f_oF_2 critical frequencies reached a sufficiently high level to support oblique propagation on 29 Mc/s at this seasonal point in the sunspot cycle, which leads one to conclude that conventional F_2 m.u.f. prediction methods are too conservative, certainly for amateur service work. Greater usage of the 10m band by amateurs is indicated even at sunspot minimum periods, as an examination of this data shows.

Single Sideband

(Continued from page 249)

individually short-circuited with the blade of an insulated screwdriver or with a 0·01 μF capacitor held in the hand and placed between the " hot " tag of the coil and the chassis screen. In this particular case short circuiting the 40m coil caused the grid current on the 20m band to rise from 0·18 to 0·32 mA, and it was obvious that the 40m coil inductance tuned by the stray circuit and switch capacity, was resonant at 19·5 Mc/s.

The cure? With a little thought this is self-evident. The stray capacity on 40m cannot be altered, but the inductance of the coil can easily be changed by altering the winding—this will stop the coil being self-resonant at the critical frequency. Yes, but what about the 40m band when you want to use it; if you have to alter the coil winding you must have detuned the circuit on 12·5 Mc/s. Easy, the circuit can remain resonant at 12·5 Mc/s but this time with a little different L/C ratio. Two turns were removed from the 40m coil winding, the coil replaced and re-resonated by increasing the trimmer capacitance value so that the grid current on the 40m band was the former value of 0·32 mA. On switching to 20m the effect of suck-out had disappeared and the grid current reading had increased from 0·18 to its final value of 0·31 mA.

Suck-out due to some other coil in the stage behaving like an absorption wavemeter was avoided in AR88, CR100 and similar receivers by using switch banks with shorting plates. However this procedure is not possible with amateur band receivers using a restricted tuning range of 500 kc/s if it is required to use a single switch bank that includes two or three sections of the 10m band. Switch banks with shorting plates would make it impossible to cover the three 10m band sections with one coil only in the r.f. and the first mixer stages. Aside from the additional cost of more 10m coils there is the problem of chassis layout and arranging a total of eight coils in each signal frequency stage at sufficient spacing to avoid interaction and at the same time give a short connection to the associated switch connecting tags. The present system in the G2DAF receiver does not normally give trouble when using the standard Yaxley switch banks. However the modern tendency to go smaller and smaller is introducing problems that were not there before. Because of the method of construction the small 1$\frac{1}{8}$ in. diameter switch wafers have greater capacitance between the unused contacts and the rotating pole, and any constructor who has used these switches should watch carefully for any abnormal operation on one range—either in the oscillator or in the signal frequency circuits—and if this occurs should suspect that suck-out is occurring and try shorting out all other associated unused coils.

(To be continued)

LETTERS TO THE EDITOR

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

Transistor V.F.O.s

I was most interested to see the letter from G. Bird, AMIERE, G3KOV, in the January BULLETIN concerning high stability transistor oscillators. I spent some time developing an oscillator along these lines until other commitments forced abandonment of the project. Nevertheless, some readers may be interested in the results that were obtained.

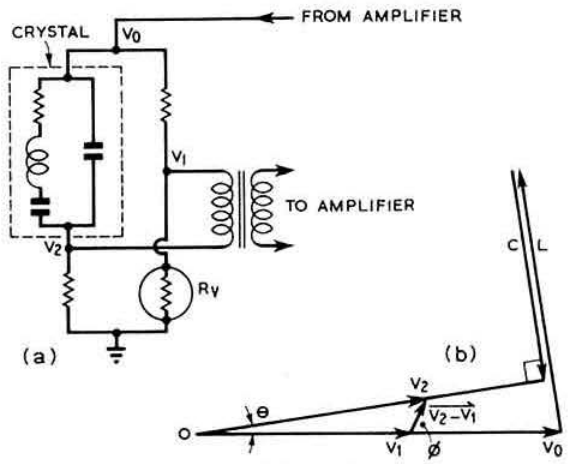
Mr Bird points out that high stability oscillators must (i) be linear and (ii) contain a frequency determining element having a very high $\frac{d\varnothing}{d\omega}$ (rate of change of phase with frequency).

The linearity requirement has been explained as arising from generation of harmonics in a non-linear oscillator which then beat together to reproduce a component at the fundamental which is shifted in phase and therefore capable of changing the oscillation frequency slightly. This explanation has an interesting corollary that optimum stability will be obtained with devices having the best high frequency capability, far in excess of that needed merely to maintain oscillation, because phase shifts in the harmonics will then be small and stable.

Linearity can be secured by making the loop gain a decreasing function of average amplitude. This technique is very common in the Wien Bridge oscillator at low frequencies where a tungsten filament lamp or thermistor increases its resistance when the amplitude of oscillation increases, thereby limiting the amplitude to the linear region. It is worth pointing out that any device used to control the amplitude must not respond to the instantaneous r.f. oscillation itself or non-linearity will be reintroduced. Diodes are thus not very suitable.

The second requirement, that of making the phase sensitivity $\frac{d\varnothing}{d\omega}$ large, is not so stra ghtforward, particularly as it is desirable to have all the phase sensitivity in the frequency-determining network and none in the amplifier. Fortunately there is a way in which the $\frac{d\varnothing}{d\omega}$ of a tuned circuit can be increased enormously. This technique has until now been applied only to crystal controlled oscillators and was used in virtually all standard frequency stations prior to the development of the ceasium clock. Quartz crystal oscillators using this method are known as Meacham Bridge oscillators and a diagram of the arrangement is shown in Fig. 1.

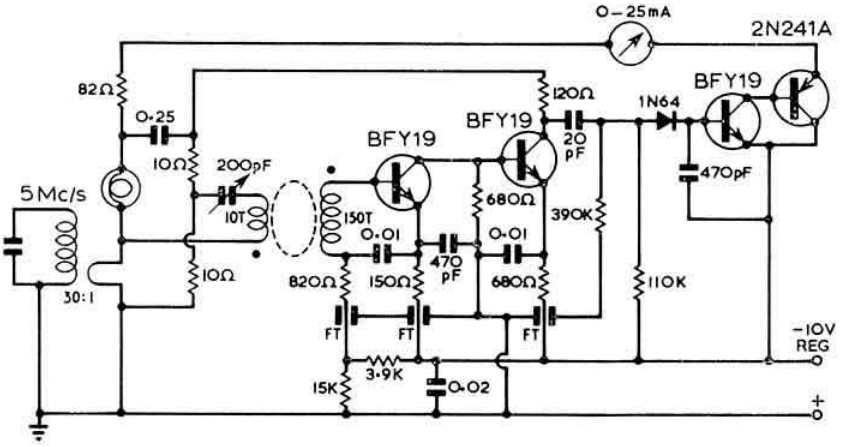
R_V is a tungsten filament bulb whose resistance in the absence of r.f. is very low. Assuming that the feedback windings are properly phased, the only frequency at which the output voltage to the amplifier (assumed ideal) is in phase with the driving voltage from the amplifier is the series resonant frequency of the crystal which then appears to be a pure resistance of a few tens or



hundreds of ohms (the effect of the parallel capacity is neglected). As the amplitude of oscillation builds up the bulb's resistance increases and the bridge becomes more nearly balanced. Eventually the amount of r.f. returned to the amplifier is reduced to the point where oscillation is only just sustained. Construction of a phasor diagram shows that the phase of the output voltage near balance ($\varnothing$) relative to the input voltage is an extremely sensitive function of the phase of the voltage across the crystal (θ). In fact, near balance, the "Q-multiplication" is of the order of half the ratio of input to output voltage, and stable effective Qs approaching 10^8 to 10^9 are not impossible with the best crystals.

Applying this principle to a v.f.o. is far from easy, because the change in impedance of the resonant circuit with frequency is much less dramatic and can permit oscillation at some spurious frequency. Any transformers involved must be wideband and introduce very little reactance.

Experimentation revealed that the series tuned LC circuit was not well suited to this application because of the tendency for spurious oscillations to occur. Much better success resulted from changing the bridge configuration to accept a parallel tuned circuit where the impedance is resistive and a maximum at resonance. A wide-band toroidal coupling transformer gave moderately good results when the primary was series resonated, but this further restricts the useful range of the v.f.o. (which is already limited by the fact that the equivalent parallel impedance of the tuned circuit varies as the square of the frequency). For maximum stability, the stray capacity of the primary to ground and the secondary must be kept as small as possible. A measure of the stability of the oscillator is the sensitivity of the oscillation frequency to small changes in amplifier constants, particularly the series resonating capacitor. In the prototype it was found to be quite small (a few kilocycles at 5 Mc/s over the range where proper operation could be obtained).



The amplitude controlling element is a 60 mA bulb (No. 49) giving a response time of about 10 to 100 ms, and dynamic impedance variation from 4 to 40 ohms. It is not controlled

directly by r.f. power as this places excessive requirements on the oscillator but is driven by an a.g.c. detector and amplifier.

It may be shown that maximum frequency and amplitude stabilities are obtained with all arms of the bridge equal. The turns ratio for the coil is thus large since the parallel impedance of the tuned circuit must be stepped down to the 10 ohms or so of the light bulb, and this contributes to stability.

It should be understood that the isolation of the amplifier from the frequency determining network means that the stability of the oscillator is just that of the tuned circuit. To realize its full capabilities, it would be essential to construct a tuned circuit of the highest quality, with a ceramic rotor shaft capacitor, careful temperature compensation, extremely stable coils, faultless mechanical stability, etc. The prototype employed only a small slug-tuned coil for frequency control.

Problems to be solved include the rather low loop gain obtainable with only two stages and the apparently limited frequency range available. I hope these will prove to be problems of technique and not principle, and that a polished version of this oscillator will soon be developed.

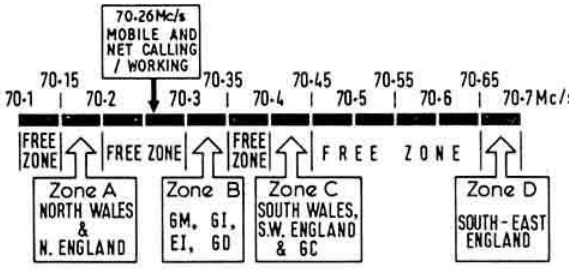
R. G. H. ROBERTSON, BA, BRS26709

Hamilton, Ontario, Canada.

Four Metre Band Planning

In last month's BULLETIN, in " Four Metres and Down," details of a 4m band plan were published, together with the results of the questionnaire survey conducted by the RSGB V.H.F. Committee. The results of this survey show that the plan referred to as the " G3OUF plan," proposed by us in the December 1965 BULLETIN (page 804) was the most popular (42 per cent), with the idea of a c.w. zone at the bottom of the band a close second (37 per cent). However, the plan now proposed for a six-month period is not based on the principle of our original plan, which advocated planning only a *small* part of the band on a regional basis, the majority of the band being "free for all," thus allowing a large proportion of the band to be used in any area by operators not wishing to work DX (i.e. at present the majority of band users). We feel that this principle is the reason for the popularity of our plan, and that the " G3FDW " plan now proposed would not be supported by the majority of 4m operators for this reason.

In view of the popularity of the idea of a 50 kc/s bottom end c.w. zone, we suggest that our plan *could* be modified to include this feature. Our modified plan appears below.



Free zones may be used in any region subject to local licensing conditions with the bottom 50 kc/s free zone being used for the A1 mode only, and 70·35–70·4 Mc/s having RAEN priority.

With our plan operators may use 450 kc/s of the band; we ask the non-DX operator to avoid only 150 kc/s. With the " G3FDW plan " all operators may not transmit on over *half* the band, and in some cases much more than this (e.g., SW England).

The problem of TVI in certain areas and a suggested possible cure raised by G3FDW requires no special top end zone, as in the " G3FDW plan," if our band plan were in use. Operators in Channel 4/5 TV areas experiencing TVI may in our band plan use frequencies in the " free zones " up to 70·65 Mc/s, if the additional separation within the 4m band proves of assistance.

In view of the questionnaire results being in our favour, and the preceding comments in this letter, we regret the decision by the V.H.F. Committee to propose the " G3FDW plan " which is not based on the principle of " free zones " advocated by us, and was not even mentioned on the questionnaire. The results of the questionnaire seem to have been disregarded.

We therefore openly ask the V.H.F. Committee to reverse its decision to adopt the " G3FDW plan " until 4m operators have had a chance to express their opinions on the relative merits of the two plans, or better still, to adopt our plan instead, as from 1 May, in view of the questionnaire results.

R. A. HARGREAVES, G3OHH
D. A. EVANS, G3OUF
J. P. MARTINEZ, G3PLX
A. R. GOLD, G3SKR

Members of the Echelford Society are greatly dismayed at the proposed 4m band plan. We are in the process of getting a club 4m net started and to achieve this we are treating it as a club project. To this end we purchased a number of crystals, which would have put us in the proper zone according to the band plan that had been suggested at the Communications Exhibition, but now unfortunately we find that we shall be outside our proper zone. At this time we cannot suspend our project because it is too far advanced, so until something concrete is decided as regards a band plan you will find some noncomformists on a Wednesday evening. I agree that this is unfortunate but crystals cost money and our members are not particularly affluent so it may take time before we all manage to conform to the proposed band plan.

Do not think that we do not agree with band planning but we are in this position of having purchased a considerable number of crystals and unless there is a possibility of an arrangement with another club net, we will have to remain as rebels. I don't think it will be all that important because the majority of us will not have high gain aerials, well, not at first anyway. The crystal frequency we decided upon was 23410·0 kc/s, producing a 4m frequency of approximately 70230·0 kc/s, landing us slap bang in the middle of the Northern zone. Any hope of 20 or more people wanting this frequency and giving us all the same frequency in the Southern Zone seems remote. So if the Northeners suffer QRM from a bunch of Southerners please forgive us.

D. F. J. WALMSLEY, G3HZL
Secretary, Echelford Amateur Radio Society (Ashford, Middlesex.)

Isleworth, Middlesex.

The conclusions of the V.H.F. committee concerning 4m band planning make interesting reading. They admit that, of the people who want a 4m band plan, more than half are in favour of the " G3OUF plan," which I personally consider to be the best compromise between the needs of the DX worker and the local natterer. I would suspect that those who do not want a band plan would be happier under the G3OUF scheme than under any other arbitrarily imposed plan, and so the total support for the G3OUF plan is probably greater than the figures appear to show.

Yet we are informed in " Four Metres and Down " (March) that a plan which has not even been open to general discussion is to be recommended on a six-month trial period basis. Now I do not want this letter to be construed as an attack on G3FDW, who is at least a regular user of the 4m band, and whose views must therefore bear more weight than those of some of the V.H.F. Committee who have never even operated on 4m, but I feel that the plan suggested in the March issue of the BULLETIN has some grave faults. The most obvious of these is that the 70·26 Mc/s calling and mobile channel is added as an afterthought as " the mobile calling frequency." This is certainly not the way 70·26 Mc/s should be treated in a band plan, for it is the only feature of 4m planning which is in regular and successful use on a country-wide basis. The gentlemen of RAEN also seem to be given rather less than full attention, and the plan generally has the appearance of being rather hurriedly thought out. If it were followed to the letter by all band users, it would rapidly change 4m into a rather narrower, and perhaps slightly less active version of 2m as it was five years ago. Heaven forbid!

I can only plead that the G3OUF plan be republished with a full explanation of how and why the various zones are placed, and the rather unfortunate statements in the last " Four Metres and Down " column be retracted. I might perhaps remind those members of the V.H.F. Committee who believe that they can bulldoze v.h.f. operators into accepting a plan that they do not want, that the last time a " suggested 4m band plan " was published for " a trial six month period " it was completely ignored by the vast majority of 4m operators. I will certainly do the same for the latest G3FDW plan.

P. K. CRIPPS, G3SKT

Bidston, Birkenhead, Cheshire.

QSL Managers

You were kind enough to print a letter from me in the December BULLETIN and also a reply to my letter from D. A. Barry, G3ONU, in the January issue. Could I again beg your indulgence for a little space to reply to some of the points brought up by G3ONU.

I have no doubt at all in my mind that VE4OX runs an efficient QSL Bureau and I have no criticisms in this department at all. Having run both the *in* and *out* bureaux here in 9V1 during the 23 months that I have operated as 9V1MT I know what it entails and what headaches he can have! Mr Barry says, and I quote, " At least we know where we stand with Ed. He requires an s.a.e. and IRC to defray costs, etc." This to my way of thinking is what we don't know judging from outgoing cards I have received from Singapore stations in the past. I have also quite recently listened to some of the stations that Ed. acts as manager for and in no case have I heard the fact that s.a.e. and IRC were a pre-requisite to receive a card in return. In all cases the station being worked was just told " QSL via VE4OX " and that was all. Quite a lot of amateurs assume (wrongly in this case) that if they send their card into their bureau annotated via VE4OX that it will reach him through the bureau and that they will in due course of time receive one back the same way. If Ed. could spread the gospel a little amongst his stations then this situation would not occur I am sure.

As for paragraph four of Mr Barry's letter I would ask him to read again my list of calls operated from and tell me if he can't see just a little bit of DX in there somewhere? For the record, and I do not under any circumstances whatever class myself as a real hot DX man, from here I have sent out over 7700 QSL cards through the bureau and over 1000 direct. I am not supported in any way financially or otherwise and do all my own chores because I like doing it. To me it is all part and parcel of being a radio amateur and if I can give somebody a new country for their DXCC—which I seem to do every day—I am highly delighted.

I'm sorry that I quoted airmail rates in my letter—I did this because I think that everybody who sends me a card direct usually expects the return by airmail even when they only put 1 IRC in to cover costs! Sea mail from here does take quite a time both in and out (I received the January BULLETIN yesterday (18 February) to give you an idea) outgoing cards from our bureaux take, we find, about three to four months to reach European stations, but this does of course include bureau time at each end.

In closing I have just checked my records and find that I have over 67 stations who all have managers (this is far from complete I know). Am I to assume that all of these will require s.a.e. and/or IRC or will a card through the bureau reach them *and* bring a return the same way?

HARRY PAIN, 9V1MT

53537 Flt.Lt. H. Pain,
JATCC (RAF) Element,
Singapore Airport,
Singapore 19.

QSL Cards

I may be able to help not only your correspondent BRS21869, but many other listeners. Instead of putting on their QSL cards " hinting gestures and reminders," why not put on some data of *real* interest to your recipient, i.e., something he will not know until your card arrives? If he has suffered as I have over the years, this will be such a surprise that he will reply before he has even realized it.

An analysis of my 3·6 Mc/s SWL reports reads roughly as follows:

Informative, useful, containing some facts not already known or expected 4 per cent.

Run-of-the-Mill card-collecting 66 per cent.

Inaccurate or downright ridiculous 30 per cent.

Those making the first grade got cards and letters of thanks. The remainder were (and will continue to be) burned.

Why should I be expected to reply to anyone who chooses to write to me about a subject in which I am not interested? Why when I have been heard over much of the country for much of the day, should I be overjoyed to find I was also heard in Much Binding?

Instead of reference to the end of Arthur Milne's letter, I suggest re-reading the first eight words.

H. S. CHADWICK, G8ON

Worksop, Notts.

G8 Licensing

I read with great interest the correspondence in your column originated by G8AKA regarding the granting of " B " licence holders the use of the 2m band. I must state that I myself am open minded about this prospect. However, the alarming feature of the subsequent correspondence is the suggested hint that G8's could be allowed the use of c.w. on 70cm band on a novice basis.

As a serious user of the communication part of the band (432 Mc/s-434 Mc/s) I would strongly oppose this as it would reduce a hitherto serious band into a c.w. kindergarten for unqualified c.w. operators. I strongly suspect that the persons prompting and supporting this line are not themselves active or keen users of the 70cm band.

No novice clod-hoppering on 70cm please. Let these operators cut their c.w. teeth elsewhere to enable them to take their rightful places on the d.c. rat race bands.

WM. DAVIES, GW8AHI
(No GW3 call-sign awaited)

Prestatyn, Flintshire.

I have been prompted to write because of all the recent correspondence relating to allowing class B licence holders to operate on 2m. This would in my view be very detrimental to 70cm activity and would be contrary to one of the original reasons for introducing the class B licence.

Although I do not believe allowing class B licence holders on 2m would stop all those stations already equipped for 70cm from continuing activity, I am sure that it would discourage many new licences from building equipment for 70cm when they can more simply become active on 2m. This would be very sad for 70cm and would tend to reintroduce the position that existed before the class B licence was issued, when during openings everybody was on 2m, and 70cm possibilities were ignored except by the few really interested stations.

The G8 stations have shown the possibilities which exist on 70cm when it is activated (e.g., the last two open contests) and it is especially important nowadays to fully activate our v.h.f. allocations and let the authorities see that they are being used; otherwise we could quite easily lose more large sections of 70cm.

The class B licence encourages activity on 70cm especially in poorly populated areas where otherwise nobody might bother to try the band and I and some of my friends in Liverpool feel that it would be wrong for the RSGB to petition the GPO to allow Class B licence holders to operate on 2m.

J. A. COFFEY, G3PSH

Uxbridge, Middlesex.

Contests

So G2DC thinks that those of us who are anti-contests " . . . are quite out of touch with modern world-wide Amateur Radio." To use his expression, what a lot of drivel. I strongly resent his inference that we are " lids " who need a marker signal to find his 10 kc/s band edge, which he so grudgingly proposes be relinquished to non-participants in these pointless contests. These number swopping games are the complete antithesis of the kind of radio communication that G3BA and many others would like to hear.

Just what is the point of these world wide contests? Is it the glory of coming out on top of the heap? Of seeing one's call in the boring write-ups of which G3IDG complains. Of having one's " mug shot " appear in all the magazines complete with a few hundred pounds worth of one's—or someone else's—equipment? It seems to me that these frequent onslaughts are merely a severe test of the operator's p.a., power supply, eardrums, larynx or wrist and not least, the patience of the rest of the family.

G2DC so rightly agrees with G5FI on the ease with which DX can be worked with high power commercial gear and beams but reckons that this is more difficult on 3·5 and 7 Mc/s due to the lack of " . . . a selection of ready made commercial aerials. . . ." I fear he must be sadly out of touch if he is unaware of the many commercial l.f. bands aerial systems available to amateurs from the same sources as the popular tri-band beams for 28, 21 and 14 Mc/s.

In his letter, G2DC quoted the number of actual entries for various major 1965 contests conveniently proving the point made by other correspondents that a very small percentage of the world's radio amateurs participate. A very conservative estimate of the number of amateurs listed in the 1965 call books is 300,000, of which perhaps one third are no longer licensed or active for one reason or another. Assuming a 50/50 division between

v.h.f. and DX operation gives a potential 100,000 DX band users. None of the major contests are mixed, so, assuming a 50/50 split between phone and c.w. leaves 50,000 possible contest participants. But G2DC records only 1407 entries for the 1965, *CQ* WW event, a tiny 2·8 per cent. Even if my estimate is 100 per cent out, the figure is still under 6 per cent.

G2DC further estimated that at least 600 UK amateurs took part in NFD, that being sufficient reason, apparently, for not adopting the idea to cut the bands for this event by 50 per cent. On page 46 of the January, 1967 BULLETIN I read that there are now over 12,000 licences in force from which I conclude that only 5 per cent are interested in NFD.

Logically, therefore, would it not be more than generous if a 5 per cent slice of each band be set aside for contest enthusiasts during major contests?

I have occasionally entered contests when I had nothing better to do. I concede that a certain element of competition is desirable in a hobby *provided* it does not interfere with the activities of those who are not competitively minded. Contest organizers should always have the courtesy to carefully consider the effect of unleashing their cacophony upon those many amateurs who do not want to play. The only sensible way to do this is to restrict contest activity to one half the phone or c.w. band at the very most and rather less for smaller affairs like BERU and NFD. I sincerely hope that the RSGB will try this out in the 1968 BERU and NFD events if only to silence the bleatings of anti-contest types which so upset G2DC.

NORMAN A. S. FITCH, G3FPK

London, E10.

I wish to explode the myth which appears to be the constant theme of those who write to the Amateur Radio press opposing contests. This states in effect that contests swamp the bands most weekends, that this eliminates " normal " activity and thus all contests are evil, immoral or insane.

The facts are:

All Contests: Except for most v.h.f. events, activity is confined to one mode of operation, thus leaving part of each band free of contest operation.

C.W. Contests: In practice, activity is confined to the lower half or two-thirds of each c.w. band, thus again leaving space for the non-contestant.

Phone Contests: The ARRL and CQ contests effectively block the 15 and 20m phone bands, but only on three weekends a year. Forty metres is congested by commercial activity, rather than amateur QRM. On 10, 80 and 160m there is sufficient space available for contestant and non-contestant alike.

V.H.F. Contests: Most are agreed that greater use of our V.H.F. bands is essential if we are to preserve these frequencies for amateur use. The new RSGB activity contests are thus most welcome.

Contrary to the statements by Mr Wagner, G3BID, in the December BULLETIN, it *is* indeed possible to gain a great deal of benefit and information from contest participation. Any difference, of consequence, between different aerials or microphones would soon be apparent from the numbers of contacts effected on change-over from one system to another. Further, annual participation in a selected contest is the best way of determining, by comparison of results, whether the station and its operator are overall becoming more or less effective. The basic requirement of a competent operator is that he can quickly and accurately send and receive information, if necessary under conditions of severe interference. The contest battle-field is the ultimate in training grounds.

M. G. WHITAKER, G3IGW

Halifax, Yorkshire.

Wife or XYL ?

Mrs Blanchard is quite right: " XYL " is a horrible epithet. But what would she have said if she had lived in the early 1930's? " OW " (old woman) was the usual abbreviation then! Later, " YF " (wife) came into use, and it is difficult to see why it should ever have been dropped. Judging by the way her letter is signed, Mrs G3JKV would probably approve of " YF." She should campaign for its revival.

A. E. J. COOPER, G5VT

Overmodulation Suppressor

I should like to emphasise a few points with respect to my overmodulation suppressor circuit, which appeared in Technical Topics last month, lest readers abuse its use.

This circuit as it stands *does not prevent overmodulation* but it will prevent the degree of modulation rising to a large value thus causing splatter. This was the main intention of the circuit and at the time of experimenting, it was not really considered to act as a speech compressor.

As the circuit relies on overmodulation to derive a rectified form of a.g.c. to reduce a.f. gain, then technically speaking this circuit is illegal because any amount of overmodulation is a " sin " according to our licences.

If it is desired to take advantage of the circuit to act as a speech compressor, I strongly advise that a fixed bias is placed in series with the diode thus enabling the diode to conduct before 100 per cent. modulation. This has not yet been tried but could conveniently be arranged in practice by inserting for instance a 9V dry battery with +ve connected above earth potential.

Pondering on the thought of modulation, who are the culprits that splatter? Let's face it, it's not the amateur with clean audio who overmodulates by a few per cent or so, but the inconsiderate amateur who uses his a.f. modulator as a (unintentional) clipper. Even a few per cent of distortion in a modulator can cause splatter and the cure is not just as simple as slapping a 0·01 μF across the modulator windings.

The majority of people who are *capable* of overmodulating do so, even if for a short period, and this circuit finds use in these cases.

I hope, by emphasizing the function of the circuit as printed in *TT*, that anyone contemplating it realises the dangers unless the bias is added. To me it seems deceivingly easy to abuse its use as it is not infallible.

R. FUSNIAK, G3TFX

Bexleyheath, Kent.

RAE Syllabus

In a letter headed " RAE Syllabus " in the March BULLETIN Mr D. J. Cave makes a plea " take π as 3 " at the RAE examination. This seems to be reducing the small amount of RAE mathematics required to infants class level—surely it is not difficult to multiply any number by 3·14.

Division, however, is rather more awkward as for instance, in finding the reactance of a capacitor where we have a string of noughts on the top line and a value of 6·28 for 2π on the line below.

This can be made much easier if 2π is given the value of 6·25 (an error of less than one half per cent) and getting rid of the decimal 6·25 becomes 625 which is 25 times 25 and cancels out completely into 10^4.

F. N. F. BEWLEY, G8HX

Mansfield, Notts.

FET Receiver

The BULLETIN these days pleases me very much. I like the format and the quality of the technical articles and alignment details for the G2DAF receiver are long overdue. Isn't it time one of the boffins produced a design for an FET front end plus transistorized circuitry of the quality of the G2DAF receiver? This is a question of getting with it and DAVCO have shown it can be done. I'd like to see such a design incorporating a 500 kc/s " synsethised " v.f.o., such as that designed by the VE contributor described in a recent *QST*.

J. L. MCVENNON

Cockermouth, Cumberland.

(*We would be only too pleased to consider such an article for publication.*—Ed.)

Subscriptions

I am most surprised at the letter by M. Ballance, G8AQB, in the January issue of the BULLETIN.

Whilst I have every sympathy for him in being forced to cut out his subscription to the RSGB, I am sure that with a little care this could have been overcome. If he finds it so difficult to find the full 90s. at once then why not try saving 1s. 9d. per week, in a wee tin box. After all if the hobby and its associations are not worth this meagre sum, why take it up until one can afford it? May his tinny be overflowing in the coming year.

J. NAIRN, BRS27690

Gordon, Berwickshire.

The RSGB was asked by the Royal Society to submit a brief report on the IQSY programme for inclusion in the National Report on the IQSY. This report has been prepared by the RSGB Scientific Studies Committee.

The Society's IQSY Programme

THE Society's programme for the IQSY was organized to investigate the following:

(*a*) Bi-static radio auroral back-scatter on a frequency of 29·005 Mc/s and in the bands 70·1-70·7 Mc/s and 144-146 Mc/s.

(*b*) Ionospheric *E* layer propagation in the same frequency bands.

(*c*) The relationship, if any, between (*a*) and (*b*).

(*d*) The relationship between (*a*) (*b*), solar rotation solar events and magnetic disturbances.

For this programme an automatic transmitting station was established at The Observatory, Lerwick, Shetland with automatic receiving stations at the Technical College, Thurso (N. Scotland) and Romford (near London). In addition, reports were rendered by radio amateurs located in the UK, Germany and Sweden who observed auroral or *E* layer propagation on the frequencies mentioned in (*a*). Magnetic recordings were obtained from the Observatory, Lerwick and information concerning Dellinger fadeouts from Cable and Wireless Ltd.

The transmitters at Lerwick consisted of the following:

29·005 Mc/s: power output 25 watts continuous operation. aerials: two 3 element Yagis, one directed North, the other South East, switched alternately each five minutes.

70·305 Mc/s: power output 15 watts continuous operation. aerials: two 4 element Yagis, one directed North, the other South, switched alternately in phase with the 29·005 Mc/s aerials.

The 29·005 Mc/s receivers at Thurso and Romford also operated continuously feeding pen recorders and each had a 3 element Yagi aerial directed to the North. A 70·305 Mc/s receiver was later installed at Thurso with a 4 element Yagi directed to the North. These receivers were supplemented by manually operated Amateur Radio stations located in the UK, Germany and Sweden.

A radio communications network operating on 3783 kc/s was used to maintain daily contact between the three sites and also with other observers who regularly listened for the signals from Lerwick. Ursigrammes were received daily at Lerwick, decoded and passed to all observers over the network. Prediction of auroral events were also made known in this way.

Owing to various technical difficulties the system was not fully operational until 1 September, 1964, although transmissions on 29·005 Mc/s commenced in July from Lerwick. From that time continuous observations were continued until 31 December, 1965, with a few gaps in the recordings due to equipment unserviceability.

Auroral backscatter signals from Lerwick on 29·005 Mc/s were first observed at Thurso in late September 1964, frequently in October, and this was followed by a gradual falling off towards the end of the year. Occurrences were infrequent during 1965. During 1964 the diurnal pattern usually contained two peaks of occurrence, the first between 14.00 and 18.00 GMT and the second at various times between 22.00 and 04.00. No occurrences were observed between 04.30 and 12.30. In 1965 auroral reflections were obtained on 13 occasions on the following dates: 3 January, 3 February, 4 April, 2 September and 1 October. During this period the receiving equipment was off for one week December/January 1964/65 and for seven and a half weeks in June/July 1965. The 70·305 Mc/s receiver only became operational in late September. Other auroral back-scatter reports have been received from Amateur Radio operators, especially in the 144/146 Mc/s band. These give good coverage of the greatest single auroral event in the year which occurred on 16 June, 1965. Photocopies of La Cour Normal Magnetogram records were obtained from Lerwick for the days when auroral reflections were observed and these are being studied at present. Very close correlation between the amplitude of the auroral return signals and the extent of the disturbance in magnetic field is evident. It has been found that the greatest correlation exists with the horizontal component.

A running study was made of the auroral backscatter and *E* layer propagation compared with total *K* index figures from Lerwick for each day. A plot was made relating solar rotation to these data in order to investigate the recurrence of phenomena and some success was achieved in predicting both auroral and *E* layer propagation using the plot as a basis for forecasting. Some events clearly show a 27 day pattern while others occur once only.

With regard to *E* propagation, the diurnal and seasonal occurrence of this was investigated between Lerwick and Romford, Manchester and Central Germany. The monthly pattern shows *E* layer propagation confined mainly to the summer months between May and September. The daily occurrence usually extends from about 08.00 to 23.00 GMT with peak occurrences around 12.00 and 18.00. It has also been found that during the summer months there is correlation between the occurrence of *Es* and auroral back scatter. On a few occasions *Es* propagation has been observed during the night and in these cases auroral backscatter has been observed simultaneously. Auroral backscatter can only be identified aurally and thus the supplementary reports from Amateur Radio operators have been invaluable in confirming this mode of propagation. The results show that two different types of *E* layer propagation have been observed, one during daylight, not necessarily related to auroral events, the other during the early hours of the morning directly related to auroral events. This has been confirmed by aural monitoring.

A particular study has been made of a very unusual *E* layer event which occurred on 4 July, 1965. On this occasion signals on frequencies in the 144-146 Mc/s band were propagated all over Western Europe from about 09·00 to 11.00, the distance being between 1100 and 2000 km. For this to occur it is considered that the critical frequency for *Es* must have been as high as 29 Mc/s. The only published data available quotes 21 Mc/s as the highest observed in the UK. There was no correlation between this occurrence and magnetic auroral activity. Other *E* propagation data has been collected initially by observers in Germany and later by the Deutsche Bundespost automatic receiving station near Darmstadt.

Work is now proceeding on the analysis of all the data collected during the IQSY, and detailed reports will be written in due course. The Radio Society of Great Britain wishes to acknowledge the invaluable assistance given by the Superintendent, The Observatory, Lerwick; the Principal, The Technical College, Thurso; The Deutsche Bundespost; the Deutsche Amateur Radio Club who operated closely with the RSGB and who ran a similar programme in Germany; Cable and Wireless Ltd., and the many radio amateurs in the UK, Sweden and Germany who made the Society's project possible.

Rules for the RSGB 21-28 Mc/s Telephony Contest, 14-15 October, 1967

Radio amateurs throughout the world are again invited to take part in the annual RSGB 21-28 Mc/s Telephony Contest to be held this year on 14-15 October.

1. Duration: The contest will start at **07.00 GMT** on **Saturday, 14 October,** and end at **19.00 GMT** on **Sunday, 15 October, 1967.**

2. Eligible Entrants: The contest is open to licensed amateurs in all parts of the world.

3. Licence Conditions: Entrants must operate in accordance with the terms of their licences.

4. Contacts: Contacts may be made using any telephony system for which the entrant is licensed. Contacts with unlicensed stations will not count for points. Proof of contact may be required. Only one contact on each band may be made with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed.

5. Contest Exchanges: An exchange of RS reports followed by a three figure serial number starting with 001 for the first contact and increasing by one for each successive contact (for example, 58001, 56002, etc.) must be made before points can be claimed.

6. Operators: Only the entrant will be permitted to operate his station for the duration of the contest. Multiple operator entries will not be accepted.

7. Entries: Entries (*a*) should be clearly typed or written on **one side only** of foolscap or International A4 size paper; (*b*) must be ruled in columns headed (in this order) (i) Date/Time (GMT); (ii) Call-sign of station worked; (iii) I sent him; (iv) He sent me; (v) Band; (vi) Bonus Points; (vii) Total points claimed; (*c*) must be addressed to the **Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, WC1, England,** the name of the contest being clearly shown on the top left hand corner of the envelope, which must be postmarked not later than 30 October, 1967. Log sheets are available from RSGB Headquarters on request.

8. Scoring: British Isles stations may not work each other for points. Overseas stations may only claim points for contacts with British Isles Stations (G, GC, GD, GI, GM and GW). Scoring will be as follows.

British Isles Stations. Each completed contact will score **5 points.** In addition, a bonus of **20 points** may be claimed for the first contact with each new country on each band. For the purpose of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as a separate country.

Overseas Stations. Each completed contact with a British Isles station will score **5 points.** In addition, a bonus of **50 points** may be claimed for the first contact with each British Isles country-numeral prefix on each band, i.e. G2, G3, G4, G5, G6, G8, GC2, GC3, GC4, GC5, GC6, GC8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GM2, GM3, GM4, GM5, GM6, GM8, GW2, GW3, GW4, GW5, GW6, GW8.

9. Awards: The **Whitworth Trophy** will be awarded to the leading British Isles entrant. In addition, **certificates** will be awarded to the leading station in each of the other five British Isles countries, and to the runner-up in the Trophy winner's country. Certificates will be awarded to the leading station in each overseas country, VE, VK, W/K, ZL and ZS call areas counting separately as in Rule 8, provided the log contains 20 or more valid contacts.

SAMPLE COVER SHEET

RSGB 21/28 Mc/s Telephony Contest **Claimed score**.....
14-15 October, 1967 **Call-sign**.....
Name .....
Address .....
Transmitter .....
Receiver ..... Aerial(s) .....

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

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

Failure to sign the declaration may involve disqualification of the entry.

Rules for the RSGB 21-28 Mc/s Telephony Receiving Contest, 14-15 October, 1967

1. Eligible Entrants: The contest is open to short-wave listeners throughout the world. All entrants agree to be bound by these rules. Only the entrant may operate his receiving station for the duration of the event. Holders of amateur transmitting licences are not eligible to take part.

2. Duration: The contest will start at 07.00 GMT on Saturday, 14 October, 1967, and end at 19.00 GMT on Sunday, 15 October, 1967. The RSGB 21/28 Mc/s Telephony Contest for transmitting amateurs will take place during the same period.

3. 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) Call-sign of the station being worked; (v) Band in Mc/s; (vi) Bonus points claimed; (vii) Total points claimed. *CQ or test calls will not count for points.*

(*b*) Entries should be set out on **one side only** of foolscap or International A4 size paper, must be postmarked not later than 30 October, 1967 and must be addressed to the **Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, WC1, England.** The name of the contest must be shown clearly at the top left hand corner of the envelope. Log sheets are available from RSGB Headquarters.

(*c*) All entries must contain the following declaration:
I declare that this receiving station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I do not hold an amateur transmitting licence.

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

4. Scoring: British Isles entrants may only log *overseas stations working UK stations in the contest.* Overseas entrants may only log *British Isles stations in contact with overseas stations in the contest.* A station whether fixed, portable, mobile or alternative address may be logged only once per band for the purposes of scoring. CQ or test calls will not count for points.

British Isles Entrants. Each complete log entry will score 5 **points.** In addition a bonus of **20 points** may be claimed for the first station logged in each new country on each of the two bands (21 and 28 Mc/s). For the purposes of scoring the RSGB countries list will be used, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as separate countries.

(Continued on page 261)

First 144 M/cs (C.W.) Contest 1967

Entries for this contest, held on 29 January 1967, totalled 44, a reduction of three compared with last year's event. GW3RUF/P was again the highest scoring station with 2820 points for 82 contacts, as well as being the winner of the low power section. G3KXA, the sole operator of the station which was sited near Patrishow in Brecknockshire is to be congratulated on a fine double achievement. The winner of the high power section was GW3NUE/P with 2340 points for 66 contacts. His QTH was near Pandy in Monmouthshire. Runners up in the high and low power sections were G3BA and GW3NOH/P respectively. There were 37 G stations taking part, six GW and one GC.

Comments

While there was general approval of the simple scoring system used in this contest several entrants considered that the GW/P stations had an unfair advantage with their bonus points. G3NNG and others suggest a separate section for /P and that GW/P should not have a bonus for working G and vice versa. This will be considered by the V.H.F. Contests Committee. From G3UBR comes the suggestion that scores might be based on radii of 25 km. multiples from the QTH which would simplify the scoring still further. However, as noted in the report on last year's event, the scoring system will not be changed unless a majority are in favour of doing so and to date there is no evidence to justify a change. Your views will be welcome!

Conditions seemed only fair during the period although much QRM was reported at the lower end of the band and the opinion voiced by several competitors was that stations did not appear to be tuning over the whole band. We hope everyone kept clear of the guard channels!

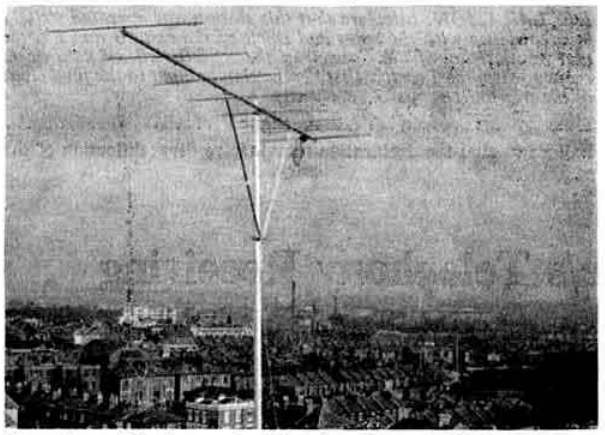
G2WS and others raised the question of the status of Monmouth, an English county, and noted in the RSGB list of counties as such, but with a GW prefix. The ruling that for the purpose of these contests the prefix defines the country.

The V.H.F. Contests committee wishes to thank G2CIW, G2BQ, BRS15823 and A3942/P for their Check Logs.

General

Extracts from comments: ". . . . then I went QRT for frostbite" (G3UBI/P). ". . . . not sure if I can enter but if I can it will boost everyone up a place" (G4JJ/M) (Not quite so OM!). ". . . . had three QSO's and then unfortunately had to go to work" (G2AVC).

A.H.D.



View from 100 ft., overlooking London, at G3UBR (Brunel University, London W3). The station appeared on 2m for the first time during the recent 2m cw contest when 60 contacts were made with stations in 25 counties and two countries. *(Photo by G3OUF)*

Call-sign	Placing LP	Placing HP	Points	QSO's	County	Power Input (Watts)	Aerial
GW3RUF/P	1		2820	82	BK	25	10 ele.
GW3NOH/P	2		2540	69	MH	18	10 ele.
GW3NUE/P		1	2340	66	MH	150	6/6
G3BA		2	1790	65	WK	150	10 ele.
G3FRV		3	1770	65	SX	150	10 ele.
G3NNG	3		1770	62	BE	10	6/6
G3KAC		4	1720	60	GR	110	10 ele.
G3SHK		5	1650	64	MX	150	10 ele.
G2XV		6	1630	57	CE	100	3 x 3 x 3
G3JEQ		7	1600	65	SY	90	Yagi
G3UBR		8	1570	59	LD	60	10 ele.
G5NU		9	1460	52	BE	120	8/8
G3MOT		10	1450	54	BS	85	8 ele.
G3PFM/P	4		1420	51	DT	25	8/8
GW3FSP		11	1380	38	GM	150	10 ele.
G3LAS	5		1360	49	HF	25	10 ele.
G3USB		12	1350	45	CE	120	2 x 6 ele.
G6RH		13	1330	30	KT	80	9 ele.
G3NEO		14	1260	44	YS	150	10 ele.
G3PTO		15	1250	31	SD	148	6/6
G3OXD/A		16	1240	50	WR	40	10 ele.
G2WS	6		1210	41	ST	28	4/4
G3OUL	7		1160	42	LE	25	6 ele.
G3PYC		17	1120	38	SX	90	10 ele.
G3SZX		18	1100	36	WE	70	4 ele.
G5DF		19	1100	31	BE	50	16 ele.
G3INU		20	1020	37	HF	100	4/4
G3SHZ	8		990	37	MX	25	10 ele.
G3ILO	9		940	31	GR	10	10 ele.
G2BLA	10		930	34	HE	12	6/6
GC2FZC		21	820	20	GY	60	8/8
G2NH		22	810	39	SY	150	4 ele.
G3ULU	11		730	22	GR	12	6/6
G5UM	12		700	21	LE	21	5 ele.
G3USF	13		700	24	SD	15	6 ele.
G3FNM		23	670	26	CH	75	5/5
GW3VXK/P	14		600	16	DB	25	8 ele.
G3UBI/P	15		530	19	YS	8	4 ele.
G3UUT		24	490	20	YS	75	6/6
G3XC		25	440	14	CL	150	16 ele.
G3OJE	16		430	19	LD	20	6/6
GW4CG		26	310	9	GM	140	5 ele.
G4JJ/M	17		270	10	YS	10	Halo
G2AVC	18		90	3	MX	5	Slot

Affiliated Societies Contest 1967

For this year's contest the entry was higher than in 1966, and the competition even fiercer! Once again the Maidstone YMCA Amateur Radio Club, G3TRF, have secured first place with a score of 2470 points, but this year Southampton University, G3KMI, have " come up from nowhere " to take second place with 2260 points. Reigate ATS " B " station improved from seventh place in 1966 to take third place this year with 2215 points. Once again many leading entrants have had substantial alterations made to their claimed scores as a result of checking, but only three clubs had entries disallowed.

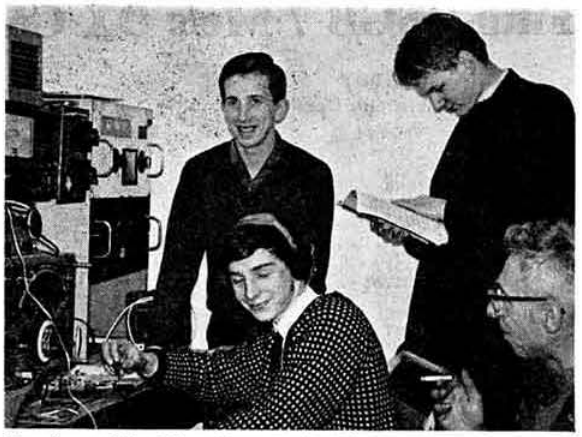
The standard of logs submitted was, on the whole, very good. However, as always there were a number of outstanding " bad 'uns." Some logs were obviously the original sheets used during the contest, complete with deletions, alterations, and nearly illegible scrawl, making them an absolute nightmare for the checkers. Two other logs were nicely typed and very neat, but with only single spacing between contacts, again very difficult to check rapidly.

The committee noted that, once again, obvious " local arrangements " had been made by *some* leading groups, and so it is proposed to alter the scoring system for the 1968 event to make such arrangements ineffectual.

Comments from Logs

" Club stations' serial numbers should start at 500: no AFS to be sent." " Instead of serial numbers, use letter combinations, e.g. 569AA, 579AB, etc " (Southampton University). " Operating generally good, but still some operators persist in long CQ calls and longer-winded procedure " (Reigate). " On the Sunday we logged one station who worked four others before 19.00 and we had a time-check receiver running" (Ainsdale).

Position	Call-sign	Club	Score
1	G3TRF	Maidstone YMCA	2470
2	G3KMI	Southampton Univ. RC	2260
3	G3FM	Reigate ATS " B "	2215
4	G3TVS	Thames Valley ATS	2180
5	G3SSO	GCHQ ARC	2170
6	G3SRC	Surrey RCC	2150
7	G3PIA	AERE Harwell RC	2140
8	G3EKW	ARC Nottingham	2115
9	G5PP	MARS " B " Station	2105
10	G3UOK	University of Keele ARC	2070
11	G3TR	Crawley ARC " A "	2060
12	G3UUP	Ealing DRS	1975
13	G3OYU	Clifton ARS " B "	1970
14	G3OWM	Newcastle University	1960
15	G3SVC	Spen Valley ARS	1890
16	G3EFX/A	Radio Society of Harrow " A "	1860
17	G3TIR	Crawley ARC " B "	1845
18	G8FC	RAF Locking	1785
19	G3ASR/A	Edgware DRS " A "	1765
20	G3REI	Reigate ATS " A "	1605
21	G3UES/A	Echelford ARS	1550
	G3ULT/A	Reading ARC	1550
23	G3SAD	Stevenage DARS	1535
24	G3VER	Verulam ARC	1490
25	G3GBU	Stoke-on-Trent RS	1485
26	G3OUL	Liverpool Univ. ARS	1455
27	G3BZG	Edgware & DRS " B "	1425
28	G3SVJ/A	Luton & DARS	1415
29	G3PMX	Chelmsford ARS	1345
30	G2CUZ	Ainsdale RC	1330
	GM3TKV	Moray Firth ARS	1330
32	G3SFG	Southgate RC	1325
33	G3SKY	Isle of Wight RS	1315
34	G3OVL	Reigate ATS " C "	1340
35	G3MDG/A	Chesham & DARS	1305
36	G3GHN	Clifton ARS " A "	1265
37	G3SRA	Silverthorn RC	1260
38	G6OI/A	Stourbridge & DARS	1210
39	G3ITZ/A	RAF Sealand ARC	1155
40	G3FVA/A	South Manchester RC	1145
41	G3KAC	Univ. Bristol ARS	1120
	G3UMA	Mid-Herts ARS " B "	1120
43	G3VEU	Crawley ARC " C "	1070
44	G3IIU	Acton, Brentford, Chiswick	1035
45	G3NJF	Grimsby ARS " B "	1010
	G3NWR	Wirral ARS	1010
47	G3DDI	South Shields DARS	1005
	G3MAR/A	Midland ARS " A "	1005
49	G3AAZ	Mid-Herts ARS " A "	995
50	G3VIP	Grimsby ARS " A "	945
51	G3NTJ	East Lancs ARS	940
52	G3RCV/A	Cray Valley RS	930
	G3UEB	Newark SWC	930
54	G3NAF	Speedbird ARC	880
55	G2BOF/A	Sutton & Cheam RS	870
56	G3GKF	Purley	830
57	G3SRT	Salop ARS	825
58	GW3HGL	Conway Valley RC	815
59	G3TVO	Worthing & DARC	665
60	G3VEF	Fareham & DARC	645
61	G3HOX	Manchester & DARS	575
62	G3NJN/A	Blackpool	530
63	G3GDT/A	Ariel Radio Group	490
64	G3VGG	Bromsgrove & DARC	355
65	G3TPJ	Havering & DARC	350
66	G3RPJ	Stratford-on-Avon RC " B "	315
67	G3VLV	Stratford-on-Avon RC " A "	215
68	G3SUY	Havering & DARC	210
69	G3VTT/A	Havering & DARC	135



Members of the Silverthorn Radio Club operating during the Contest. L. to r. G3VMO, G3RJ1, SWL Bean and G2HR.
(Photo by G2HR)

The following entries were disallowed for the reasons stated:

G3POI Harrow " B " Station—Rule 1—General Rules for Contests.

G6LQ/A Weston-super-Mare RC—Rule 8 (no operators' call-signs against each contact)

GM3UKG Moray Firth ARS—Rule 6 (serial numbers *not* consecutive)

Check Logs from the following stations are gratefully acknowledged:
G2MI, G3JFY, G3ING, G3TAK/A, G6QN/A, OK1AAU, OK1KOK, OK2TX, OK3CHZ, OK3KFV, OK3KRN, OL1AEM, OL1AFB, OL4AFI, OL5ADK, OL6ACH.

80 Metre Field Day 1967

The rules for this year's 80m Field Day are as follows:

1. Duration: 10.00 GMT to 17.00 GMT on **10 September, 1967.**

2. Eligible Entrants: All fully paid-up Corporate Members of RSGB resident in G, GC, GD, GI, GM and GW. A maximum of two operators will be allowed per station; only one call-sign may, however, be used.

3. Contacts: must be made on c.w. (A1) in the 3·5 Mc/s band only. Contestants should identify themselves as taking part in the contest by including the letters FD during transmission.

4. Scoring: 15 points may be claimed for each contact with a portable or mobile station, and 3 points for each contact with a fixed station.

5. Contest Exchanges. RST reports followed by contact number starting at 001 and the location, e.g. RST559001 Bradford.

6. Logs: (*a*) Must be tabulated in columns headed (in this order); date and time (GMT); call-sign of station contacted; my report on his signals and serial number sent; his report on my signals and serial number received; location of station contacted as received; call-sign of operator; points claimed. Printed log forms and cover sheets are available from Headquarters on request.

(*b*) The cover sheet must be made out in accordance with Contests General Rule 4. The declaration must be signed and the location as transmitted given.

(*c*) Entries must be postmarked not later than **25 September, 1967.**

7. Equipment: The total d.c. input to the anode circuit of the valve(s) or any other device energizing the aerial, or to any previous stage of the transmitter, shall not exceed 10 watts. The power for all parts of the station must be derived entirely from storage batteries or accumulators. The practice of " float charging " the storage batteries or accumulators in use, whether from portable generators or supply mains, is not permitted.

8. General Rules relating to RSGB Contests, published in the January 1967 issue of the RSGB BULLETIN, will apply except as superseded by the rules of this contest.

9. Awards: At the discretion of the council, the Houston Fergus Trophy will be awarded to the winning station and certificates of merit to the runner-up and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

Grafton Top Band Contest

The phone section of this contest will take place on 8 April. (Rules were published on page 190, March RSGB BULLETIN). Logs bearing the usual signed declaration, should be sent to G3SIL, 29 Pangbourne Drive, Stanmore, Middlesex, to arrive not later than 17 April (blank Log Sheets and detailed copies of the Contest Rules are available from G3SIL on receipt of an s.a.e.).

Fifth RSGB 7 Mc/s DX Contest

C.W. CONTEST

Single Operator Section

Position	Call-sign	Points
1	G3FXB*	3447
2	G5DQ*	3430
3	G3HS	3335
4	G3OQR	3015
5	G3MXJ	2860
6	G8PB	2680
7	G3KLH	2655
8	G3DYY	2390
9	GB3RWL	2125
10	G5PQ	1940
11	G3SEP	1935
12	G2QT	1915
13	G3IAR	1855
14	G3TJD	1805
15	G2DC	1800
16	G2DU	1685
17	GM3JZK*	1605
18	UF6LA*	1585
19	G3UCN/A	1580
20	G3KSH	1515
21	G3LNC	1485
22	G3LZQ	1445
23	W2LXK*	1440
24	G3APN	1405
25	W4YXW*	1370
26	GW3CW*	1305
27	K3CYA*	1277
28	I1KE*	1230
29	G3KZC	1200
30	G3KDB	1170
31	GM3EOJ	1140
32	G3VPS	1100
33	MP4BDF*	1075
34	HA1KSA*	1070
	G3UFW	1070
36	YU1EXY*	1065
37	VO1AW*	1045
38	UI8AI*	1025
39	G6ZG	995
40	F2PO*	990
41	GC4LI*	985
42	SP8MJ*	975
43	F9NF	965
44	SP8ARY	960
45	G3TBK	950
46	G3SYC	935
47	I1ESE	915
48	SP3BQR	897
49	F5JX	855
50	VK3APJ*	850
51	ON4XG*	835
52	OK2QX*	830
53	UB5TQ*	815
	DJ1UE*	815
55	SP5CR	805
56	G3ILO	795
57	DL1KS	790
58	W2EQS	780
	9H1AB	780
60	G3AKF	765
	SM6ARH*	765
62	UA2AKW*	730
	UA2KG*	730
64	SP8AG	725
65	UA1UC	705
66	VK5KO*	700
67	UB5KLD	695
	SM3TW	695
69	UA3GM	690
70	OH2BCZ	685
	UP2NW*	685
	G2GM	670
72	F8TM	670
	UC2WP*	670
75	GM2HCZ	665
	SP4AWE	650
76	PY1MGF*	650
	F3IZ	650
79	OK1AOV	645
80	OK1AHQ	620
81	UP2AW	617
	VE2LY*	605
82	VE3FG*	605
	SM6DPF	605
	UF6HK	600
85	UA2BI	600
	UC2WJ	600
88	UB5KBV	595
89	SP1AAY	590
90	HB9KC	580
	PA0ZC	580
92	DL1JC	577
93	DL1QQ	570
	OK2BCH	570
95	SP9AMA	565
	GM3SBS	565
97	OL5ADK	560
98	F9OE	555
99	F8JH	550
	PA0LV	550
101	DJ0NH	545
	UA3JW	545
103	SP2AVE	540
104	SP2LV	535
105	UC2KMZ	530
106	SM0BNX	525
	LA7QI	525
108	OZ1LO	520
109	SP2BKT	510
110	YU1NOL	495
111	F5LQ	490
	SM0BDS	490
113	UA3KWB	480
114	UC2LU	475
115	F9DW	470
	YU1SF	470
117	YO2BM	445
	G8VG	445
119	UO5AA	440
120	W4HOS	435
	UA3KYA	435
122	UW3AX	405
	G8KU	405
124	VK3XB	400
125	OE8SH	375
126	SM5ACQ	365
127	SP5AGS	315
128	G3JKY	305
129	UA1BT	300
130	SP5YQ	285
131	UC2KAC	275
132	UB5SC	230
133	W3DPJ	225
134	HB9UD/A	175
135	SM4CMG	170
	OK1AAU	170
137	F5MG	110
138	UC2OI	75

Multi-operator Section

Position	Call-sign	Points
1	GW3OAY	3930
2	G3FM	2395
3	SP2KAC	990
4	UA9KDL	720

TELEPHONY CONTEST

Single Operator Section

Position	Call-sign	Points
1	GI3OQR*	2975
2	G3NMH*	2540
3	G3HS	2515
4	G3NLY	1827
5	G5HZ	1705
6	G3DYY	1295
7	G3KSH	1221
8	G3TZH	1110
9	G3OMK	1050
10	CN8AW*	995
11	G3IAR	980
12	DJ0JE*	875
13	DL2AN	775
14	GM3RFR*	755
15	DJ8SW	695
16	G3TJD	660
17	HB9DX*	610
18	G3SLH	575
19	OH5SM	545
20	I1KDB	540
21	PA0SNG	517
22	W5HWR/VP9	490
23	LA1MG	485
24	W3AZD	435
25	JA6YB	425
26	PA0QT	420
27	SM3DKO	416
28	LA1K	405
	SM5CAK	405
30	DM3YPD	390
31	OH5UQ	385
32	PA0DEC	330
33	DL7LV	315
34	VE2LY	290
35	G3PZU	265
36	OH1UR	245
37	VK3XB	200

* Certificate winners

Multi-operator Section

Position	Call-sign	Points
1	G3SME	1115
2	UA3KBO	490

LISTENERS' CONTEST

C.W. Section

Position	Call-sign	Points
1	George Allen	1740
2	A3942	1545
3	BCRS195	1300
4	BRS18461	1190
5	UA6/85206	615
6	UB5/5382	450

Receiving Telephony Section

Position	Call-sign	Points
1	BRS26444*	2094
2	A3724*	1795
3	A3942	1570
4	A4273	1515
5	A4533	1454
6	BRS26003	1330
7	A5154	1265
8	BRS26431	1200
9	A5224	1055
10	A4378	1035
11	BRS25429	965
12	A5032	910
13	A5126	855
13	BRS26870	855
15	BRS26189	770
16	SM5-2735*	745
17	A4752	690
18	A4699	610
19	A5105	600
19	A4874	600
21	A4884	470
22	WPE3AZC*	450
23	NL819*	430
24	VE3-11606*	290
25	ON4-1497*	285
26	BRS27525	200

*Certificate winners

This contest produced a slightly higher entry in the c.w. section than in 1965 which is especially gratifying as there was a clash of dates with the OK contest. This was most unfortunate as the RSGB had notified its 1966 calendar to IARU well in advance as agreed internationally.

First place in the c.w. section is Mr A. J. Slater, G3FXB, with a final total of 3447 points from 272 contacts. Runner-up is Mr P. J. Broom with 3430 points—a really close contest. Mr Broom made his score from 291 contacts. Both the winner and runner-up submitted beautifully made out logs which the Contests Committee found a joy to check. In third place is Mr D. T. Boffin, G3HS, who was in sixth place in last year's contest.

The Multi-Operator Section of the c.w. contest produced only five entries one of which had to be disallowed under Rule 6 (a) of the General Rules for RSGB Contests 1966. The leading multi-operator station is GW3OAY with a score of 3930 points from 323 contacts. This winning entry was a chance one as GW3OAY injured his right hand on the evening of the contest and so GW3NJW and G3SQX did the operating with GW3OAY logging! Runner-up was last year's winner Mr J. Duckworth, G3FM, assisted by G3NKS and G3RCY. Their total was 2395 points from 249 contacts.

In the c.w. section of the Receiving Contest there were six entries—the same as last year. The winner is Mr G. Allen, ex-BRS250, who is now living in W. Australia. He succeeded in logging 30 British stations but strangely enough did not hear the winner G3FXB! Runner-up is a home listener, Mr A. A. Goacher, A3942, and in third place is the redoubtable Eric Trebilcock, BCRS195, who heard 19 British stations from his station in Australia and like Mr Allen did not hear G3FXB!

In the Telephony Contest there was a total of 37 entries which is a considerable increase over the 1965 total of 27 although only two of this increase were British Isles entrants. The winner this year is Mr Dick Gibson GI3OQR with 2997 points from 220 contacts and 50 of these gave him bonus points. Some quite interesting stations were worked—TG9, HR1, HK, XE, ZL, JA, VP2, 3, 9, H1, and a long string of Ws. His transmitter is a KW Viceroy and the aerial a rhombic with 360 ft. on each leg. Runner-up in this section is Mr Hal E. Perkins, G3NMH, with 2540 points from 199 contacts with 45 of these carrying bonus points. G3NMH used a Heathkit station, SB200, SB400 transmitter and an SB300 receiver. His aerials were a 41 ft. vertical and a three-half-wave long horizontal.

In the multi-operator phone contest there were only two entries: G3SME with 1115 points and UA3KBO with 490 points.

The Telephony Receiving Section drew 26 entries; just five more than last year. The winner was Peter J. Baxter, BRS26444, with 2094 points and in second place was Mr Chamberlain, A3724. These two stations sent in beautifully tidy and very accurate logs. In fact the standard of logs from the receiving stations was exceptionally good and were a pleasure to check. BRS26444 used a Mosley CM1 Receiver plus *Q* Multiplier and a Joystick aerial. While A3724 used a CR100 and 130 ft. long wire only 12 ft. high.

Comments from Competitors

In the Telephony Section G3KSH remarks that transceivers are a mixed blessing unless a spare receiver is available for working the North American Continent.

A lot of entrants in the c.w. section complain about the clash with the OK contest. Some mention is made that conditions seemed to be very good but there is still too much QRM from stations that should not be there!

The H.F. Contests Committee gratefully acknowledges check logs from the following stations: 4U1ITU, DM4ZL, DM4WKL, G4JZ, G6LD, LA1H, LA6U, OK1DC, OK1KUA, OK3CEY, OK3KIO, SM7CKZ and YO6AW.

RSGB 21/28 Mc/s Telephony Receiving Contest **(Continued from page 257)**

Overseas Entrants. Each complete log entry relating to a British Isles station heard will score **5 points**. In addition a bonus of **20 points** may be claimed for the first station heard in each British Isles country-numeral prefix on each band, i.e. G2, G3, GM4 etc., as listed in Rule 8 for the transmitting contest.

5. Awards. At the discretion of the Council, the **Metcalfe Trophy** will be awarded to the leading British Isles entrant. In addition, **certificates** will be awarded to the British Isles runner-up and to the leading entrant in each overseas country.

6. The Council of the RSGB reserves the right, on the recommendation of the Contests Committee, to reject any entry that is consistently inaccurate.

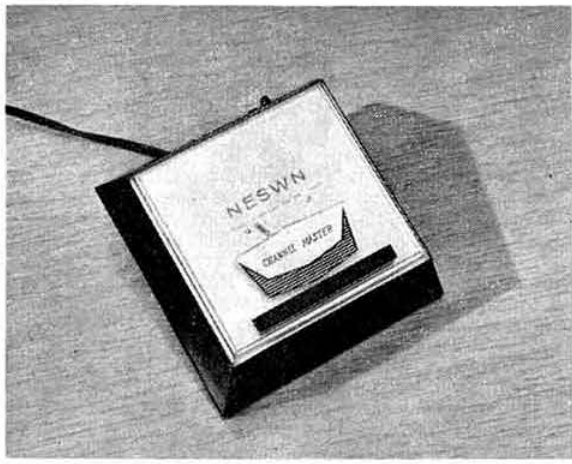
* * *

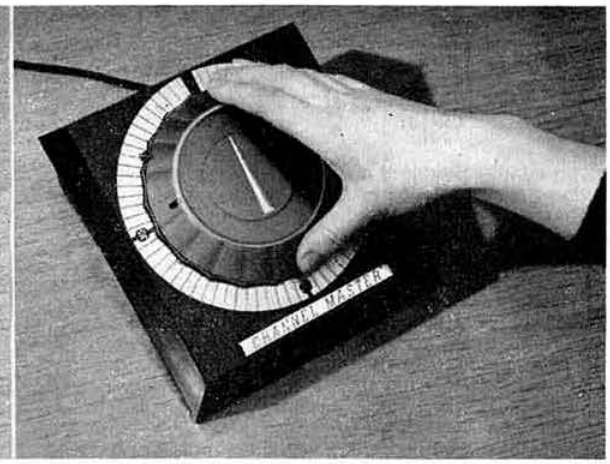
The closing date for posting entries is 30 October, 1967.

CONTESTS DIARY

8-9 April	—*CQ* WW S.S.B. Contest (see page 167, March, 1967)
15-16 April	—Second 70 Mc/s Contest (Open)* and 70 Mc/s Listeners' Contest* (see page 111, February, 1967)
23 April	—D/F Qualifying Event
1 May	—D/F Qualifying Event
6-7 May	—USSR Contest (see page 166)
7 May	—Third 144 Mc/s Contest (Portable)* (see page 189, March, 1967)
20-21 May	—First 1296 Mc/s Contest (Open)* (see page 190, March, 1967)
20-21 May	—YL Int. S.S.B. Contest
27-28 May	—First 432 Mc/s Contest (Open)* (see page 189, March, 1967)
3-4 June	—National Field Day (See page 50, January, 1967)
18 June	—D/F Qualifying Event
2 July	—Fourth 144 Mc/s Contest (Portable)*
8-9 July	—1·8 Mc/s Summer Contest
16 July	—D/F Qualifying Event
23 July	—Third 70 Mc/s Contest (Portable)*
30 July	—D/F Qualifying Event
2-3 September	—V.H.F. NFD/IARU Contest* (see page 108, February, 1967)
10 September	—80 Metre Field Day (see page 259)
17 September	—D/F National Final
7-8 October	—Second 1296 Mc/s Contest (Open)*
7-8 October	—RAEN Rally
14-15 October	—RSGB 21-28 Mc/s Telephony Contest (see page 257)
14-15 October	—Second 432 Mc/s Contest (Open)*
28-29 October	—RSGB 7 Mc/s DX Contest (Phone)
11-12 November	—RSGB 7 Mc/s DX Contest (C.W.)
18-19 November	—Second Top Band Contest
3 December	—Fourth 70 Mc/s Contest (C.W.)*

*Qualifying contests for V.H.F./U.H.F. Listeners' Championship.





CHANNEL MASTER AERIAL ROTATOR

Tenn-a-Liner

By JOHN A. ROUSE, G2AHL

BEAM rotation at G2AHL has taken a variety of forms over the years, all with their advantages but principally with disadvantages. The first, tried after the hasty construction of a 28 Mc/s beam at the time of the excellent conditions just after World War 2, was simply a rope attached to the boom (the beam rotated freely on the mast unless the rope was suitably secured). More sophisticated methods used later included cowl gill motors with selsyn indication and latterly, once again, hand rotation of the mast. This method has the advantage of simplicity and reliability but little else: in cold weather having to open the window to turn the beam quickly evaporated much enthusiasm for 2m operation.

The opportunity to try one of the new Channel Master rotators was therefore welcomed: this rotator, sold in the UK by Electroniques STC, is a comparative newcomer to the British market and was first shown at last year's RSGB International Radio Communications Exhibition where it was subjected to severe use by many visitors intrigued by a working model.

Two versions of the Channel Master are available: the simpler one with manual control and compass type indicator (Type 9519) requires a four core control cable. The system uses two motors, one in the rotator, the other in the control unit.

The model tested employs the automatic control unit type 9528 shown in the photograph coupled to the rotator on the mast by a three core cable which feeds power to the motor and provides direction indication. We used p.v.c. covered 5 amp cable.

The control unit contains a mains transformer, which supplies 22V at 1A to the rotator. It is simple to use: to point the aerial array in the required direction all that has to be done is to turn the arrow on the central knob to the bearing desired and the rotator follows. The speed of rotation is about 1 r.p.m. and the direction of rotation can be changed at any time by simply turning the control knob. The only sound from the control unit is a slight hum while rotation is actually taking place.

A twin conductor mains lead terminated in a standard US 2 pin plug is fitted to the control unit but an adaptor is supplied to plug into a British 5 amp 2 pin socket.

Provision is made on the outer rim of the brown plastic control box to mark the beam headings for particular stations. This should prove useful for turning the aerial accurately towards beacon stations.

The rotator can be fitted to masts up to 2 in. diameter. Although the manufacturer states that it will accept stubmasts up to 1⅞ in. diameter, it was found impossible to pass a tube of this nominal diameter through the alignment bearing (an optional extra) which bolts to both the main and stubmasts.

The 144 Mc/s 8-over-8 J-Beam array at G2AHL is mounted on a 1½ in. diameter stubmast 8 ft. long. The actual rotator is mounted about 4 ft. below the top of the main mast with the ball race alignment bearing at the top. This produced a rigid assembly.

Detailed instructions for the installation and initial setting up of the indicating system are supplied and no difficulties should be encountered. It should be noted however that a projection on the rotator must be broken off and filed off level when it is mounted below the top of the mast.

At the time the rotator was installed by members of the Headquarters staff for the purposes of this review, strong south westerly gales were blowing and it soon became evident that the rather flexible Minimitter mast was not very suitable for an array of this size complete with a rotator. It is therefore being replaced with a much stouter mast made from scaffolding tube. The moral of the tale is to make sure that your mast is man enough to support both aerial array and rotator!

The Channel Master Tenn-a-liner costs £17 17s for the rotator and automatic control box; the manual version is £12 12s. and the alignment bearing costs an extra £3 5s.

International Broadcast Conference for London

The Electronic Engineering Association and the Royal Television Society are jointly organizing an International Broadcasting Conference to be held in London during September 1967. The EEA are to be responsible for the exhibition side of the Conference while the lecure programme will be in the hands of the RTS. The Conference is certain to bring into London a great many prominent broadcast engineers who are also radio amateurs. Venue is to be London's latest hotel, The Royal Lancaster.

Radio Amateur Emergency Network News

By S. W. LAW, G3PAZ*

Response Curve

FIRST and foremost, thanks to those who have sent in news and information for this column. It is this interest that forms the life-blood of any organization, for no body (corporate or corporeal) can have animation without the circulation of vital fluid; and for us that means communication. So if you have an idea, some data of general interest or even a good "beef" to get off your chest—send it along. If in the *réchauffé* it shrinks a little in print, it is only the ever-present limitations of space with which we all have to contend in this quaintly-named " space-age "!

Busy Folk

These Norfolk chaps certainly keep on the go! For those who have problems of coverage over similar terrain we can recommend a look at the results of a very interesting exercise in the coastal area of Norfolk over an 80-mile stretch. The object of the exercise was to ascertain the reliable working distances between fixed, mobile and portable stations at night in this area. The CC (County Controller), G3HRK has compiled a very informative chart of the results, and those who use Top Band in their areas may find this of interest. Better still, if any interested persons can get along to the County Police Headquarters at 69 Thorpe Road, Norwich, on Friday, 21 April at 19.45 BST, there will be a "Raynet Teach-In" evening comprising a series of lectures and talks on RAEN.

Light Relief

We all enjoy our joke against the chap who gets lost in unfamiliar country (see last month)—but have *you* practised your map-reading *in the dark*? Make sure you have a torch (with a good battery) in the car; and don't forget your glasses, if worn. A magnifier is a good thing to have around too.

Aftermath?

Our sympathies are extended to the Surrey CC, G3VK, who has been laid low for such a long period with a very trying upset to his " internal economy." It is a matter for conjecture how much of John's trouble stems from that marathon stint that he did on the RAEN Stand at the Communications Exhibition. If the few hours that the writer spent on the job are any indication, the whole period must have been a task to daunt the strongest. Certainly the effort was well rewarded to judge by the amount of interesting data that was accumulated. Only limitations of space prevent us from presenting a full run-down on the matter collected during the period, but it can safely be said that, due to the efforts of the Surrey group (who were manning the stand on this occasion), a large number of people left the Show with a much clearer knowledge of RAEN and the work which is voluntarily undertaken by the officers and members.

In particular, the working base station on 70·365 Mc/s was a great attraction to people whose attention had been drawn by the very attractive revolving sign (one of G3ORE's efforts) and the coloured county map. That practically the whole stock of the RAEN Manual was sold showed the effectiveness of the approach.

RAEN Committee

At the meeting held in February, the post of Honorary Chairman was accepted by Peter Balestrini, G3BPT. A hearty vote of thanks was accorded to the retiring chairman, G3ION. The position of Honorary Deputy Chairman is now held by G3IIR. Mr E. R. L. Bassett, BRS16075 continues in the arduous capacity of Honorary Secretary. Apologies for absence were received from G3VK and G3PAZ. The resignation of G3FZW (past Honorary Editor of " Network News ") was finally, and regretfully, ratified. The formulation of the rules for the 1967 Raynet Rally is to be in the capable hands of John Scarborough, G3MBQ. Details will be published as soon as they become available.

Registration

Further to the item in last month's issue, will members and those in process of becoming members please note that registration is now undertaken by G2ABC, Mr R. A. Ledgerton, 1 Latchindon Gardens, Woodford Bridge, Woodford Green, Essex who is now Honorary Registrations Secretary.

Ear to the Ground

For those listening for the " little people "—seen any shamrock about lately? Watch this space.

Clanger?

Not really, although a little expansion might clear the air. When we mentioned covenanted disaster and organized events last month we were, of course, *not* referring to organized exercises held in conjunction with the User Services. Nor was the inference meant to include exercises held to further interest in RAEN in such a manner as to bring us before the eye of the public—as an example, take the 1966 Radio Communications Exhibition. If an offer of stand space is received from the organizers of a local show, there is nothing to stop a Raynet exercise being held by the local group using the exhibition stand as an out-station on the understanding that there will be no participation in the activities of the show radio-wise and, of course, no advertising. Don't take the last too much to heart and turn down any enquiries from prospective new members!

Police Re-Shuffle

Some despondency seems to have been caused in our ranks by the re-organization of some County Police areas. In the long run this should make little difference to our effectiveness as a provider of emergency communications, and once things have shaken down into the new framework any minor temporary dislocations will soon fade away. Keep in touch, however, and remember to ensure that you can live up to our claim to provide service when called upon.

Get it all Taped

Our SWL members may sometimes feel that their usefulness is more apparent than real but, when an exercise is in progress, a recording from a listener station can be of very great value in assessing the progress and effectiveness of the endeavour. So why not arrange for a small team to attend to this side of things on *your* next exercise?

Sorry

We unfortunately gave the South Essex AC as G3OVX last month–this should have been G3OBX. Apologies to both gentlemen.

* 11 Chisholm Road, Croydon, Surrey.

News from Headquarters

The 1967 RSGB Exhibition

This year's Show will be held at the **Royal Horticultural New Hall** in Vincent Square, London, SW1, only a short distance from Victoria Street and the main line Victoria Station terminus.

The date is also changed and the Exhibition will be open from **Wednesday** to Saturday, **27** to **30 September.**

The exhibition of **Home Constructed Equipment** will be along the same lines as last year and items displayed will either have been the subject of published articles in the RSGB BULLETIN or comprise equipment about which the member will, *if required*, write a constructional article for the BULLETIN. In 1966 the display was the subject of much favourable comment and it is hoped that members who may now be building equipment will consider submitting it for display at the Exhibition. The space allocated for this section will be larger than last year and it is hoped that a display of first class home built equipment will be available.

London Lecture Meeting

The Lecture on 22 February 1967 at the Institution of Electrical Engineers was given by Mr Brian Armstrong, G3EDD of Pye Telecommunications Limited. The lecture, which was illustrated with slides, was thoroughly enjoyed by the audience of more than 70 members. In addition to providing a detailed description of v.h.f. mobile equipment Mr Armstrong introduced many points of vital interest to the amateur.

The Chairman of the meeting was Mr R. F. Stevens, G2BVN, and a vote of thanks to the Speaker was proposed by Mr R. C. Hills, G3HRH.

Norman's Hamfest

Over 150 amateurs from all over the South of England assembled at the High Wycombe Works of Ernest Turner Electrical Instruments, Limited, on Sunday, 12 March, as guests of G4NT. Amongst those present were the Secretary of the RSGB, John Rouse, G2AHL, now happily well on the way to recovery, and VK2AAB. The first " Norman's Hamfest " was held 20 years ago and these events have been a regular and ever more popular feature of Amateur Radio ever since, until this year it was a case of standing room only!

Stations G4NT, G4CY/A and G3QDC/A were on the air from 13.30 and the proceedings commenced at 15.00 with a cordial welcome from G4NT. A lecture " The Possibilities of Amateur Colour TV Transmission " by W. Hipwell, Esq., by kind permission of the Marconi Co. Limited, followed, and after the guests had been entertained to tea, T. D. Humphries, FRSA, MIERE, Managing Director of Reproducers and Amplifiers Limited, lectured on loudspeakers in a highly entertaining and instructive manner. A colour film " Follow the Golden Fleece," taking the audience on a tour of the Greek islands was followed by a lucky prize draw, and refreshments. Ken Alford, G2DX, proposed a warm vote of thanks to G4NT, for his hospitality on yet another of these ever popular amateur occasions.

Ninth Annual RAOTA Reunion

The Ninth Reunion of the Radio Amateur Old Timers' Association will be held at The Horse Shoe Hotel, Tottenham Court Road, London, W1, on Friday, 5 May, 1967, when Sir Francis McLean, CBE, Director of Engineering, BBC, will be the guest of honour. Membership of RAOTA is open to any currently-licenced radio amateur who has held a licence issued by the United Kingdom Postmaster General for an unbroken period of at least 25 years, including the war years. Holders of prewar Artificial Aerial Licence calls are eligible for membership provided they obtained a full call early in 1946 and have held that call ever since. Further details of the Association can be obtained from the Founder Secretary, 16 Ashridge Gardens, London, N13. The Annual Reunion is confined to members of the Association of which there are now more than 200.

Amateur Bands Receiver

Following the article by **L. Williams, BRS25769,** which appeared in the January 1967 issue of the BULLETIN, Electroniques have issued a comprehensive Data Sheet which will be invaluable to intending constructors. The data sheet details suitable components and suggests an alternative to the use of crystals with the mechanical filter. The modular chassis system outlined in the Electroniques Hobbies Manual is suggested as a sound mechanical basis of construction. The Data Sheet is obtainable from Electroniques (Prop. STC Ltd.), Edinburgh Way, Harlow, Essex.

RAEN Cup

On Friday, 27 January, 1967, the Manchester Group RAEN were honoured by the presence of the 1967 RSGB President, " Barney " Patterson, GI3KYP, at a small dinner party held to celebrate and receive the RAEN trophy award.

The trophy was received by Chief Inspector B. G. Stephens, of Manchester City Police, on behalf of the Manchester Group. It was the Group's wish that he do so to mark its appreciation of the work he has put in as its Liaison Officer.

Both Mr Patterson and Chief Inspector Stephens commented favourably upon the RAEN organization and to its well-being during their respective speeches.

Mr Patterson, GI3KYP, presenting the RAEN trophy to Chief Inspector B. G. Stephens.

Receiving Contests

Council has decided that members holding Class B Sound licences shall be eligible to take part in any RSGB receiving contests except those bands on which they are licensed to transmit. For example, a G8——— may enter the receiving section of BERU.

Jamboree on the Air 1967

This 1967 event will take place during the weekend 5-6 August to coincide with the Diamond Jubilee of Scouting and the Twelfth World Jamboree in Idaho, USA.

New QTH for Royal Signals ARS HQ Station

The RSARS Headquarters station moved to Blandford Camp, Dorset, on 1 April, where it was located in the new Army School of Signals. From that date the station will operate under the call G4RS. The old call, G3CIO, long associated with Catterick, will remain with the Catterick Camp club station, which will operate from the old HQ station QTH.

Looking after the club at Blandford will be Forman of Signals, Roy Walmsley, G3IBB. Local amateurs and visitors to the nearby seaside resorts are invited to call at the club. The new address is c/o S/Sgt (FofS) R. Walmsley, School of Signals, Blandford Camp, Dorset.

Andorra Visit

Two members of the Gresham's School Amateur Radio Society are hoping to form an Expedition Group to visit the State of Andorra for two weeks between 24 July and 16 September 1967. They would like to enlarge the party, and so any members who are interested, and preferably own a car, should contact J. R. Hawke, G3VNV, Gresham's School, Holt, Norfolk, stating the most convenient fortnight.

Bornholm Island

Amateurs on Bornholm Island have for the first time in 10 years organized a Summer Camp for Radio Amateurs. The resort is the Lyngholt Family Camp, lying some 12m from the coast. Facilities include 220V a.c. for campers, caravans and chalet users. For further information, write to OZ1IF, 1b, Andreasen, Aakirkeby, Bornholm, Denmark.

73 Magazine

On 1 February the subscription to *73 Magazine* was increased to $5.00 per year. A two year subscription will now cost $9.00 and for three years it will be $12.00. The British rate, when ordered via RSGB Headquarters, is 37s. for one year.

A Directory of Semiconductor Manufacturers

We regret that an oversight caused the omission of International Rectifier Co. (GB) Ltd., Hurst Green, Oxted, Surrey, from the list of manufacturers published in Mrs Priestley's article last month. I.R. have pointed out that their devices include power rectifiers and variable capacitance diodes which find application in Amateur Radio equipment. They have a network of distributors who are willing and able to supply devices to radio amateurs.

Plessey (UK) Ltd, Ilford, Essex, are considering appointing distributors shortly.

RSGB 21-28 Mc/s Telephony Contest

In last month's report on the RSGB 21-28 Mc/s Telephony Contest, sixth place in the Single-operator Section was shown to be G3JAZ. This should have been G3JAF.

A Modulation Monitor

In last month's article by G3BNM, R11 should be 100K ohms, and T1 winding Y-Y should deliver 4 volts.

MOBILE RALLIES

30 April ..... Medway Mobile Rally
British Uralite Ltd., Higham, Nr. Rochester, Kent.
Organized by the Medway Amateur Receiving and Transmitting Society.

30 April ..... North Midlands Mobile Rally
Drayton Manor Park, ½ mile South of Fazeley, near Tamworth.
Organized by the Midland Amateur Radio Society.

7 May ..... Thanet Radio Society
Cliff-top site, by the Viking Ship, Pegwell Bay, Ramsgate.
Organized by the Thanet Radio Society.

21 May .....Cardiff Mobile Picnic
Porthkerry Park, near Barry, Glamorgan.
Organized by the Cardiff RSGB Group.

11 June..... Medway Mobile Rally
Mote House, Mote Park, Maidstone, Kent.
Organized by the Medway Amateur Radio Mobile Rally Committee.

18 June .....ARMS Mobile Rally
Organized by the Amateur Radio Mobile Society.

18 June ... Hunstanton Annual Bucket and Spade Party
Brookes Refreshment Rooms, the Car Park, opposite the railway station.

25 June ..... Longleat Mobile Rally
Longleat Park, on the Frome-Warminster Road, A362
Organized by the Bristol RSGB Group

9 July..... RSGB National Mobile Rally
Gilwell Park, Chingford, NE London.
(Overnight camping is permitted on the site)
Organized by the Radio Society of Great Britain.

16 July..... Worcester Mobile Rally
Details to follow shortly.

23 July ..... Cornish Mobile Rally
Pentire Head, Newquay, Cornwall.
Organized by the Cornish Radio Amateur Club.

13 August .....Derby Mobile Rally
Ryknеld School, Derby.
Organized by the Derby and District Amateur Radio Society.

3 September ..... Swindon Mobile Rally
Lydiard Park, near Swindon, Wilts.
Organized by the Swindon and District Radio Club.

24 September.....Harlow Mobile Rally
Organized by the Harlow and District ARS.

North Midlands Mobile Rally, 30 April, 1967

Drayton Manor Park, entrance one mile south of Fazeley on the Tamworth-Coventry Road, A4091.

Excellent Catering and Parking facilities are available. Attractions for the family will include Aerial Cars, Zoo, Boating and Paddling Pools.

Thanet Mobile Rally, 7 May, 1967

Cliff-top site by the Viking Ship, Pegwell Bay, Ramsgate.

Talk-in stations: G3DOE, 160m; G3JMB, 70·56 Mc/s; G3BAC, 144·48 Mc/s.

Refreshments will be available from the site Hotel and from a nearby restaurant.

Silent Keys

We record with sorrow the passing of the following:

A. C. Knight, BRS23247, of Totterbridge, London.

B. M. Scudamore, G6BS, of Great Shelford, Cambridge.

Obituaries

Dr M. B. SARWATE

Dr Manohar Balajl Sarwate, the Secretary General of the International Telecommunications Union passed away in Geneva on 19 Febuarary 1967 following a minor operation.

Born on 15 March, 1910, Dr Sarwate was a Bachelor of Science of the University of Bombay, held the Diploma of the Indian Institute of Science in Electrical Technology and received his Doctorate of Philosophy in Radio Engineering from Liverpool University. After a period during which he was engaged in the development of aircraft radio and radar equipment in the United Kingdom, he became, in 1941, an officer in the Technical (Signals) Radio Branch of the Indian Air Force. In 1946 he joined the Civil Aviation Department of the Government of India and in 1953 became Adviser, Wireless Planning and Co-ordination in the Indian Ministry of Transport and Communication. At the 1959 ITU Plenipotentiary Conference, in which he was the Alternate Leader of the Indian Delegation, he was elected Deputy Secretary-General of the ITU. Dr Sarwate had wide experience of international work both with the ITU and the ICAO and he was the leader of the Indian Delegation to the 1959 Geneva Radio Conference where he was elected Vice-Chairman of the Conference. After his election to the post of Deputy Secretary-General he participated in many Union Conferences and represented the ITU at conferences throughout the world. At the 1965 Plenipotentiary Conference in Montreux Dr Sarwate was elected Secretary-General of the ITU which onerous post he has filled with distinction.

Dr Sarwate was a Honorary Member of the Amateur Radio Society of India and shortly before his death had consented to become Patron of the International Amateur Radio Club at Geneva. He had always shown a keen interest in the work carried on by amateurs throughout the world.

The death of Dr Sarwate will be mourned by his many friends in many countries and the world of telecommunications will be the poorer by his absence. R.F.S.

G. A. KENYON ex-G3YK

We regret to report the passing on 12 February of G. A. Kenyon, ex-G3YK.

Jerry was well known up to about 12 years ago on 80m using a B2 transmitter. Unfortunately he was plagued with TVI and as a result decided to close down. It was at this time that his interests turned to projection television. Jerry was professionally employed as Secretary-Superintendent at Poole Hospital, Nunthorpe where he had worked for 10 years.

Our sympathies are extended to his widow for her loss. A.L.T.

ARTHUR SIMMONDS, ex-2ARW

We regret to report the passing away of Arthur Simmonds of Hayes, Bromley, Kent.

Arthur started his radio career in the early days with the call 2ARW, transmitting from Dulwich and Crystal Palace with hand and water power driven gear, always of his own making. He was a radio engineer with Radio Rentals and later with the LCC. He patented several ingenious radio parts before the war, and was a master at making and mending amateur and domestic radio equipment. He was always ready to lend a helping hand to anyone interested in Amateur Radio, and it was thanks to his very friendly guidance and encouragement that many young people gained their amateur licences. Although more recently in failing health, he was as ever a cheerful and valuable friend to those around him, who he still helped in every way. Those who knew Arthur will mourn the loss of a good man.

He leaves a daughter in Australia and a sister-in-law, to whom we offer our deepest sympathy. G.K.K.

S. T. G. WESTON, G6WS

On 23 February, 1967, Stanley T. G. Weston, G6WS, passed away after a sad and protracted illness.

Stan served with the Royal Flying Corps in World War I and was a great friend in those early postwa-r years when 1000m and 440m were amateur bands. Happy memories of basket coils, shellac, polished ebonite, Croydon telephony, Nauen, Eiffel Tower, Poldhu and Dutch concerts are recalled—days shared with Stan who was a neat and careful craftsman. Licensed in 1926 as G6WS, Stan's activity lessened in recent years, but he was always a keen constructor.

His many friends will be sad to lose yet another " Old Timer "—a kind and gentle person whose quiet ways endeared him to all who met him. Our sympathy goes out to his widow in her sadness. L.E.N.

Redbourn Annual Fair

This year's Redbourn Annual Fair will be held on 29 May, 1967. In addition to the usual attractions associated with fairs one or two unusual features have been arranged. Highlight of the day will no doubt be Greyhound racing supported if all goes to plan by the landing of an aerobatic glider piloted by G3KPF. GB3RED will be operational from Sunday, 28 May, on Top-Band talking-in visiting mobiles and on one of the h.f. bands depending on propagation conditions at the time. A special QSL card will of course be used to acknowledge all contacts with the exhibition station. It is also proposed to hold a D/F hunt if sufficient entries are received.

Special Activity Station G3TGS/A

The Baden-Powell House Scout Amateur Radio Group will be operating G3TGS/A from the Royal Exchange, in the City of London, during the " Venture 1967 Exhibition " to be held from 3-5 April, 1967 from 10.30 a.m. to 4.30 p.m. each day. The station will operate on h.f. bands s.s.b. as conditions permit.

The exhibition is organized by the Royal Exchange, Bank of England and Westminster Bank Scout and Guide Societies to show the public some of the many activities enjoyed by the members of both movements. The exhibition is open to the public each day.

RAE Course for North London

Southgate Technical College, which is already an examination centre for the RAE is prepared to offer a course of instruction leading-up to the May, 1968 examination provided there is sufficient support. Possible candidates for the course are invited to write to the Head of the Electrical Engineering Department, Southgate Technical College, High Street, London, N14, as soon as possible. The Principal of the College, Mr W. A. G. Easton, MA (Cantab) C. Eng., is a member of the City and Guilds of London Institute Advisory and Moderating Committees for the Radio Amateurs' Exhibition.

Pirates Fined

As a result of Post Office enquiries into the suspected unlicensed use of wireless telegraphy transmitting equipment, the following convictions have been obtained.

On 25 January, 1967, at Stratford Magistrates Court a Mr Francis Christopher Scott, of 20 Wolsey Gardens, Barkingside, Ilford, Essex, was convicted on a charge of using wireless telegraphy transmitting apparatus without the appropriate licence, contrary to the provisions of Section 1 of the Wireless Telegraphy Act, 1949. He was fined £10 and ordered to pay £3 3s. costs.

On 3 February, 1967, at Harrow Magistrates Court, a Mr Ronald Allan Sylvester, of 107 Malvern Gardens, Kenton, Harrow, Middlesex, was convicted on a similar charge. He was fined £10 and ordered to pay £5 5s. costs.

On 8 February 1967, at Nottingham Magistrates Court a Mr Michael Holt, of 8 Rivergreen, Clifton Estate, Nottingham, was convicted on a similar charge. He was fined £10 and ordered to pay £5 5s. costs and £2 2s. Advocates fee and to forfeit the equipment to the Postmaster General.

On 15 February, 1967, at West Ham Magistrates Court a Mr Anthony William Storey of 12 Paul Street, Morden, E15, was convicted on charges of installing and using wireless telegraphy transmitting apparatus without the appropriate licence, contrary to the provisions of Section 1 of the Wireless Telegraphy Act, 1949. He was fined £10 on each of the two charges.

On 24 February, 1967, at Neath Magistrates Court, a Mr Colin Phillips, of 56 Park Avenue, Lonlas, Skewan, Neath, Glamorgan, was convicted on two similar charges. He was fined £5 on each charge.

Society Affairs

A MEETING was held on Friday, 3 February, 1967, and was attended by The President (Mr A. D. Patterson in the Chair), Messrs B. Armstrong, N. Caws, J. Etherington, J. C. Foster, J. C. Graham, E. G. Ingram, L. E. Newnham, J. F. Shepherd, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, G. Twist, E. W. Yeomanson (Members of the Council), Mr D. W. Robinson (Assistant to the General Manager) and Mr H. J. Hallen (Headquarters staff).

Apology for Absence was submitted on behalf of Mr J. A. Rouse.

Welcome to New Member. The President exended a welcome to Mr B. Armstrong as a new member of Council.

Membership and Affiliation

The Council elected 84 new members (69 Corporate and 15 Associate) and accepted eight applications for transfer from Associate to Corporate grade.

Affiliation was granted to the following:

Weston-super-Mare Radio Society.
Jersey Amateur Radio Society.
" 73 " Single Sideband Society.

Region 3 ORM

The Council were pleased to accept the offer of the Regional Representative, Mr R. W. Fisher, G3PWJ, to hold an Official Regional Meeting at the North Midland Mobile Rally at Drayton Manor Park on 30 April, 1967.

Contribution to The Edward Appleton Memorial Trust

It was agreed to contribute the sum of £25 to the above Trust. The first purpose of the Trust will be to establish Appleton Scholarships which initially will be available for work in the Edinburgh University Settlement. After a year's experience in settlement work they will make available their experience in territories overseas, especially in the developing countries.

Parliamentary Questions

The content of two Parliamentary Questions to be asked on 2 February and 9 February was tabled and it was reported that the Society was in touch with Mr G. D. Wallace, M.P.

The two questions and replies thereto are as follows:

Mr Dodds-Parker asked the Postmaster-General why he is now endorsing the clause in the amateur sound licence " A " which imposes a speed of not more than 12 words per minute in sending the station call-sign; and whether he will bring the rule into line with more accepted rates of transmission.

Mr Edward Short: There is no new policy in respect of this rule; amateurs have been required to comply with it since 1 June, 1954. I think it is a sensible rule and I have no reason to suppose that it is not acceptable to amateurs generally.

* * *

Mr Harold Walker asked the Postmaster-General if he will remove the compulsory Morse test from the " A " Licensing condition for amateur radio transmission.

Mr Edward Short: No. We have an obligation under the International Radio Regulations to require applicants for the " A " licence to pass a Morse test, but I am prepared to consider how the licence conditions might be made less burdensome.

Citizen's Band

Attention was drawn to an article in *Electronics Weekly* dated 1 February in which the Communications Editor dealt with the advisability of establishing a citizen's band.

Four Metre Band Plan

After considerable discussion the Council accepted the Recommendation of the V.H.F. Committee in connection with a band plan for a trial period of six months (See page 158 of the March 1967 BULLETIN).

Minutes of Meetings of Committees

Minutes of the following Committee Meetings were received as reports: RAEN (3.12.66), V.H.F. Contests (29.12.66), H.F. Contests (12.1.67).

The Council was in session for 3 hours.

Headquarters Fund List No. 32

The following are additions to the list of those who have contributed to the Fund.

H. W. Rees, G3HWR, R. J. C. Broadbent, G3AAJ, H. J. Platt, BRS25243.

Total amount contributed to date: £2273 0s. 2d.

Affiliated Society

The following society is now affiliated to RSGB.

JERSEY AMATEUR RADIO SOCIETY:

H. J. Phillips, GC3PRA, Decca Navigator Station, Tas-de-Geon, Trinity, Jersey.

Area Representative

The following member has been appointed an Area Representative:

CRYSTAL PALACE

T. Knappett, 279 Brownhill Road, Catford, London, SE6.

Affiliated Society Representative

The following has been appointed an Affiliated Society Representative:

STOCKPORT RADIO SOCIETY:

E. C. Wizzell, 54 Clarendon Road, Hazel Grove, Stockport.

Amateur Radio Call Book

The following are corrections to the 1967 Edition of the RSGB *Amateur Radio Call Book.*

9M2DQ, J. C. Pershouse, Baling Estate, Kuala Ketil, Kedah, Malaysia.

G8UA, H. Tee, 33 Red Lees Road, Cliviger, Burnley, Lancs.

G3FFL, J. H. O. Parker, Braye Cottage, Hoselands Hill, Hartley, Dartford, Kent.

G3LEQ, G. L. Adams, 6 Carrington House, Windsor Road, West Mersea, Nr. Colchester, Essex.

GI3LEQ, G. L. Adams, " Donegal," Bayview Road, Bangor, Co. Down.

GM3LWS, E. H. Ross, 24 Fttrick Way, Glenrothes, Fife.

G3MRD, R. H. Wright, o/b/o/ Kingston-upon-Hull, College of Technology, Queens Gardens, Kingston-upon-Hull, Yorks.

G3SCW, R. Hooper, Railway Station House, Tavistock, Devonshire.

G3VIJ, G. W. Perkins, 35 Kingstown Road, Carlisle, Cumberland.

G3VNX, A. R. Uwins, Ravenscourt, Grange-over-Sands, Lancashire.

CLUBROOM

A Monthly Survey of Club and Group Activities

For further information on membership or the activities of a particular club, application should be made to the person whose call-sign is indicated at the end of the item. Full addresses may be obtained from the RSGB Amateur Radio Call Book.

It would seem from one or two contributions this month that the younger members of clubs, who have by many in the past been regarded as inferior, are playing a more useful part in local club life. If this line continues let's hope that no further letters will be received from SWL's commenting that they were not even permitted to touch the club's HRO—in case they damaged it!

Addiscombe ARC continues to meet on the second and fourth Tuesdays of the month, with a club net on Sundays at 14.30 local time on 1915 kc/s. The club recently enjoyed a lecture on RTTY and further talks are being arranged for future meetings. *G3VLJ.*

Baden-Powell House SARS recently spent a weekend at the Air Scout Base at Lasham, Hampshire. The club station was operated at intervals during the weekend between talks on " Radio in Aircraft " and films on Aircraft and Zeppelins through the ages. This Scout Station always welcomes contacts with other Scout organizations, who if interested should write to the Hon. Secretary, A. H. Watts, G3FXC, Baden-Powell House, Scout Amateur Radio Station, Queen's Gate, South Kensington, London, SW7. *G3FXC.*

From **Basildon & DARS** comes a new Newsletter. In the first issue the Editor introduces himself and at the same time requests information, articles, etc., for inclusion in future editions. Some worthy comment is passed on various topical subjects and if this first edition is anything to go by future editions should be well worth receiving. *G3IJB.*

Bedford & DARC had the misfortune to lose its meeting place, and for some weeks had been seeking a new Headquarters. However a new QTH was found and meetings now take place at the Dolphin Inn, Broadway, Bedford. *G3BVA.*

Summer came a little early to the **South Birmingham RS** when in February Bunny Summers, G5SS livened up the evening with his talk " How not to get TVI and how to cure it when you have it." Tom Douglas, G3BA, of the BBC will talk on v.h.f. transverters during the April meeting which will be held on 19 April. *G3OMG.*

Cambridge and District ARC held its AGM on 3 March when S. J. Granfield, G5BQ, was re-elected President and H. C. L. Barnett, G2AIQ, Honorary Secretary. Visitors are always welcome at club meetings and all cordially invited to attend. *G5BQ.*

Chelmsford ARS met on 7 March for a talk entitled " Sparks—plain or coloured," when Stan Woods gave a talk on radio from 1901 to 1914, bringing as a demonstration piece an original Coherer. A " mini D/F Hunt " was arranged for 2 April, with G3VCH/P as the hidden station. This contest was to prepare members for the first full scale Hunt of the season on 23 April, when G3EIX/P and G3PDK/P will try and out fox the hounds! *G3RZP.*

Cheltenham. At a combined meeting of the Cheltenham Amateur Radio Society and Cheltenham RSGB Group, specially convened to discuss the possibilities of merging the two clubs, a majority voted in favour of the move. It was then resolved to elect three members from each to make decisions on outstanding points. The highlight of the meeting was a plea from C. F. Atkins, G3HCV, for all members to forget past differences and combine for the general good of Amateur Radio in the area. On 2 March a very poor attendance greeted the Sigurney of S. Smith and Sons, who delivered a talk on integrated circuits to the group. *G3CGD.*

At the February meeting of the **Cheshunt and District RC,** John Johnson, G3TZZ talked about radio control, explaining some of his circuits and techniques. He also took along a number of exhibits, including receivers, transmitters, encoders and decoders. Most spectacular of the exhibits was a model control aircraft which was demonstrated (not flying of course). *G8ASB.*

Chiltern ARC met on 23 February when the guest speaker G. T. Peck gave an extremely interesting talk on D/F Techniques illustrating his experiences in this field from the late '20's to the present day with slides of Press photographs and circuit diagrams. Following a question and answer session National D/F Champion Eric Mollart was invited to give a running commentary on an excellent colour film of D/F events. *G3UJK.*

Derby and District ARS's President, A. G. G. Melville, FRCSE, presenting his trophy to A. Hitchcock, G3ESB, winner of the 1966 Direction Finding Contest.

(Photo by G3SZJ)

Cornish RAC held its Annual Dinner on Friday, 17 March. Activities are well spread over the month, there being only one Thursday free, and it is hoped that this will soon be filled by the Falmouth Group. The S.S.B. and V.H.F. Groups hold separate meetings, but being directly associated with the parent Club, all members attend the monthly main club meeting. At the March meeting 65 members and friends were present to hear Brad Butcher, W9WPV, talk on " Ham radio state-side." It would appear that Amateur Radio is not the rat race here that it is in USA. Let's keep it that way! If you want a healthy and successful club keep it active, and cater for all members. *G3NKE.*

Crawley ARC entered three stations in the RSGB Affiliated Societies' Contest on 14-15 January thus " giving many of the club's c.w. operators the opportunity to brush up on their contest operating." Better to brush up first! A construction contest was won by A. Jones, G3SGA with a transistorized v.h.f. receiver.

Cray Valley RS experienced its first tape lecture at the February meeting and comments very favourably on both audio and visual quality. *G3DNC.*

Derby and District ARC reports a small drop in membership during 1966 to 175. It was also decided to discontinue Direction Finding practice events until the demand increases and the insurance problems are solved. The society is also finding security in having sound funds, which as some smaller clubs may not appreciate allows great flexibility in club events. *G2CVV.*

Dorking and District RS met last month and discussed various forthcoming contests with the view of participating in the forthcoming year. Later in the month it enjoyed a well presented talk by G3HWR on 23cm operation. *G3MBK.*

Dudley ARC in *Local Oscillator* under review prints a practical article entitled " Let's go on two," by R. Fisher, G3PWJ, a step by step feature on getting started on 2m. The Dudley ARC should be congratulated on a well produced Newsletter.

Echelford ARS were recently visited by Mr E. Knight of BOAC who in the short time available managed to cover many aspects of h.f. and v.h.f. communications systems including D/F and navigational arrangements and the instrument landing procedure. It is hoped a return visit may be made in the future to discuss such aspects as LORAN. *G3HZL.*

Edgware and District RS met in February, when G3NYK lectured on Transistor Production and Testing. Congratulations

are also due to one of the younger members Steven Marcus, now G3WCW, on obtaining his Ticket. *G3FKI.*

Grafton RS met on each of the four Fridays during February, 3 February being the first Friday in the month, was, as usual, devoted to " Short Wave Listeners' Corner," conducted by G3KRH. This monthly feature usually attracts a good number of SWLs and RAE students and the February meeting was no exception. This was followed on 10 February by a technical film show which was well received. A Question and Answer session on 17 February produced the usual batch of unanswerable questions! The month ended on 24 February with a practical evening during which the committee met yet again in order to finalize arrangements for celebrating the Society's 21st Anniversary during April. *G3SIL.*

Hemel Hempstead ARS has recently been formed to cater for enthusiasts in and around this town. The inaugural meeting took place on 3 March when it was hoped sufficient response would be forthcoming to warrant further meetings. In the meantime the Acting Secretary is J. B. Adams, 8 Lindlings, Chaulden, Hemel Hempstead, to whom all correspondence should be addressed.

Hull and District ARS held on 24 February an open night, which attracted a number of visitors from which a further seven new members were elected. For the SWL, Morse classes are regularly run with the RAE tuition commencing in May. *G3NOP.*

In June 1966 the **Kendal ARS** was formed under the Chairmanship of Cliff Thomas, G3JGP, with only six members. During a visitor's night on 22 February, membership rose 300 per cent to 17, despite torrential rain during the evening. Congratulations to G3WBZ for getting his ticket. *G3VEC.*

Lichfield ARS is yet another Society which has passed through another AGM, when the following were elected to serve on the committee; President, G3NLY, Vice-President G3LNN, Secretary, G3PFT, Treasurer, G3UHP, Chairman, G3UMK, and two ordinary committee members G3OMT and G3KDB. *G3PFT.*

Lothians Radio Society is looking forward to a busy summer with the V.H.F. Convention coming up, also preparations for NFD. In May and June members can look forward to lectures on electronic organs and radio astronomy. Also planned is a station to be run during the Edinburgh Festival in August. *GM3PSP.*

Oxford University ARS comments, " like the sunspots, that this club has had a period of rather low activity "—but with acquisitions of equipment including an AR88, double beam oscilloscope, HRO and VTVM. Operation has commenced on 160m and 80m and plans are afoot for s.s.b. operation on the h.f. bands. Informal meetings are held every lunch hour in the club room in the University Union. Do you attend? *G3UJI.*

Following its AGM, **Mansfield ARS** has decided to double its meetings to the first and *third* Fridays each month. On 7 April a commercial transistor tester will be the subject of the evening when members are invited to test their own devices. *G8HX.*

Like the Mansfield ARS the **Medway ARTS** has just completed its AGM. Unfortunately the Society has now been given notice to leave its present QTH. Anyone any suggestions? *G3UXH.*

Norfolk ARC reports the club station to be on the air again manned by more than a score of operators. *G3PNR.*

North Kent RS met on 12 January when Lyell Herdman, G6HD, spoke on modulation, a subject on which he was obviously well informed, judging by P. T. Baber's report in North Kent RS Newsletter. Unlike other newsletters it would appear from an editorial that the Editor is getting an influx of contributions thus saving him from writer's cramp!

Northern Heights ARS met recently when a couple of members talked on their experiences while visiting various mobile rallies during last season. Also shown was a film taken by G3UBI and G3UGF during an expedition to Ireland last year. The transmitter fund was boosted as a result of a sale of surplus equipment conducted by G8CB. *G3MDW.*

North West V.H.F. Group is now meeting weekly on Tuesdays. In addition to this two additional events have recently been supported with great enthusiasm, the first being the 144 Mc/s C.W. Contest and the other a Dinner and Social Evening. Immediate club projects are to complete 432 Mc/s and 1296 Mc/s gear adding to present 70 and 144 Mc/s equipments.

Purley and District RC comments on the excellence of a lecture by a young SWL on the Decca Navigator. Club nets continue on Sunday mornings at 1980 kc/s and Wednesday evenings 70·32 Mc/s. *G3FTQ.*

The eighth Annual Dinner and Dance of the **Reigate ATS** was held on 24 February and was apparently acclaimed a complete success. Guests of Honour were J. C. Graham, G3TR, Vice President of RSGB and Ron Vaughan, G3FRV, Honorary Secretary of the Crawley ARC. It was also announced that the first recipient of the Denis Thom Memorial Cup was G. E. Mac'Krell, G3KAX, in appreciation of his work towards the Society before he moved to the Falkland Islands last November. *G3FRV.*

The first meeting of the newly formed **Rhyl and District ARC** was held on Tuesday 14 February at the new club room, off Windsor Street, Rhyl. A total of 29 enthusiasts attended, when among other activities the club 160m station using the call-sign GW3JGA/A was put on the air making several contacts with local stations. Other demonstrations included homebuilt equipment of various kinds. Slow Morse classes are being arranged for those interested and it is hoped that RAE classes will be included in the 1967-68 session. On 21 February 20 members paid a visit to the Moel-y-Parc BBC Television Transmitting station near Caerwys, Denbighshire. Great interest was shown in the duplicated equipment and automatic change-over arrangements. Thanks are due to Mr W. Buckley and Mr R. Taylor who made the visit so enjoyable. *GW3UTG.*

From *Tamar Pegasus*, Journal of the **Saltash and District ARC**. we extract the following: The Perfect Ham.

It came to my head, when lying in bed,
a question which peeves me a lot—
Why do some hams act like thick lambs
and tune up on " any old spot "?
You may ask " Why? ", it may make you cry,
when you can't hear the DX underneath.
You might feel like a killer,
'cos you can't hear Don Miller,
Who's calling CQ from a reef!

J. TOZER.

Silverthorn RC welcomed G3JDG of *Practical Wireless* editorial staff on 3 March, when he gave a humorous and instructive talk, with relevant exhibits, on construction. *G3SGF.*

Skegness and District Group will be holding its annual spring Junk Sale and Hamfest at the Bull Hotel, Halton Road, Spilsby on Friday, 21 April, 1967, to commence at 7 p.m. All the popular facilities will be available for an admission charge of 2s. 6d. *G2ABK.*

Spen Valley ARS met on 2 February when G3GJV spoke on transistor control systems for cars. On 16 February S. Marsden of West Riding Electronics gave an interesting account on the development of semiconductors, followed a week later by a talk on electronics counting by J. E. Sugden of Research Electronics, who brought along several pieces of demonstration equipment. *G3JQC.*

Surrey RCC have an interesting constructional project afoot. At present, however, G3TPK is being used as a guinea pig to sort out problems that might occur during the construction of the G3OQD transceiver. Careful notes are being kept of any difficulties experienced in obtaining components, layout, alignment, etc., and eventually it is hoped to offer benefits thus derived to would-be constructors. *G3KGA.*

Sutton Coldfield RS were given a talk entitled " Mobile on the Continent " by G3BHT to a meeting on 13 February. The talk contained useful information on how and where to apply for licences, and was of interest to all who attended. *G3LNN.*

Thames Valley ARTS has a new venue at the Court Restaurant, Hampton Court. On 5 April K.W. Electronics will lecture on their new receiver. *G3JKA.*

Torbay ARS is holding its AGM in April. All members should attend. *G3LKJ.*

Verulam RC's last two monthly meetings have shown evidence of their committee's promise to secure top-line speakers for the club. In January, members welcomed again RSGB Council Member John Swinnerton, G2YS, who provided a lively account of his recent trip to the USA, illustrated with colour slides. John's description of the more zaney aspects of the " American-way-of-life " provided an entertaining evening for all, while the more serious-minded and dedicated members found food for thought in his account of several amateur stations he visited, and operated, during his trip. A kilowatt plus a full-sized rotary on an 85 ft. tower is now very much the rule rather than the exception, it seems!

The February gathering was made notable by the appearance of Arnold Mynett, G3HBW, who was billed to talk about " FETs and all that." To everyone's delight Arnold also described a whole range of transistorized gear he had designed during the past few years including a click-free fast-response

(Continued on page 271)

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. Standing instructions cannot be accepted.

REGION 1

Ainsdale (ARS).—5, 19 April, 3 May, 8 p.m., 77 Clifton Road, Southport.

Allerton (Liverpool) (SRHS).—Thursdays, 8 p.m., 3rd Allerton Scout Group Headquarters, Church Road, Woolton, Liverpool.

Ashton under Lyne (AUL & DARS).—Fridays, 7 p.m., Rooms F52 and F53, Ashton College, Beaufort Road.

Blackburn (ELARC).—6 April (Constructional Competition), 4 May (Talk by G2HFP), 7.30 p.m., YMCA, Limbrick, Blackburn.

Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 p.m.

Bury (B & RRS).—11 April, 9 May, 8 p.m., Old Boars Head Hotel (private room), Crompton Street.

Chester (DARS) —11 April (Film Show by BICC Ltd.), 18 April " Workshop Practice," by G3TNN), 21 April (Society Dinner), 25 April (Lecture), 8 p.m., YMCA Chester.

Crewe & District.—1 May, 8 p.m., Earl of Crewe Hotel, Nantwich Road.

Eccles (E & DRC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft. Every Thursday, club Top Band net 20.30 hours.

Liverpool (L & DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.

(ULARS).—7.30 p.m., Students' Union, 2 Bedford Street North, Liverpool 7. No more meetings until October owing to examinations.

Macclesfield (M & DRS).—11, 25 April, 9 May, 8 p.m., The George Hotel, Jordangate.

Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.

(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.

Morecambe.—5 April, 3 May, 125 Regent Road.

North West V.H.F. Group.—Tuesday, 8 p.m., Club Headquarters, Chapeltown Street, Manchester 4.

Preston (PARS).—11, 25 April, 9 May, 7.30 p.m., St. Paul's School, Pole Street.

St. Helens (SES).—18 April, 2 May, 7.30 p.m., IVS Centre, 55 College Street.

Southport (SRS).—Wednesdays, 8 p.m. and Sundays, 4 p.m., The Esplanade.

(73 S.S.B. Society).—Tuesdays (all commencing with a talk on part of the RAE Syllabus), 8 p.m., 73 Avondale Road North, Southport.

Stockport.—5, 19 April, 3 May, The Blossoms Hotel, Buxton Road.

Warrington—Culcheth (CARC).—Fridays, 7.30 p.m., The Harrow Inn, Culcheth.

Wirral (WARS).—5 April (Talk by H. Schroeder), 19 April (Talk by G3JIR), 3 May, 8 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley (B & DARC) —14 April (" S.S.B. Transmitter," by G3GJF), 28 April (" A Simple 4 meter transceiver," by G3GNK), 7.30 p.m., King George Hotel, Peel Street.

Bradford (BRS).—11 April (" IBM Computers at Work," W. G. Scarlett, G3RXS), 26 April (Radio Astronomy visit to Northern Heights ARS), 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford.

Hull (H & DARS) —7 April (" Marine Procedure," by G3NOP), 14 April (Approach to receiver fault finding,' by G3RDM and G3PQY), 21 April (" Mathematics of Radio," by G3TEU), 28 April (" Current Workshop projects—2m converter & G2DAF transmitter), 8 p.m., 592 Hessle Road, Hull.

Northern Heights.—12 April (AGM), 26 April (" Lightening—its nature and effects," by K. Walton, G3IKS), 7.45 p.m., Sportsman Inn, Ogden, Halifax.

Scarborough (SARS).—Thursdays, 7.30 p.m., rear of 3 Trinity Road, Scarborough.

South Shields (SS & DARC).—7 April (" Safety precautions," by J. Corston, G2BCY), 8 p.m., Trinity House Social Centre, Laygate, South Shields.

York (YARS).—20 April (Visit to York Telephone Exchange), Thursdays, 7.30 p.m., 61 Micklegate, York.

REGION 3

Birmingham (BRS).—7 April, 8 p.m., 14 April (" Audio "), 21 April.

(MARS).—Third Tuesday in the month, 7.45 p.m., Midland Institute.

Birmingham (SBRS) —19 April (" V.H.F. Transverters," by Tom Douglas, G3BA), 8 p.m., The Scouts Hut, Pershore Road, Selly Park, Birmingham 29.

Bromsgrove (B&DARC).—Second Friday in the month, 8 p.m., Co-op Hall.

Cannock (CCARS).—First Thursday in the month, Bridgtown Social Club, Walsall Road, Cannock.

Dudley (DARC).—7 April, 21 April, 8 p.m., Art Gallery, Dudley.

Leamington Spa (MWARS).—10 April (" Mid Canada Radar System," by G3VLG), 24 April (Junk Sale), 8 p.m., 7 Regent Grove, Leamington Spa.

Redditch (EWARG).—13 April (" V.H.F." by T. P. Douglas), 8 p.m., Old People's Centre, Park Road, Redditch.

Salop (SARS).—13 April (Construction Competition), 27 April (Sale of Surplus Equipment), 7.30 p.m., Old Post Office Hotel, Milk Street, Shrewsbury.

Stratford (S-u-A & DRC).—6 April, 20 April, 8 p.m., Halls Croft, Old Town.

Sutton Coldfield (SCRS).—10 April (" Radio Interference," by G3AYJ), 26 April (Natter Night), The Fox, Walmley, Sutton Coldfield.

Wolverhampton (WARS).—17 April " The RSGB. Is it a good thing? " (Discussion), 8.15 p.m., Nechells Cottage, Stockwell, Road.

Worcester (W & DARC).—23 April (Constructional Contest), 8 p.m., (Informal meetings each Saturday 8 p.m.), 35 Perdiswell Park, Droitwich Road, Worcester.

REGION 4

Derby (D & DARS).—5 April (Surplus Sale), 12 April (RAE Demonstration " Key Click Filters "), 19 April (Mobile Rally Meeting), 26 April (Technical Film Show), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.

Grimsby (GARS).—6 April and 20 April (Informal), 8 p.m., Grimsby Model Engineers Club Room, Fletcher's Yard, Wellowgate, Grimsby.

Heanor (H & DARS).—11 April (coffee evening in the Refectory), 18 April (sale of Surplus), 25 April (Demonstration of Radio Controlled models), 7.30 p.m., Room No. 14, South East Derbyshire College of Further Education, Ilkeston Road, Heanor.

Leicester (LARS).—Mondays (7.30 p.m., Slow Morse Practice), Sundays (10.30 a.m., Informal), Club Room, Old Hall Farm, Braunstone Lane, Leicester.

Loughborough (LARC).—Fridays (7.30 p.m., Informal), Club Room, Bleach Yard, Wards End, Loughborough.

Mansfield (MARS).—7 April (Informal), 7.30 p.m., New Inn, Westgate, Mansfield.

Melton Mowbray (MMARS).—20 April (Shack visit to G4MK) assemble at 7.30 p.m.

Newark (NSWC).—Mondays, Thursdays, 7.30 p.m., The Guildhall, Guildhall Street, Newark.

Nottingham (ARCN).—Tuesdays, Thursdays, 7.30 p.m. Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.

Peterborough (P & DARS).—Fridays (8 p.m., Informal), Old Windmill, behind The Peacock Inn, London Road, (opposite Murkitts Garage).

Worksop (NNARS).—Tuesdays (RAE Class), Thursdays (Lecture Night), 7.30 p.m., Club Room, 13 Gateford Road, Worksop.

REGION 5

Bedford (B & DARC).—New HQ " Dolphin Inn," Broadway, Bedford. Programme from G3BVA.

Cambridge (C & DARC).—7 April (Bumper Junk Sale), 14 April (Informal), 21 April (" The Sommerkamp Transceiver " by Brian Armstrong G3EDD), 28 April (Informal). Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.

Luton (L & DARS).—Tuesdays, 8 p.m., ATC Headquarters, Crescent Road, Luton, Bedfordshire.

March (M & DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, High Street, March, Isle of Ely.

Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Hertfordshire.

Shefford (S & DARS).—6 April (" Demonstration of Test Equipment," by G3EUS), 13 April (" Advances in Medicine," by Club President, Mr. Howlett), 20 April (" Test Field Day Transmitter "), 27 April (" C.W. Operation Proceedure " by G2DPQ), 7.45 p.m. Church Hall, High Street, Shefford, Bedfordshire.

REGION 6

Cheltenham RSGB Group —6 April (Junk Sale), 8 p.m. First Thursday each month, 8 p.m., Great Western Hotel, Clarence Street, Cheltenham.

Gloucester (ARS) —13, 27 April, 7.30 p.m., Lamb Inn, Market Parade.

REGION 7

Acton, Brentford and Chiswick (ABCRC) —18 April (Discussion-Members problems), 7.30 p.m., Chiswick Trades and Social Club, 66 High Road, Chiswick.

Ashford (Middlesex) Echelford (ARS) —13 April (RAE), 27 April (AGM), 7.30 p.m., St. Martins Courts, Kingston Crescent, Ashford.

Bexleyheath (NKRS) —13 April (" Basic Principles of Colour TV "), 27 April (Jennings Musical Instruments), 7.30 p.m., Congregational Church Hall, Chapel Road, Bexleyheath.

Chingford Group —Alternate Fridays, 7, 21 April. G3EHD SIL 5642.

(SRC) —Fridays (except 1st in month), 8 p.m., Friday Hill House, Simmons Lane, Chingford, E4.

Croydon (SRCC) —18 April, 7.30 p.m., Blue Anchor, South End.

Dorking (D & DRS) —11 April (Informal Meeting), 8 p.m., Wheatsheaf, 25 April (Formal Meeting), 8 p.m., Star & Garter, Dorking.

Ealing (E & DARS) —Tuesdays, 7.30 p.m., Northfields Community Centre, Northcroft Road, Ealing, W13.

East Ham —First & third Tuesdays, 7.30 p.m., 12 Leigh High Road, East Ham.

East London RSGB Group —Sunday, 16 April (W1BB Tape and Slide Lecture), 2.30 p.m., Wanstead House, The Green, Wanstead, E11.

East Molesey (TVARTS) —First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.

Edgware & Hendon (E & DRS) —10 April (Discussion-Preparation for NFD), 24 April (" U.H.F. and Amateur T/V " by G6RNK/T), 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.

Gravesend (GRS) —Third Wednesday each month, 7.30 p.m., RAFTA Club, Overcliff Road.

Guildford (G & DRS) —14, 28 April, 8 p.m., Guildford Model Engineering Society, in Stoke Park.

Harlow (H & DRS) —Tuesdays, Thurdsays, 7.30 p.m. Mark Hall Barn, First Avenue.

Harrow (RSH) —Fridays, 7, 14 April (Practical Morse and RAE), 21, 28 April, 8 p.m., Roxeth Manor School, Eastcote Lane.

Havering (H & DARC) —12, 26 April, Romford.

Holloway (GRS) —7 April, 7.30 p.m. (" SWL Corner," by G3KRH—RAE Classes Mondays). Wednesdays (7.30 p.m. Morse), Friday 14 April (Practical Evening), 21 April (" Lasers," by G. A. Clarks of GPO Research Station, Dollis Hill), 7.30 p.m., Montem School, Hornsey Road.

Hounslow (HDRS) —6, 20 April, Canteen Mogden Main Drainage Department, Mogden Works, Isleworth.

Ilford —Thursdays, 8 p.m., 103 Heath Road, Chadwell Heath.

Kingston (K & DARS) —Second Wednesday each month, 8 p.m., YMCA, Eden Street.

Leyton & Walthamstow —4, 18 April, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E10.

London U.H.F. Group.—First Thursday each month, 7.30 p.m., White Hall Hotel, Bloomsbury Square, Holborn.

Loughton.—7, 21 April, 7.30 p.m., Meeting alternate Fridays, Loughton Hall (Nr. Debden Station).

Maidenhead (M & DARC).—18 April, 7.30 p.m., Victoria Hall, Cox Green, Maidenhead.

New Cross.—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, SE14.

Norwood and South London (CP & DRS).—15 April (" New Semi-conductor devices," by G. M. C. Stone, G3FZL), 8 p.m., CD Centre, Catford, London, SE6.

Paddington (P & DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W2.

Purley (P & DRC).—7, 21 April, 8 p.m., Railwaymen's Hall, Side entrance, 58 Whyteclifte Road, Purley.

Reigate (RATS).—12 April (" IARU," by G3FZL), 8 p.m., George & Dragon, Cromwell Road, Redhill.

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

Science Museum '(CSRS).—11 April (" American space efforts," by USA Information Services), 6 p.m., Science Museum, South Kensington.
Scouts (ARS).—20 April (" Introduction to V.H.F.," by Arnold Mynett, G3HBW), 7.30 p.m., Baden Powell House, Queensgate, South Kensington, SW7.
Sidcup (CVRS).—6 April (AGM), 8 p.m., Congregational Church Hall, Court Road, Eltham. 20 April (Natter Night), 8 p.m., All Saints Church Hall, Bereta Road, New Eltham.
Slough (SDR Group).—First Wednesday every month, 8 p.m., United Services Club, Wellington Street.
South London Mobile Club.—8 April (Mobile Talk), 22 April (AGM), 7.30 p.m., Clapham Manor Baths, SW4.
Southgate & District.—13 April, 7.30 p.m., Parkwood Girls School (behind Wood Green Town Hall).
St. Albans (Verulam ARC).—19 April (R. C. Hills, G3HRH talking about his solid state V.H.F. receiver), 7.30 p.m., Cavelier Hall, Watford Road, St. Albans.
Sutton and Cheam (SCRS).—18 April, 8 p.m., The Harrow Inn, High Street, Cheam.
Welwyn (Mid Herts ARS).—13 April (" Video tape recordings," by Don Callender, G3GDA), 8 p.m., Welwyn Civic Centre, Welwyn.
Wimbledon (W & DRS).—14 April, 8 p.m., Community Centre, St. Georges' Road, Wimbledon, SW19.
Wembley (GECARS).—Thursdays, 7 p.m., Sports Club, St. Augustin Avenue, North Wembley. This club is now open to non-G.E.C. employees by invitation. Telephone ARNold 1262 first.

REGION 8

Crawley (CARC).—12 April (Informal), for details contact G3FRV, 26 April (Junk Sale), 8 p.m., Trinity Congregational Church Hall, Ifield.
Mid-Sussex(M-SARS).—5 April (" The G3HTA Receiver," by G3VAK), 19 April (" S.S.B. Transmitter Part 2, by G3RMY), 8 p.m., Lindfield Primary School, Haywards Heath.
Worthing (W & DARC).—11 April (" Dual Standard Television," by D. R. Topping Esq., Chief Engineer Gosport Unit, Ultra Radio & Television Ltd.,), 9 May (NFD Discussion), 8 p.m., Rose Wilmot Centre, Worthing.
Medway (MARTS).—30 April (Mobile Rally at Higham Kent), New Club QTH to be announced shortly.

REGION 9

Bath.—21 April, 7.30 p.m., RNR Training Centre, James St. West, Bath.
Bristol.—21 April, 7.30 p.m., Transport House, Victoria Street, Bristol 1.
(BARC).—Mondays and Thursdays 7.30 p.m., 43 Ducie Road, Barton Hill, Bristol 5.
Burnham-on-Sea (BoSARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.
Camborne (CRAC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, Nr Camborne.
(CRAC V.H.F. Group).—First Thursday in each month, 7.30 p.m., The Coach and Horses, Ryder Street, Truro.
Exeter.—First Thursday in each month, 7.30 p.m. George and Dragon Inn, Blackboy Road, Exeter.
Plymouth (PRC).—Tuesdays 7.30 p.m., Virginia House, Bretonside, Plymouth.
Saltash (S & DARC).—Alternate Fridays 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.
South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walks, Dorchester.
Taunton.—Alternate Thursdays, 7 p.m., Lecture Theatre, Taunton Technical College.
Torquay (TARS).—Last Saturday in each month, 7.30 p.m., Club HQ, Belgrave Road, Torquay.
Wells (WARS).—Mondays from 8 p.m., EMIE (Wells) Sports and Social Club, Chamberlain Street, Wells, Somerset.
Weston-super-Mare.—First Friday in each month 7.30 p.m., Technical College (Wyndham Hall).
Yeovil (YARC).—Wednesdays 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Blackwood (ARC).—Fridays (" Lecture Programme with section devoted to RAE "), 7.30 p.m., Blanche Cottage, off High Street, Blackwood, Mon.
Cardiff RSGB Group.—10 April (" Life in Australia," by R. M. Morris, GW3HJR), 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 13

Edinburgh (LRS).—13 April (" Aircraft Navigation," by A. R. McWalter, GM3TSZ), 27 April (" Super High Frequencies," by T. Spears, GM3OWI), 7.30 p.m., YMCA South St. Andrew Street, Endiburgh.

REGION 14

Ayrshire (AARC).—5 April, 19 April, 7.30 p.m., Seaforth House, Seaforth Road, Ayr.
Auchenharvie (A & DARS).—6, 11, 13, 18, 20, 25, 27 April, 7.30 p.m., Auchenharvie Community Centre, Stevenston.
Glasgow (GGRSGB).—14, 28 April, 7.30 p.m., Christian Institute, Bothwell Street, Glasgow.
(GURC).—12 April, Engineering North Building, University of Glasgow, Glasgow.
Greenock (G & DARC).—14, 28 April, 7.30 p.m., Arts' Guild, Campbell Street, Greenock.
Motherwell (MRSGB).—21 April (Receiver Alignment), 7.30 p.m., Carfin Hall, Motherwell Road, New Stevenston, by Motherwell.

REGION 15

Belfast and District RSGB Group.—Third Wednesday in each month, 8 p.m., War Memorial Building, Waring Street, Belfast.

REGION 16

Basildon (BDARS).—Details from G3IJB.
Chelmsford (CARS).—2 May, 7.30 p.m. Marconi College, Arlner Lane, Chelmsford.
Great Yarmouth (GYRC).—Fridays 7.30 p.m., The Manager's Office, the Old Power Station, Swanstons Road, Great Yarmouth.
Ipswich (IRC).—26 April, AGM 7.50 p.m., Red Cross HQ, Gippeswyk Hall, Ipswich.
Norwich (NARC).—Meetings every Monday at Old Lakenham Hall, Mansfield Lane, Norwich.

REGION 17

Reading (RARC).—11 April (Constructional Contest and Equipment Exhibition), 25 April (" Buying Surplus Radio Equipment," by G8AAG), 7.30 p.m., St. Pauls Hall, Whitley Wood Lane.

Clubroom

(Continued from page 269)

transistor TR switch rumoured to be the Harrow Club's " secret weapon " on NFD! Supported by an array of his home-built equipment, G3HBW described a novel and effective variable selectivity system he had devised which fired the imagination of many of the contest-minded members. A particularly lucid explanation of FETs formed the main part of the lecture and everyone present now has a much clearer understanding of these new devices.

Verulam's February meeting was concluded with a film show depicting the club's participation in the Redbourn Fair when local members provided a multi-band amateur radio station that aroused great interest. *G3GJX.*

Wolverhampton ARS met on 6 February when Bob Palmer, G5PP, presented yet another of his ever successful mobile lectures. Particular interest was shown to his all purpose test unit which contained many useful ideas which could be adapted for a base station. *G3UBX.*

East Worcester RG reports the success of its AGM held last February (See " Clubroom," page 197, last month for formula). On 13 April Tom Douglas will lecture on a v.h.f. topic. *G3RUK.*

Worthing and District ARC revived on 25 February the Annual Dinner Party and are more than pleased with the results. After G3JHM had welcomed many visitors G3GFN replied on behalf of the many guests. A lecture given on 14 February by G3IWL proved interesting, concluding the evening by displaying one of only two phones made for the de-Rothchild family. These two can be seen in the GPO museum and are dated about 1890. *G3LQI.*

Newsletters were also gratefully received from the **BARTG, Chippenham and District ARC, Crystal Palace and District RC, Echelford ARS, Reigate ATS, Southgate RC, Sutton and Cheam RS, Mid-Warwickshire ARS** and the **Wimbledon and District RS.**

It would be of assistance to the compiler of " Clubroom " if reports could be concise, typed double spaced and submitted before the final deadline if at all possible. In handwritten reports, please spell unusual words in block capitals.

Deadline for the **May** issue is 7 **April** and for the **June** issue **12 May.**

LOOKING AHEAD

30 April.—North Midlands Mobile Rally and Region 3 ORM.
7 May.—Region 1 (NW) Field Day.
13 May.—International V.H.F./U.H.F. Convention.
21 May.—Region 1 (NW) ORM at Southport, Lancs.
13 August.—Region 1 (NW) V.H.F. Field Day.
26 September.—Electronics, Instruments, Controls and Components Exhibition and Convention, Belle Vue, Manchester.

Grafton Radio Society

Way back in 1946, Bill Jennings, G2AHB, invited some 25–30 enthusiasts to meet him on the 12 April at the Grafton School, Eburne Road, Holloway, London, and at that gathering a new London star was born, London's Mecca of Ham Radio, the Grafton Radio Society.

To celebrate its coming-of-age a small Dance/Buffet has been arranged for Saturday, 15 April, at Beale's Restaurant, 368 Holloway Road, London, N7, between 7.30 p.m.–midnight at which it is hoped many of that original gathering will be present to again meet the founder who has promised to attend. As accommodation is somewhat limited, it is expected that all the tickets will be taken up by club members but by the time this appears in print maybe a few tickets at 18s. 6d. single, 35s. double will be available. Please contact the President, G2CJN, 154 Uxendon Hill, Wembley Park, Middlesex, if you are interested.

Can You Help?

● M. R. Kidman, G3SDK, 232 Marsh Road, Leagrave, Luton, who requires information on the A510 transceiver?

● F. H. Hicowe, Box 15, Sorrento, Victoria, Australia, who requires details on the P104 and P38 receivers?

● K. W. Taunton, G3UCZ, 170 Bradford Road, Pudsey, Yorkshire, who requires the official handbook or circuit diagram for the Radiovision Commander receiver?

K.W. Corner

Dartford, Kent

Dear OM,

I am afraid some printing errors crept-in last month and for those interested in NFD the replacement for the 6146 should have been 2E26 (not 2E28) and this valve will of course run at 50 watts D.C. input (not 500 watts). We are getting 2E26's from USA but remember the heater current is different from the 6146. In the KW2000 a parallel ballast resistor is necessary to balance up the 6 volt section of the 12 volt rail. Many readers will be interested to learn how we got along with the Hustler 4BTV vertical aerial. This aerial covers 10-40 metres and 80 metres with a top loaded whip extension. On the whole it worked very well without radials but it is necessary to drive in a good 1⅜ in. dia. earth stake which can be used to mount the aerial on with the "U" clamps provided. This stake should be about 6 ft. long and driven about 4 ft. into the ground. If this aerial is mounted on a roof or pole or above ground it is advisable to fit radials. Always use 52 ohm co-axial cable for the feed. Mentioning feeders, reminds me that we are meeting with a fair amount of success in our KW Balun. This is designed to be fitted on the aerial or Beam at the end of the co-ax feeder to provide a satisfactory match (10-80 metres) from unbalanced feed to a balanced system. It certainly helps with the TVI problem. We can also supply a balun for the TV Aerial which, when fitted, provides a step forward in the elimination of TVI by "shock excitation." Then there is the High Pass Filter, the E-2 Match ATU, the Low Pass Filter and the KW Match SWR Indicator. If you need advice drop us a line. Exports from KW are improving again and last month we shipped no less than 25 KW2000A to Canada, plus some KW201 Receivers and KW Vespa transmitters and we continue to receive unsolicited testimonials. "The KW201 meets and surpasses all you claim for it—an excellent RX"—G3RDU. "The KW2000A excellent appearance and finish—DX stations were worked with remarkable ease. I was complimented on the signal quality and strength"—G3IDW. See you next month after my trip to USA and Canada.

Yours faithfully, **ROWLEY SHEARS** Sgd.
Managing Director, G8KW

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Guide to Amateur Radio (Twelfth Edition)	5/9
S.S.B. Equipment	3/–
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Morse Code for Radio Amateurs (Fourth Edition)	2/–
ARRL PUBLICATIONS	
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Shop and Shack Shortcuts	29/6
73 MAGAZINE PUBLICATIONS	
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S-9 Signals	8/6
EDITORS & ENGINEERS	
Transistor Radio Handbook	42/6
AMERICAN MAGAZINE SUBSCRIPTIONS‡	
CQ (*Cowan*) Monthly (p.a.)	44/–
QST (*ARRL*) Monthly (p.a.)	43/6
Institutions, groups etc. (p.a.)	50/–
73 Magazine Monthly (p.a.)	37/–
‡ *Mailed direct from USA*	
MISCELLANEOUS PUBLICATIONS	
Basic Electronics (*Dover*)	23/6
Basic Electricity (*Dover*)	25/6
Basic Theory and Application of Transistors (*Dover*)	11/6
Dictionary of Electronics (*Penguin*)	8/–
Electrons, Atoms, Metals, & Alloys *(Dover)*	19/6
Foundations of Wireless (*Iliffe*)	22/3
Guide to Broadcasting Stations (*Iliffe*)	6/6
How to Listen to the World (*New Edition*)	26/–
Ham's Interpreter (5th Edition)	8/6
Log Book, 150 pages, opens flat (*Martins*)	22/6
Manual of Transistor Circuits (*Mullard*)	13/6
Outline of Radio and Television (*Hawker*)	34/6
Radio Amateur Operator's Handbook (*Data*)	5/6
Radio Amateur's Vocabulary (German/English)	9/3
Semaphore to Satellite (ITU)	70/–
Short Wave Listening (*Iliffe*)	13/2
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RSGB ANNUAL, 1928; Guide, 2nd (1934) Edition; BULLETINS, July 1933 and January 1944, with covers.—G3IDG, 96 George Street, Basingstoke, Hampshire.

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HOLIDAY ACCOMMODATION with DXing facilities in Scotland, for family of four for eight days between 25 August -5 September.—Burchell, 16 Love Lane, Whitby, Yorks.

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G3HBW, overwhelmed by correspondence, asks the indulgence of those awaiting replies. All letters will be answered in due course.

POLISH GIRL, age 19, seeks employment as an *au pair* girl, for six months from July 1967. Replies please via G3VJI, Steel, Zodiac House, Porthcurno, Penzance, Cornwall.

CORNWALL.—Holiday accommodation. Modern bungalow; minutes beach. Bed, breakfast, evening meal optional. Car space. Terms from—G6AY, "Lohengrin," Swanpool, Falmouth.

KW2000 and owner seek accommodation inside London area. Please contact GM3KTZ, 40 Cautley Avenue, Clapham, London S.W.4.

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