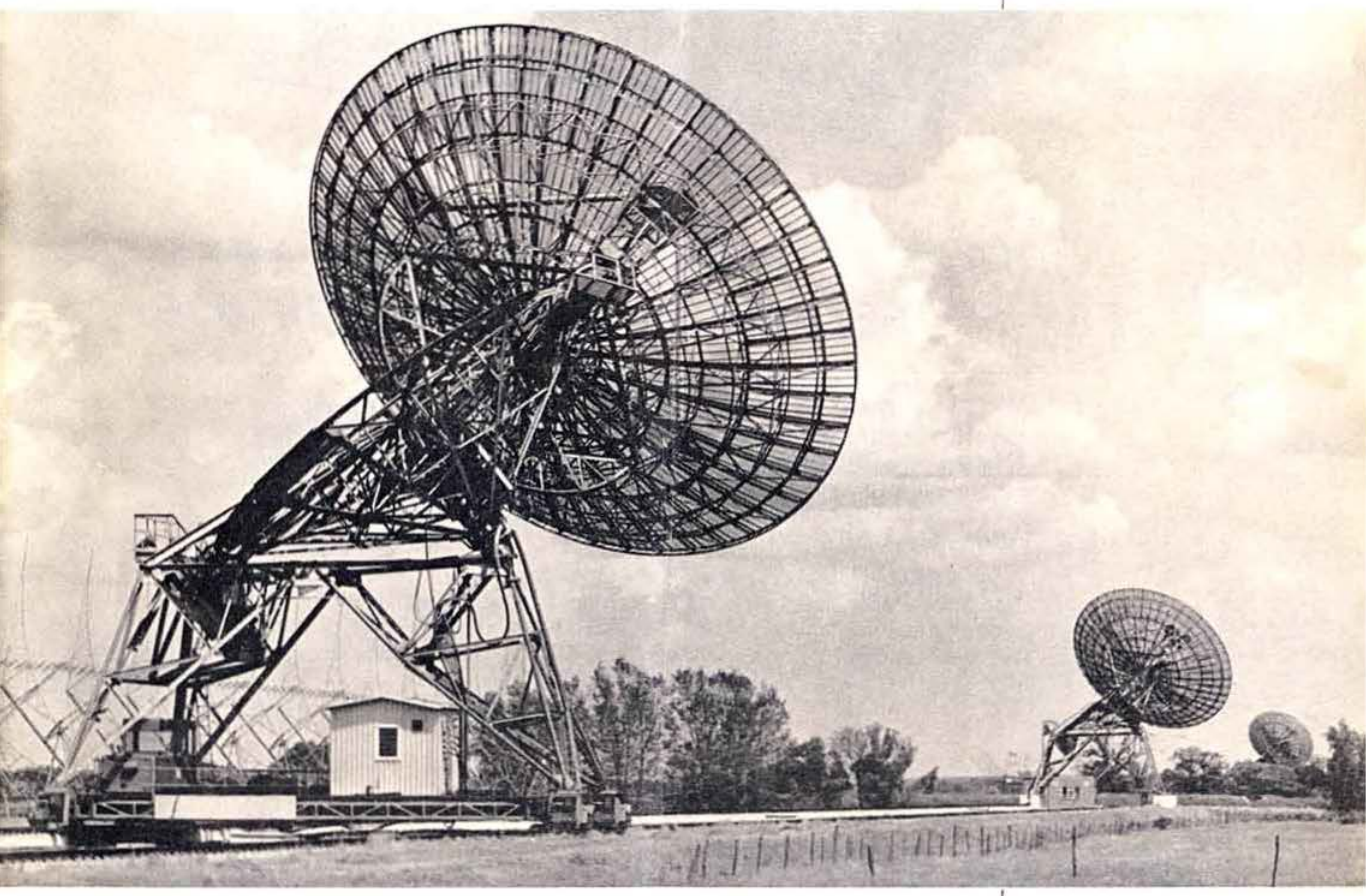
RSGB

BULLETIN

AUGUST 1965
VOL. 41, No. 8



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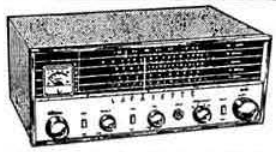

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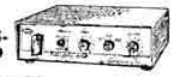

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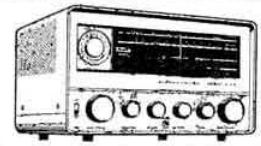

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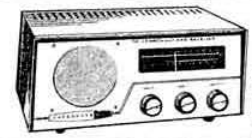

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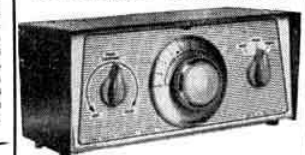

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August 1965

4/- Monthly

RSGB BULLETIN

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Front Cover: The three paraboloidal reflectors of the new "one-mile" radio telescope at the Mullard Radio Astronomy Observatory, Cambridge. They are 60 ft. in diameter and equatorially mounted on an east-west axis. The further two are fixed in position but the nearer one can be moved along a 2,500 ft. rail track. (*Copyright Science Research Council.*)

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Current Comment

The Bulletin under Fire

SELDOM has a letter from a member provoked so quick a response and so much correspondence as Mr W. A. Scarr's letter in the July issue. Quite clearly, the contents of the BULLETIN and the present editorial policy are of burning interest. This month's *Current Comment* therefore takes the form of a selection of the many letters on this topic received within a few days of publication of the July issue.

DEAR SIR,—I was most pleased to read the letter in the July issue from G2WS concerning the BULLETIN and its contents.

I think I am right in saying that the vast majority of readers are not raw recruits to the hobby and therefore do not find much to interest them in pages of elementary circuit theory, Ohm's Law and descriptions of what a coil looks like.

Most readers will have learned this before they join the RSGB. However there must be equally few who can appreciate the finer points of calculus, higher mathematics, and the like. Most amateurs are not particularly interested in a thesis on the energy levels in atoms and how they can be used to describe the workings of the tunnel diode, but they might very well be interested in a good practical article on how to use the devices, with a quick general description of the workings of the diode.

In my view there should be many more articles on the construction of useful equipment, not requiring the use of machinery to be found only in a precision engineering workshop, and above all, not requiring a bottomless bank balance. Articles should not be hyper-technical nor childishly simple, bearing in mind that the occasional elementary or very advanced article should be published, thereby keeping the interest of the minorities best suited to read them.

In my view there is just the right amount of Society news, reports on rallies, exhibitions, etc., and general interest notes and pictures. Contest reports and the like bore me to tears but I realise that there are a very great many who do not share my dislike of contests and, therefore, these reports are very necessary. However, it is quite beyond me to see what interest or use those lists of " who-worked-what " stations are to anybody, but maybe there are many who think otherwise.

Yours faithfully,
A. C. WADSWORTH, G3NPF

Rochford, Essex.

DEAR SIR,—May I add my support to the view expressed by G2WS in the July BULLETIN.

The general standard of the BULLETIN has declined over the last year. There is now too much space given to so called " newsy " articles and accounts of individual trips abroad, etc.

Give us more technical articles of the G3VA and G2DAF quality.

Yours faithfully,
JOHN C. JOHNSON, GM3GSC

Ayrshire.

DEAR SIR,—With reference to Mr. Scarr's letter in the July BULL, I agree only with his dislike of supposedly humorous articles, which are a waste of time and space.

I should say licensed members form the hard core of the Society, but the beginners and those studying for the RAE are its permanently present nucleus—essential for the future evolution of Amateur Radio.

I remember when I first received the BULL only a few years ago feeling overawed by the wealth of articles for advanced amateurs, and discouraged by the apparent neglect to cater for people down at my level.

It is true that radio theory (both elementary and advanced) may be swotted from numerous text-books, but personally I find their explanations of some aspects difficult to grasp.

Mr. Scarr ridicules the articles *Progressing through Amateur Radio* calling them " Elementary Physics for Beginners ", but I should like to express my great interest in this series of articles, and I hope the author, Mr. K. L. Smith, can make more advanced radio theory as clear and interesting as his early articles have been.

My only complaint is that that these articles should not appear monthly. If they did they would now be well advanced into the " meat " of radio theory.

Yours faithfully,
R. W. COLEMAN, BRS

Bradford 6.

DEAR SIR,—With reference to Mr. Scarr's letter in the July issue, I must record my complete agreement with Mr. Scarr's comments regarding recent editions of the BULLETIN, but would like to submit in defence of the BULLETIN the following.

Comparing my first April BULLETIN (1958) with the issue received yesterday containing Mr. Scarr's letter, with the same analysis.

	1958	*Current*
Construction of amateur station equipment	2	7
Technical Notes	1½	14
For beginners	4	6
Construction of ancillary equipment	1	2
Humorous	nil	nil

Plus the information that the 1958 edition contained only 33 pages of information against the current issues 56 pages, this is not counting any advertisements. The 1½ pages of technical notes in the 1958 edition was the first of Mr. Hawker's excellent *Technical Topics* series.

Comparison between these two issues shows a considerable long term improvement.

So don't be too hard on the BULL.

Yours faithfully,
A. T. DODSON, G3MGU

Cirencester, Glos.

DEAR SIR,—I was pleased to read the letter from G2WS and as a reader of the BULLETIN from the first number, I fully endorse his sentiments. I think it is unnecessary to look for further facts, since the points outlined by Mr. Scarr put the whole matter in a nut-shell.

Whilst writing there is one technical matter of interest to all that seems to have had very little treatment in the BULLETIN over the past year or so, and that is the problem of TVI. I am fully aware that this subject is covered in the *RSGB Handbook* and other publications but the problem has been brought very much to the fore by the increased use of high power linear amplifiers. So far all the applications hitherto published have failed to solve the writer's own problem and by the discussions that can be heard over the air I am by no means alone.

I am sure contributions in the BULLETIN from members on this subject would find a welcome reception by many.

Yours faithfully,
L. H. LEE, G5FH

Oldbury, near Birmingham.

DEAR SIR,—I read Mr. Scarr's letter in the July BULL with considerable interest and an immediate reaction of complete disagreement with his criticism of recent issues of the BULL. Without having analysed the contents as has Mr. Scarr, my

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.

impression has been that the quality of the contents of the BULL has been steadily improving over recent years until it is now supreme among amateur radio periodicals published in the UK.

I have now turned up and compared the particular issues referred to by Mr. Scarr and I cannot help feeling that he selected these issues to illustrate his particular point, i.e. his strong preference for constructional articles on station equipment. In fact, the April 1964 issue is exceptional in this respect as it includes one of G2DAF's excellent articles on his Mark 2 transmitter (10 pages). None enjoys such articles more than I and I have in fact successfully constructed both his receiver and transmitter from BULL articles. However, no member could expect such an article in every issue and, indeed, few amateurs would embark upon more than one such major project per year. On the other hand, the construction of ancillary equipment is not a major project and, in my view, the more the better.

I agree with Mr. Scarr to the extent that I am not interested in articles on elementary physics but a proportion of members is interested and I do not complain if a minority is so catered for. I note that the July 1965 issue includes four pages for beginners out of a total of 57 pages on other subjects (excluding advertisements) and I take the view that this is a fair balance.

Yours faithfully,
B. H. T. OLIVER, G3DJQ

Isle of Wight.

DEAR SIR,—I have read Mr. Scarr's, G2WS, letter in the July BULLETIN with great interest and heartily agree with him. I think that the BULLETIN is degenerating into a schoolboys electrical magazine. I feel that many are looking in vain for articles of a technical and instructive nature on Amateur Radio, and that the BULLETIN has fallen to the low level of the other radio magazines.

The way in which the BULLETIN could be improved would be to discontinue the series *Progressing through Amateur Radio* and publish this series as a separate booklet, *Forthcoming Events* to be combined with *Clubroom* and the emphasis to be on the future events not on those that have taken place. *The Month on the Air* would be condensed and the interminable list of call-signs on the various frequencies vigorously pruned.

With the pages thus saved I would include more articles on the construction of amateur equipment and ancillaries. *Technical Topics* lengthened and include items that discuss ideas rather than constructional notes.

Yours faithfully,
C. ROBERTSON, BRS24475

Basildon, Essex.

DEAR SIR,—I was interested to read G2WS's comment on the comparative analysis of contents of two BULLETINS 12 months apart. As there is some criticism from members who think the BULLETIN too highbrow, and some articles are beyond their comprehension, some discussion on the contents may be useful.

Firstly it must be a balance between the many specialised aspects of our hobby and the varying degrees of knowledge aquired by members.

Only a small proportion of radio amateurs are radio professionals and to have obtained a transmitting licence means only the first step in gaining that storehouse of knowledge which accumulates over many years in amateur radio. Even the old hand needs from time to time to brush up on the fundamentals.

I am pleased to see space given to the beginners and consider the April 1965 BULLETIN has a better balance than in 1964. The Editor has to walk a tight-rope between the many conflicting interests and can only please the most tolerant.

Yours faithfully,
L. S. KING, G4IB

Tunbridge Wells, Kent.

Do Bulletin Small Advertisements Really Pay?

DEAR SIR,—In the July issue of the BULLETIN I advertised an Electroniques Qoilpack type QPI66 for sale for £5. Since this advertisement appeared I have been inundated with requests. I have received telegrams, letters, and a total of £83 15s.—in cash, cheques, money orders, postal orders, and telegraphed money orders. I am now suffering from typewriter's cramp and will never advertise anything again!

Yours sincerely,
RICHARD YOUNGS, G3TFD

Beccles, Suffolk.

RSGB Radio Communications Exhibition

DEAR SIR,—As a member of the Exhibition Committee I helped on the stand at last year's International Radio Communication Exhibition and this year I have undertaken to act as Equipment Manager for the home-constructed equipment which is to form a special display feature on the stage of the Seymour Hall.

At the close of last year's Exhibition the small staff of helpers were set the task of packing up the Society's stand in about an hour when it had taken a day to set up. At this time I found myself responsible for repacking the home-constructors exhibits.

The most delicate item proved to be the easiest to repack. It was a parametric amplifier with coaxial tuned circuits and a protruding micrometer adjustment. Its wooden box was clearly marked with what it was to contain and also had fixed to it instructions on how to return the amplifier to its box. This was not easy because of the small clearance between the box and the micrometer. The baseboard on which the amplifier was mounted for display was found to be the lid of the box and repacking comprised only the replacement of a few wood screws. The box was already marked with the address for return and transit instructions.

Another item had its own box clearly marked but repacking was a difficult problem. It had been packed in a large number of differing rectangular shapes of foamed plastic. It appeared that the owner had originally cut pieces to size as he went and fitted them in. Repacking was rather like doing a jigsaw upside down and needed many times its share of time to repack to the original efficiency and precision.

At the end there were some seven items to pack and four soft cardboard boxes without any identification and a pile of crumpled newspaper. They had originally been secured with Sellotape or similar but this had been destroyed in the unpacking.

All this history leads on to a few recommendations for packing equipment for exhibitions where repacking with the same materials is required at the conclusion of the show.

Choose a strong box: this can be of cardboard but in general, grocery boxes are unsuitable. Boxes that have contained electrical goods, glassware or bottles are more suitable.

The soft packing material that allows the equipment to float in its box should not be loose but should be contained in some way perhaps in paper or polythene bags or by an internal lining.

Alternatively the item of equipment may be rigidly held or mounted into the box without packing. This requires a rigid box with its strength proportional to the weight of the equipment. Much of the Service equipment travels this way in a strong wooden box held firmly by wooden spacers and felt packings.

Instructions for repacking may not seem necessary but it should be assumed that the repacker is tired and in a hurry. The instructions should also identify the box with the equipment. Give return instructions and addresses as required and if the item is to be called for give details regarding the collector and time of collection.

In conclusion I would ask that members note that as the home-constructed equipment is the special stage display this year we shall need at least twice as much as last year and with a wider range. Details of the various awards will appear in the September BULLETIN but offers of equipment are welcome now and should be sent to the address below.

Yours faithfully,
A. J. WORRALL, G3IWA

62 Gallants Farm Road,
East Barnet, Herts.

QRA Locator System

DEAR SIR,—Neither G2JF nor G3MCY, in their replies to my letter on the QRA Locator System attempt to justify the illogical dimensions used in drawing up the Locator grid. One would be hard put to justify the three entirely different methods used to obtain the successive stages of coding.

There is no reason why latitude and longitude degrees and minutes (also seconds if necessary) should not be used to form the grid. The distance measurement problem would be exactly the same, a reasonable approximation within an area such as Europe.

I am sure that the use of these simpler international units, put into a letter-figure code, would result in the speedier adoption of a Locator system.

Yours faithfully,
R. A. BASTOW, G3BAC

Ramsgate, Kent.

V.F.O. CONTROLLED TRANSMITTER FOR 70Mc/s

A design offering the option of V.F.O. or switched crystal control and running up to 48 watts D.C. input

BY PAUL HARRIS, G3GFN*

PART I

IN view of the rapidly increasing activity on the 70 Mc/s band, it has become apparent that the current practice of single channel working—the use of a common transmitter and receiver frequency by all operators within a certain area—will be short lived. While this type of operation has much to commend it when the number of stations is limited, there comes a time when mutual interference can hardly be avoided. In certain areas this difficulty already exists.

Why is " Four " fast becoming so popular? Possibly it is due to the availability of the B44 and Pye transceivers which, with minor modifications, will function in a reasonable manner. Perhaps it is because comparatively simple equipment will give reliable communication within a radius of some 25 miles, depending on terrain, yet hold the possibility of contacts over very much greater distances when propagation conditions are suitable. On the other hand, it could be that while the 70 Mc/s allocation is in the v.h.f. region, constructional techniques are no more complicated than those considered as good practice on the l.f. bands.

The availability of the B44 and Pye 12 volt d.c. operated transceivers has, in itself, created an odd situation on 70 Mc/s. In most areas the number of mobile stations far exceeds the number of fixed stations, and this, combined with single channel working has substantially contributed to the QRM problem.

The Nuvistor converter described by the writer [1] will, in conjunction with a reasonable receiver, resolve many signals denied to other arrangements. The transmitter to be detailed, whose design was influenced by the need to provide alternative working frequencies, is its companion unit. Running a d.c. input just below the permitted maximum, it packs a pretty hefty punch in the opposite direction

Frequency Control and Stability

To say v.f.o. to many v.h.f. operators is quite likely to have the same effect as waving a red flag at a bull. However, not without good reason, for there have been some really bad v.f.o.'s on the v.h.f. bands.

It must be made absolutely clear at the outset that constructing a v.f.o. controlled transmitter for any v.h.f. band is not a project to be undertaken lightly, nor one which can be completed in double quick time. Further, very thorough testing on a dummy load must be undertaken before such a transmitter is placed into service.

For the above reasons, and although primarily concerned with v.f.o. control, the design of this transmitter provides for a switched frequency crystal oscillator unit to be substituted for the v.f.o. assembly. Indeed there may be many who would prefer to commence with crystal control and then, after ensuring the transmitter was satisfactory in other respects, incorporate a v.f.o. at a later date.

What order of stability must a v.f.o. achieve before it can be used to control a 70 Mc/s transmitter? It is certainly not sufficient just to say " It must not drift." This virtually implies absolute stability, and this cannot be achieved with normal amateur circuitry, even when crystals are used.

In the case of an a.m. transmission, any frequency shift must be limited to an amount that does not cause the transmission to wander out of the passband of the equipment used at the receiving end. If a.m. transmissions only were involved, then the order of stability would be primarily governed by the bandwidth of the most selective receiving system.

S.s.b. and c.w. transmissions are quite another story, however. In these cases stability requirements are especially stringent. In s.s.b. for example, a change of 100 c/s can be unacceptable. While c.w. is somewhat more tolerant, frequency creep can be distracting, particularly in the higher speed ranges, or where selective audio filters are employed.

It now becomes apparent that when more than one mode of operation of a transmitter is involved, then the stability tolerance of the master oscillator, whether crystal controlled

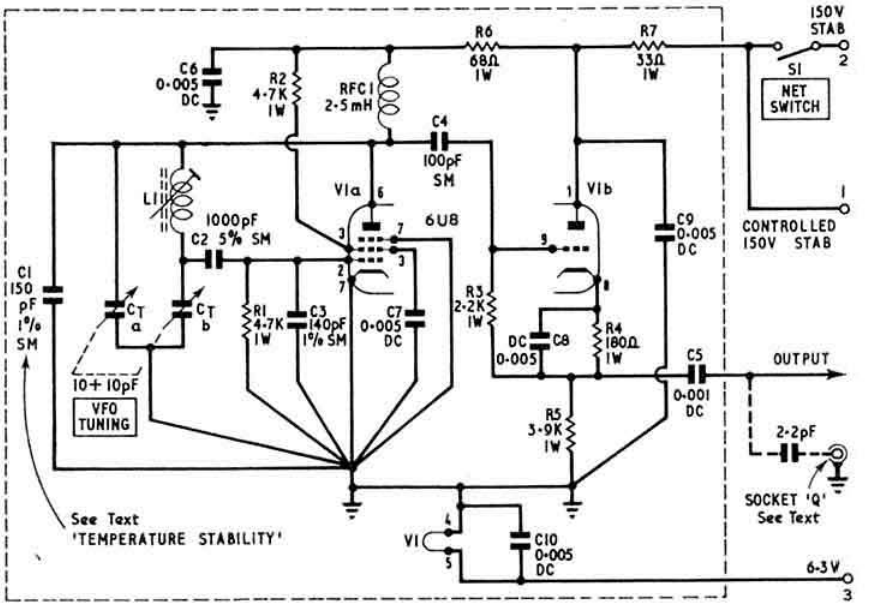


Fig. 1. The 11·675 Mc/s to 11·790 Mc/s variable frequency oscillator. Capacitors marked s.m. are silver mica, and those marked d.c. are disc ceramic.

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

or variable frequency, must be related to, and governed by, the most frequency sensitive application. Consequently no straightforward answer can be given to the initial question.

Nevertheless, we still require a standard against which to evaluate the stability performance of any v.f.o. intended to control a 70 Mc/s transmitter. For all normal purposes, including c.w., the order of stability given by an *average* crystal, with a fundamental frequency which does not require multiplying more than 10 times to produce a frequency in the 70 Mc/s range, when operated in a *lightly loaded* oscillator, may be considered satisfactory.

The object must therefore be to produce a variable frequency oscillator which equals this order of stability, or at least comes very close to it.

The v.f.o. to be described is capable of meeting this requirement, and has proved to be somewhat more stable than a number of crystal oscillators currently used to drive some transmitters on the 70 Mc/s band. As a matter of interest, this v.f.o. and transmitter were in use for many months before any of the "locals"—with selective receivers—tumbled to the fact that the transmitter *was* v.f.o. controlled.

General Notes

The transmitter circuit is drawn in two parts. Fig. 1 is the v.f.o. which could, if desired, be constructed as a separate unit for use with an existing transmitter, provided the multiplier sequence was the same as that in this transmitter. Fig. 2 shows the circuit of the frequency multiplier stages, power amplifier and p.a. clamper, the arrangement of which bears a strong family resemblance to the 70 Mc/s transmitter described in the *RSGB Amateur Radio Handbook* [2].

The frequencies employed in this transmitter are such that they are well clear of any TV channel, and also of the usual intermediate frequencies employed in television receivers.

Variable Frequency Master Oscillator

The v.f.o., Fig. 1, consists of a pentode Vackar-derived* oscillator, V1a, tuning between 11·675 Mc/s and 11·790 Mc/s, followed by a triode, V1b, operating as a cathode follower. Both functions are performed within a single valve type ECF82/6U8. Subsequent transmitter stages multiply the basic oscillator frequency six times, so providing complete coverage of the 70·1 Mc/s to 70·7 Mc/s allocation with a small overswing at each end.

In view of the frequency multiplication which takes place in order to arrive at the carrier frequency, it is of paramount importance that only first grade, high stability components

* Subsequent to the articles "High Stability Variable Frequency Oscillators" published in February and March 1964, it has come to the writer's notice that in the course of the original translation of the paper by Jiri Vackar, the positions of C2 and C3 were reversed. In fact, the higher of the two capacitors should be between grid and ground, and the lower from grid to L1.

While the transmitter operates in a perfectly satisfactory manner as specified, some constructors may care to try the effect of reversing the positions of C2 and C3. This will not affect the frequency coverage, but will reduce the available output to V2. It seems likely that increasing C11 to, say, 100pF, will restore the required drive to the p.a.

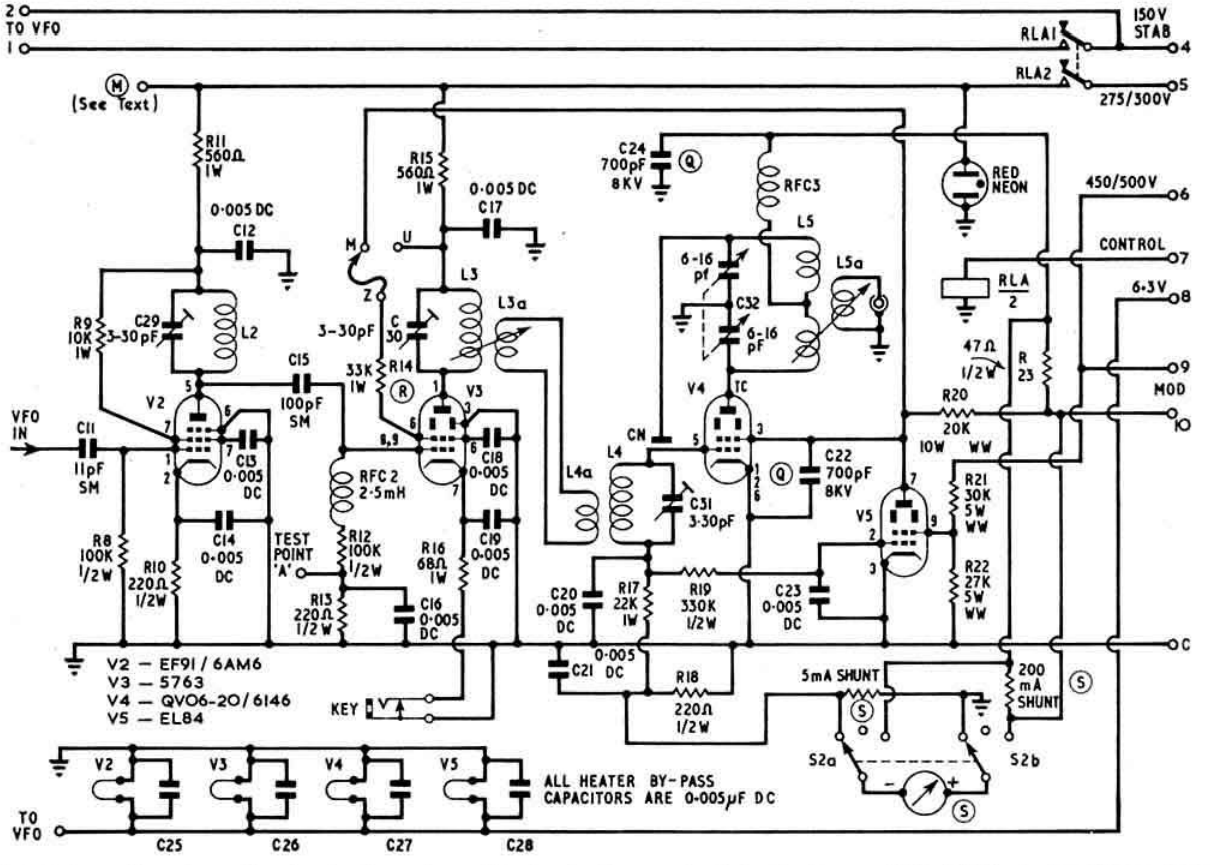


Fig. 2. Driver and p.a. stages. S.m. denotes silver mica, and d.c. denotes disc ceramic. Q, two "radiospares" 350pF 8 kV pulse ceramic capacitors in parallel. M & R, see text under "Modulation." S, see text under "Metering."

are used throughout the oscillator. This even applies to decoupling capacitors, and therein hangs a tale.

Three oscillators were constructed to check the stability of the circuit, and to verify that the design was repeatable in respect of the order of stability. One of these drifted violently and erratically. After some hours of frustration, the cause was traced to a highly unstable bypass capacitor on the screen grid of the oscillator, C7 on V1a.

The three test oscillators were tuned to zero beat with the third harmonic of a crystal oscillator operating on 7800 kc/s —using the second harmonic of the variable oscillators. The worst oscillator remained within 15 c/s of zero beat over a period of one hour, and the best within 10 c/s. Taken over a three hour period, the worst oscillator drifted exactly 150 c/s and the best remained within 40 c/s. Starting and stopping the v.f.o.'s did not show any audible frequency " swoop " when this was accomplished by removing and applying the h.t. The frequency difference measurements were made on a direct reading frequency counter.

One point will be noted about the v.f.o. circuit, and this is the apparently high value of the output coupling capacitor C5. This is, in fact, just a d.c. blocking capacitor, and the drive from the v.f.o. is adjusted by means of another capacitor in series with it, C11 in Fig. 2. This course was adopted to cover cases where the v.f.o. is to be used with other transmitters, so allowing the drive to be adjusted externally and removing the need to experiment with capacitors within the v.f.o. assembly.

Socket " Q," which is optional, allows the output of the v.f.o. to be directly coupled to frequency measuring apparatus. This socket is principally used when setting up and calibrating the v.f.o.

Multiplier-driver Stages

The circuits of the multiplier-driver stages are those associated with V2 and V3 in Fig. 2.

The first valve, V2, is an EF91 operating as a frequency doubler, the tank circuit, L2/C29, being tuned to 22/23 Mc/s. Output from the v.f.o. is coupled to the grid of this stage by the small capacitor, C11, the value of which has been selected to give the correct grid current through R8. The LC ratio of the tank circuit, L2/C29 is somewhat of a compromise between efficient operation and bandwidth, with the preference being towards bandwidth. By making the tank circuit somewhat more inductive than it should be, this circuit does not require retuning over any part of the frequency range that it has to handle, and as a result, the tuning capacitor can be pre-set. Cathode bias is provided by R10 and this serves to protect the valve in the event of failure of drive.

The output of the frequency doubler is capacity coupled to V3 which is a 5763 functioning as a frequency trebler. As in the case of the previous stage, the coupling capacitor, C15, has been selected to provide the correct grid drive. The LC ratio of the tank circuit of this tripler, L3/C30 has been selected for optimum efficiency, and with no sacrifice in favour of bandwidth. It is possible to do this in this case as the " nose " of the bandwidth of a reasonably designed tank circuit is usually of the order of 1 per cent of the operating frequency. As this circuit functions on 70 Mc/s, it is almost bound to be some 700 kc/s wide, which is just right for our purpose and again allows the tuning to be pre-set. In any event, if it were sharper than 1 per cent, which is unlikely, the form of coupling to the grid of the p.a. is such that a bandpass circuit is formed, and the desired bandwidth can be secured in any event.

Provision is made in this stage, which is also the driver for the p.a., to operate the screen grid of this valve, V3, from either an unmodulated, or modulated, h.t. line [4].

In view of the action of the clamper valve, which is to be dealt with later on, it might be thought that the method shown for connecting the screen grid of V3 to a modulated supply is incorrect, for at first sight it would appear that when the p.a. screen grid is clamped, there would be no voltage for the screen of V3. In point of fact the screen voltage of the p.a. does not drop completely to earth potential, and the few volts which are present are sufficient to give drive to the p.a. when the transmitter is switched on, after which the action becomes cumulative.

C.w. operation of the transmitter is effected by keying the cathode of this driver stage, and this produces a clean chirp free note. In view of the potential which exists across the key under key-up conditions, a fully enclosed key should be employed. A small resistor is included in the cathode lead to provide just sufficient bias to prevent the valve being damaged should the drive to it fail.

Output coupling from the driver to the p.a. is inductive via the adjustable link L3a, the position of which determines the p.a. grid drive. The method of coupling between driver anode and p.a. grid employed in this transmitter is highly frequency selective and ensures that all the grid drive indicated in the p.a. is due to the desired frequency, and is not a result of a combination of frequencies.

Power Amplifier and Clamper

The p.a. valve, V4, is a 6146/QV06-20 which will run up to 48 watts d.c. input quite comfortably.

The grid circuit is tuned and comprises L4/C31. In this case the coil is somewhat smaller than that which would normally be expected on 70 Mc/s, and the capacity somewhat greater. This is for two reasons. By making the grid to earth capacity as high as conveniently possible—bearing in mind the power available from the driver to give the required grid current—the possibility of u.h.f. parasitic oscillation is, to some extent, reduced, especially if the grid capacitance can be made somewhat larger than that of the anode circuit. In addition, it materially assists the ease with which the stage can be neutralized.

The drive from the preceding stage is coupled to L4 by L4a, the two windings being closely coupled. Drive is adjusted by varying the position of L3a as has been indicated in the previous section. A graph showing grid current *vs* frequency will be found in Appendix A, and illustrates the effectiveness of the steps taken to provide level drive over the frequency range without resorting to tuning individual stages.

The p.a. tank circuit consists of L5/C32, with the output taken from a variable link winding L5a. It is important to use the particular capacitor specified for C32, for not only is this designed to operate at these frequencies, but also it permits a layout which allows straightforward positioning of the neutralizing arrangements.

Although the p.a. tuning capacitor is brought out as a panel control, unless excursions from one end of the band to

Notes on Components

All capacitors and resistors as specified on circuit diagrams.
C1, C2, C3, C4, waxed silver mica 1% high stability.
C29, C30, and C31, 3–30pF pre-set. G. W. Smith & Co. Ltd., 3–34 Lisle Street, London, W.C.2, or Jackson C803 air spaced trimmers.
C32, 6–16pF butterfly. Eddystone Cat. No. 587.
C7 15pF plus 15pF split stator as illustrated in Fig. 4, or Jackson C808 3–25pF. See " V.F.O. Construction."
Drive drums. One 3½ in. diam., Jackson 5035 BIL. One 1¼ in. diam., Jackson 4597 BIL.
Meter. Kyoritsu Electrical 0–5mA, or w.h.y. See text " Metering."
R1, R2, high stability.
Relay RLA. Either 2 pole make, or 2 pole change over with one set of fixed contacts unused. 12 volt operated.
Valveholders. Ceramic, except for V1, which must have p.f.t.e. insulation.
Chassis and all metalwork constructed from 16 s.w.g. aluminium.

Details of Coils and Chokes

L1, 20 turns, 24 s.w.g. enam. copper wire, close wound.
L2, 18 turn . s.w.g., enam., close wound.
L3, 6½ turns, 20 s.w.g., enam., close wound.
L3a, 2 turns, 22 s.w.g. plastic covered, to slide on former.
L4, 3½ turns, 20 s.w.g. enam., close wound.
L4a, 2 turns, 22 s.w.g. plastic covered, positioned adjacent to L4.
All the above coils are wound on ⅝ in. diam. formers.
L5, 4 turns either side of centre, wound on a ¾ in. mandrel with 16 s.w.g. tinned copper wire. Silver plated wire should be used if possible. The gap at centre is ¾ in.
RFC1, RFC2, 2·5mH iron cored chokes.
RFC3, 39 in. 34 s.w.g. enam. close wound on a 1 M ohm 1 watt insulated resistor.

another are undertaken, very little, if any, adjustments will be required.

That there is no decoupling capacitor shown at the centre tap of the tank coil L5 is perfectly correct, and under no circumstances should any attempt be made to fit one. Doing this would be more than likely to upset the balance of the p.a. tank circuit.

Due to the low anode to grid capacity of the 6146/QV06–20 it is not really practicable to employ any form of actual capacitor for neutralizing. The neutralizing capacity C_N is formed by running a wire back from the tank circuit to the proximity of the grid pin.

As all the bias for the p.a. is derived from the flow of grid current through the resistor R17, and no protective cathode or fixed bias is employed, some arrangements must be made to prevent the p.a. valve being damaged through excessive anode current should the grid drive fail. Such a situation will arise in any event during c.w. operation under key-up conditions. In this transmitter, the p.a. is protected by the use of a clamper valve.

The anode current of a pentode or tetrode can be readily governed by adjustment of the screen voltage, and if the screen grid is earthed, the anode current will fall, usually to zero or certainly to a very small figure.

The clamper valve, V5, which is itself a beam tetrode, is arranged with its anode connected directly to the screen grid of the p.a. valve, and its cathode earthed. The screen grid of the clamper is fed from a potential divider consisting of R21 and R22, connected across the p.a. high voltage supply, and this maintains the screen voltage of the clamper at its correct value. The grid of the clamper is coupled, via an isolating resistor, R19, to the top end of the resistor which provides the bias for the p.a. grid, R17.

When the drive to the p.a. is " on," the high negative voltage developed across R17 for the purpose of biasing the p.a. is fed, via R19, to the grid of the clamper which is then biased well beyond cut off, and no current flows through it. Although the anode of the clamper is connected to the screen of the p.a., as the clamper is taking no current, the valve may as well not be there as far as the p.a. and its operating conditions are concerned.

Now cut the drive to the p.a. The negative voltage across R17 promptly vanishes and this in turn leaves the grid of the clamper without bias, but, momentarily at any rate, with quite a large voltage on its anode (the screen voltage of the p.a.). Without any bias, the clamper anode starts to draw current heavily, and immediately a large voltage drop occurs across the p.a. screen resistor, R20, due to this current. The net effect is that the screen voltage of the p.a. drops virtually to zero, and this in turn shuts down the anode current.

Metering

As the doubler and tripler stages are pre-tuned, metering in this transmitter is limited to the grid and anode circuits of the p.a., the former monitoring the drive, and the latter confirming the d.c. input. Both functions are performed by a single meter which is switched between the two circuits, correct value shunts being automatically connected across the meter.

Any meter with a full scale deflection of 5mA or less may be used, the shunts being arranged to give the correct f.s.d. current. The current ranges are: p.a. grid, 0–5mA; p.a. anode, 0–200mA. If a 5mA f.s.d. meter is employed, only one shunt will be required on the p.a. anode range.

It will be noted in the circuit diagram, Fig. 2, that the meter switch is shown as having a spare position between the grid and anode connections. While a toggle switch is illustrated in the physical layout diagrams, a rotary Yaxley type switch could be substituted in another presentation, and in such cases these spare contacts are essential.

The potential difference existing between the grid and anode contacts on the switch is quite high, and with a Yaxley switch, even if of the break-before-make variety, there is every possibility of arcing during the switching operation unless a blank position is left. Without it, there is every chance of burning out the meter.

Meter Shunts

Meter shunts are not specified as they depend on the full scale current, and the internal resistance of the meter employed. A very simple method of producing sufficiently accurate shunts is illustrated in Appendix B to Part 2.

Initially, the potentiometer is set so as to produce full scale deflection of the meter to be shunted. A shunt is then produced by winding some 30 to 34 s.w.g. enamelled copper wire on a 1 M ohm ½ watt resistor, and this placed across the meter which will cause it to read something less than f.s.d. Adjust the potentiometer to bring the meter back on to f.s.d. and then read the new full scale current on the multimeter.

Disconnect the battery and modify the shunt as required. To increase the full scale current, *decrease* the amount of wire on the shunt. To decrease the full scale current, *increase* the amount of wire on the shunt. Reconnect the shunt and by adjusting the potentiometer again check the full scale current. Repeat until the desired range is secured. The process sounds much more complicated than it really is.

The exact gauge of wire used for the shunts is not important, so long as it will pass the range current without any heating.

Transmitter Control

The transmitter is controlled by a relay whose contacts RLA1 and RLA2, Fig. 2, control the h.t. supply to the v.f.o. and multiplier-driver stages respectively. No transmit-receive switch is shown in Fig. 2, as the application of 12 volts d.c. between terminal 7 and common, C, from an externally switched source makes the change-over.

It should be noted that the p.a. h.t. is *not* removed during RECEIVE. This is for two reasons. Firstly, the action of the clamper reduces the p.a. anode current down to some 20mA

CAUTION

The p.a. h.t. voltage could prove *LETHAL* and every care must be taken when making adjustments to the p.a. anode circuit. *Always switch off* the p.a. power supply, and make sure that it is provided with a suitable bleeder resistor, before making any adjustments. Don't be foolish and say " *It won't happen to me*," for it could.

The p.a. is thoroughly cased up, not only for the purpose of r.f. screening, but also to prevent accidental contact with components operating at a high potential. Do not let a moment of carelessness nullify the precautions taken in the design.

when the drive is removed, and this idling current is of no consequence. Actually, this small current removes the possibility of cathode poisoning which can occur when heaters only are run for protracted periods, and so it is useful in this direction. Secondly, no relay is asked to switch a high potential supply, the arcing of whose contacts could be difficult to control.

Construction—General Notes

The construction of the v.f.o. and transmitter are covered thoroughly to ensure, as far as possible, that the performance of the writer's equipment can be duplicated without running into serious difficulties.

The transmitter may be assembled as an r.f. unit only, or it may incorporate its own modulator.

The layout of the r.f. section of the transmitter when used as a straightforward r.f. assembly is shown in Figs. 3–9 inclusive.

V.F.O. Construction

The heart of this transmitter is the variable frequency oscillator and this needs every care lavished on its construction, for, in the last analysis, it is the performance of this unit which either makes or breaks the whole project.

It was made clear earlier that the construction of a v.f.o. for a v.h.f. transmitter cannot be undertaken lightly, and in view of this, an alternative method of frequency control is to be given. The need to provide this alternative method of control largely dictated the construction of the v.f.o. which is built as a completely separate unit and secured to the top of the chassis. The alternative frequency control system is constructed within the compass of another unit of precisely the same dimensions as the v.f.o. so making the substitution of one for the other a simple matter.

The v.f.o. chassis-box assembly is illustrated in Fig. 3. While only simple tools are required to form this unit—or for any other of the metal work specified—an Eddystone diecast box type 650 may be substituted for the assembly

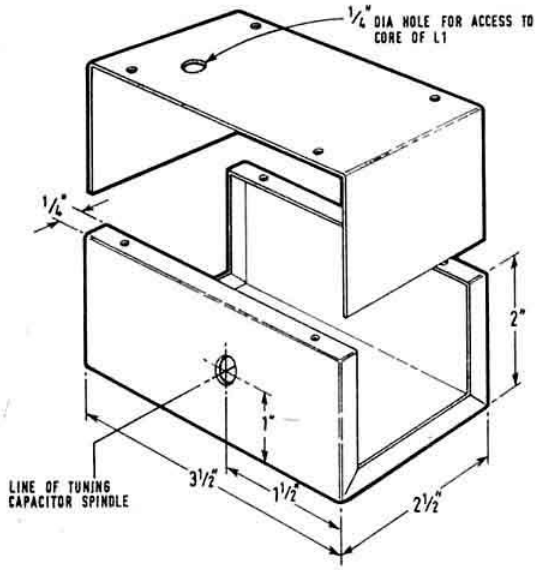


Fig. 3. V.f.o. box/chassis and cover assembly. The box and cover are constructed from 18 s.w.g. aluminium and the cover is secured in place by four PK screws. The hole which allows access to the core of L1 should be drilled after L1 has been fitted to ensure correct register. Supply leads to, and the output from the v.f.o. are taken through holes in the base of the box drilled under the tag strip (see Fig. 4). An Eddystone diecast box No. 650 may be used, without much change of layout.

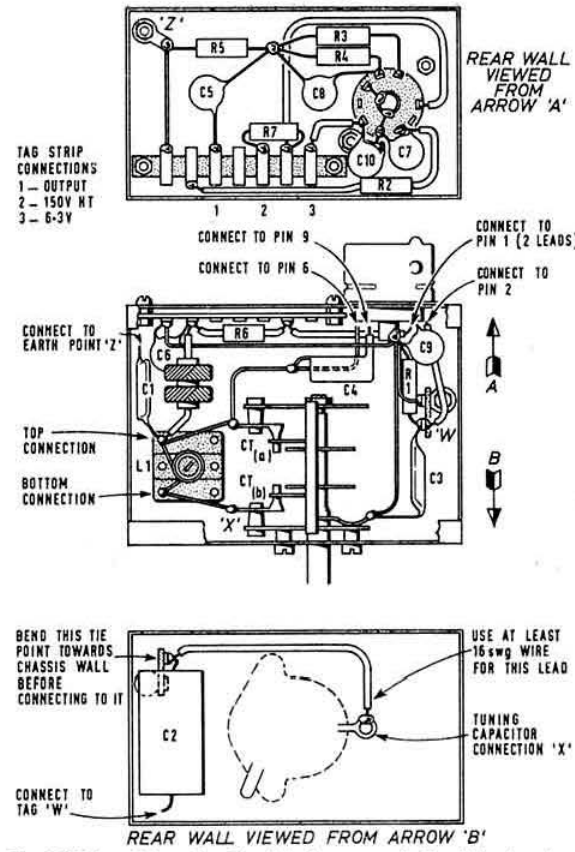


Fig. 4. Wiring of the v.f.o. Fig. 4(a), the rear wall; Fig. 4(b), plan view; Fig. 4(c), looking at the front wall from the direction of the rear wall.

illustrated. This is somewhat larger than really required, but it can be fitted to the chassis without difficulty. However, the oscillator valve will project over the rear edge of the chassis unless the front to back measurement is increased by 2 in. The width needs no alteration.

Figs. 4(a), (b) and (c) show the exact disposition of all the components within the v.f.o. unit. As one of the main requirements of the actual wiring is that none of the components shall be free to move due to vibration or shock, tag strips and tie points are used to firmly anchor components in position. All leads use 16 s.w.g. wire.

The tuning capacitor, C_T, is a freely available surplus unit rated at 15pF + 15pF. However, if difficulty should be experienced in obtaining this, a Jackson Bros C808 split stator 3–25pF can be substituted with virtually no change in layout. Due to the somewhat greater capacity of the latter capacitor, the overswing at each end of the band will be greater. This can be corrected by removing two turns from L1.

Leads to and from the v.f.o. are taken through holes drilled in its base underneath the tags marked 1, 2 and 3 in Fig. 4(a).

Construction

Fig. 5 shows the topside layout of the chassis when a modulator is not included, while Fig. 6 is a wire by wire illustration of the underside. Both diagrams should be largely self-explanatory.

If the writer has a fad it is that he likes his equipment to look reasonably attractive and workmanlike when it is

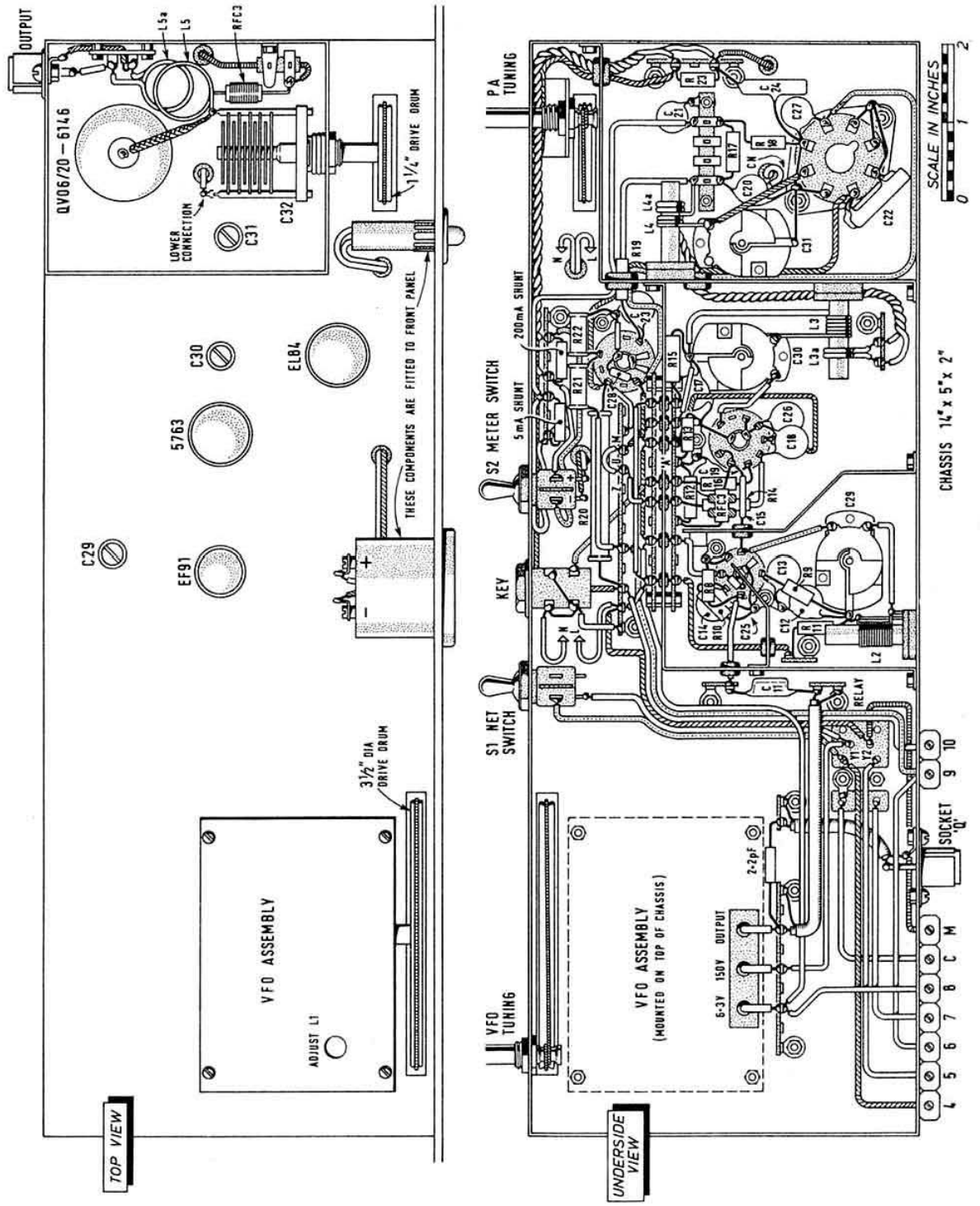


Fig. 5 (upper). Disposition of components and v.f.o. assembly on chassis, together with drive cord drums, and rough details of p.a. layout. Fig. 6 (lower diagram). Wiring diagram of the underside of the chassis. Connector numbers tally with those given in Fig. 2. Socket Q is optional—see Fig. 1 and associated text.

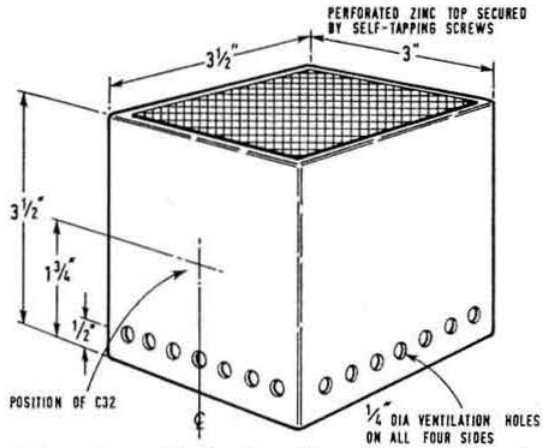


Fig. 7. General assembly of p.a. box. The top is secured after adjusting the link, L5A. To ensure adequate ventilation, the ¼ in. holes must be drilled as shown. The box is constructed with ⅜ in. inward projecting lips at both the top and bottom, the lips being on all four sides. Those on the bottom secure it to the main chassis and those on the top provide a fixing for the cover.

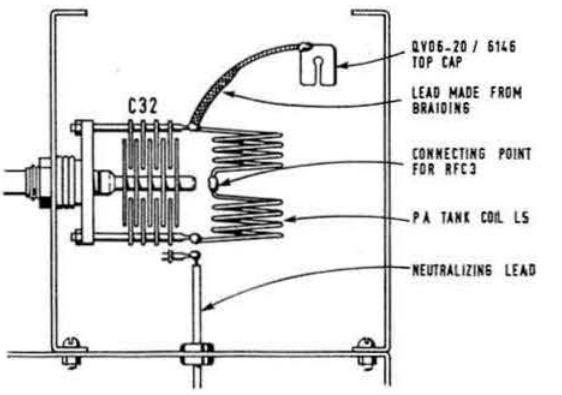


Fig. 8. Side elevation showing essential layout details of p.a. tank circuit.

completed. Particularly irritating is a randomly knob dotted panel. As will be seen from Fig. 9, the panel layout of this transmitter is clean, balanced and straightforward.

It seems inevitable that the best positions for controls from a constructional point of view are nearly always unsuitable when it comes to laying out the panel. This transmitter was no exception. To overcome this, recourse is made to two cord drives, one of which is used on the v.f.o., and the other on the p.a. tuning capacitor.

The drive drum, which is attached to the v.f.o. tuning capacitor, also carries the card scale. This is positioned behind a window cut in the front panel (see Fig. 9). The reduction ratio given between the drum and the cord drive is just right, allowing quite rapid frequency shift, but accurate setting to zero beat. As the v.f.o. drum extends below the chassis level, a slot is cut in the chassis to accommodate it.

A small drum is used on the p.a. tuning capacitor spindle as in this case a large reduction ratio is not needed. In practice, the reduction given by this arrangement is quite useful, giving a smooth feel to the tuning of the p.a. To give correct alignment between the p.a. drive drum and the drive spindle, the drive spindle is mounted on a small bracket set back from the front edge of the chassis.

Nylon drive cord should be used in both systems.

A study of Fig. 6 will indicate the general order in which the components are fitted, as well as their positions. The object is to keep all r.f. leads as short as possible, and to connect all decoupling capacitors from the decoupled point to earth by the shortest route. Earthing points themselves are important, and they should be positioned as indicated.

The p.a. requires particular attention, and it is *absolutely essential* that the earthing system, and the earthing points, on the base of the p.a. valve are precisely as shown.

Fig. 7 illustrates the construction of the p.a. screening box. As this is ventilated by thermal displacement, the air entry holes which are all round the bottom edge of the screening box must be provided. Failure to ventilate the p.a. in this manner may cause it to run at an excessive temperature. For reasons of safety alone, the p.a. must not be constructed without being completely cased up.

Fig. 8 shows how the p.a. tank circuit is constructed, the manner in which the coil is fitted to the tuning capacitor, and how the assembly is fitted to one side of the screened compartment. It also illustrates how the neutralizing lead, which forms C_N (see Fig. 6), is connected and routed.

Finally, Fig. 9 gives details of the front panel layout with the positions and functions of the various controls. Note that only the dead panel size is given, no allowance being made for the overhang which will be required to secure the panel to a cabinet. Whatever cabinet is used must be generously ventilated, and this implies a fully perforated top, and not just ventilation louvres at the rear.

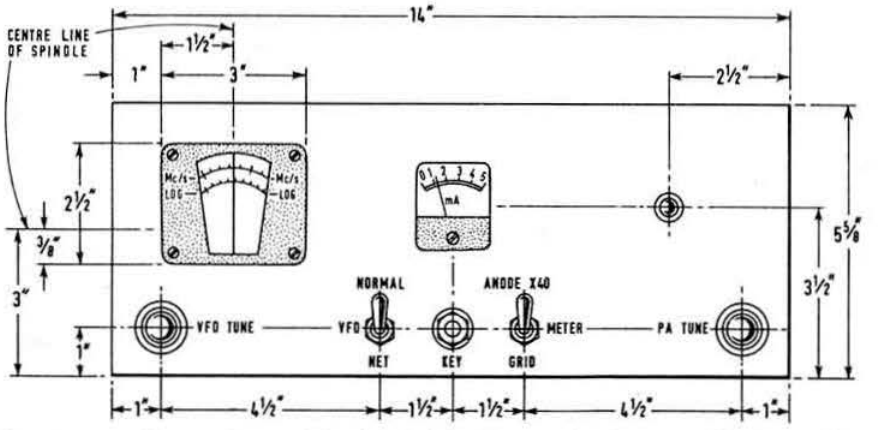


Fig. 9. Front panel layout. The panel size given is the minimum, and makes no provision for overhang of the chassis width. The p.a. screening box top will be ⅛ in. below the top edge of the above panel. Allowance must be made for the required panel overhang when selecting or fabricating a cabinet, which must be generously ventilated. No transmit/receive switch is shown as the unit is designed for external control.

To be continued

References

[1] RSGB BULLETIN, April, 1964, page 219.

[2] *RSGB Amateur Radio Handbook*, page 219.

[3] RSGB BULLETIN, March, 1964, page 156.

[4] RSGB BULLETIN, July, 1964, page 443.

LC Calculations

By R. G. WHEATLAND, G3SZW*

WHEN designing or constructing equipment, there inevitably comes a time when the value for a particular R, C, or L has to be determined. While that for R can usually be calculated by Ohm's Law, and that for C determined by reference to published tables or graphs or for that matter calculated fairly simply, when it comes to L and LC combinations, matters tend to become rather complex for the average constructor.

Faced with many different formula and methods, resort is usually made to empirical determination of a suitable combination. Colloquially known as " cut and try," this can become, and usually is, a very tedious business indeed, especially when inductance values are quite large.

For many years the writer has used a particular formula for determining LC values, which, in association with certain equipment for checking parameters, has proved highly successful. These form the subject of this article, and their adoption will simplify the thorny problems usually associated with LC circuitry.

Equipment

In practice, the values for L and C could be calculated directly from the formula to be given and wound accordingly. However, if it is desired to quantitatively assess Inductance, Q, Self-capacity and to determine the Co-efficient of Coupling (k), then the following equipment will be needed:

(a) A stable variable frequency oscillator covering the frequencies of interest,

(b) A calibrated capacitor with close tolerance standards and

(c) A valve-voltmeter.

The v.f.o. must be matched to an output impedance not exceeding 1 ohm, while the valve-voltmeter must have an input impedance of not less than 10 Megohms.

Abbreviations

The abbreviations used in the following formula are as follows:

L inductance in μH
C capacitance in pF
f frequency in Mc/s
N number of turns
l length of winding in inches
d diameter in inches

Where subscripts are indicated then:

$_1$ denotes first reading
$_2$ denotes second reading.

LC Factors

A list of the LC factors for the l.f. ends of the amateur bands calculated from $LC = \frac{25330}{f^2}$ is: . . . . . A

1·8 Mc/s	$LC = 7818$
3·5 Mc/s	2067
7 Mc/s	517
14 Mc/s	129
21 Mc/s	57
28 Mc/s	32

Applying LC Factor

An example of applying the LC factor to determine C is as follows:

$L = 100\,\mu$H and $f = 1{\cdot}8$ Mc/s

then $C = \frac{7818}{100}$

therefore $C = 78{\cdot}18$pF.

Alternatively, knowing C, L can be calculated in a similar manner.

Converting Inductance into Coils

For single layer coils, close wound, then:

where $l = 2d$

then $N = 10\sqrt{\frac{L}{d}}$ . . . . . B

where $l = d$

then $N = 7{\cdot}6\sqrt{\frac{L}{d}}$ C

and where $l = \frac{d}{2}$

then $N = 6{\cdot}2\sqrt{\frac{L}{d}}$ . . . . . D

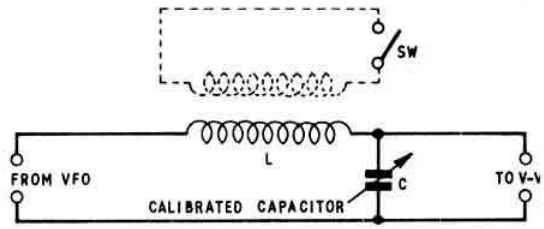
Example: $L = 100\,\mu$H, $d = 1$ in., and $l = 2$ in.

then $N = 10\sqrt{\frac{100}{1}}$

so $N = 100$ turns.

Measurements

The arrangement for all the measurements is the same and is illustrated in Fig. 1.



(i) Self Capacity (C_s)

Set the v.f.o. to the required frequency and adjust C for resonance as indicated on the valve-voltmeter. Note the reading given by C and call this C_1.

Tune the v.f.o. to twice the original frequency. Reduce the capacity of C until resonance is again indicated on the valve-voltmeter. Note the reading given by C and call this C_2.

Then $C_s = \frac{C_1 - 4C_2}{3}$ . . . . . E

(ii) Inductance and Q

Set the v.f.o. to the required frequency and tune C to produce resonance as indicated on the valve-voltmeter. Read off the capacity value from C.

Calculate L by using formula A.

Note the valve-voltmeter reading at resonance, mis-tune C to obtain 0·707 of this reading, then

$Q = \frac{C}{\triangle C}$ . . . . . F

(iii) Coefficient of Coupling (K)

Tune C for resonance with S open, and use formula A to

Continued on page 520

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Sources of Noise and Noise Sources

By G. R. JESSOP, A.M.I.E.R.E., G6JP*

IN order to make the best use of radio signals, it is necessary to amplify them to a workable level but in such a manner that the noise generated in doing so does not submerge the wanted signal. The relationship between noise and signal, commonly known as the signal-to-noise ratio is of prime importance in any receiving system, and one of the design objects is always to keep this ratio as high as possible.

When seeking to evaluate signal-to-noise ratio, it is necessary to know what are the causes of noise, and to have available a means of testing and setting up the receiving equipment for the best performance in relation to the particular function that it has to perform.

Broadly speaking, noise can be divided into two categories:

(a) External noise—including atmospherics, thermal noise from the earth, solar and cosmic noise, man-made static etc.;

(b) Internal Noise—that generated within the receiving equipment such as resistive noise, shot noise, flicker noise, partition noise, transit time and induced grid noise.

Since we can do little or nothing about externally produced noise, apart perhaps from using effective limiters to mitigate their effect, any improvement in the signal-to-noise ratio within our control relates to the performance of the receiving equipment itself and its internal noise.

The various forms of internal noise, how and why they are produced, are briefly as follows.

Resistive Noise

This type of noise is to be found in all resistors, together with the resistive elements of inductance and capacitance. The actual level of resistive noise depends on the type and construction of the resistor.

Even a so-called " ideal " resistor of the metallic type will generate noise. This noise is created by the random movement of free electrons within the molecular structure of the resistive element, and since the " activity " of these electrons is dependent on temperature, the level of noise will vary with changes in temperature.

Some qualification of the foregoing temperature *v* noise statement is however needed. Most resistors operate at a temperature in the region of 17°C or 290°K unless special cooling is undertaken. Since it is only at Absolute Zero—273°K below 0°C—that the motion of the random electrons ceases, and the resistor would become " silent ", it will be appreciated that, over the normal working temperature range, any changes in temperature will be proportionately very small when compared to the elevation above absolute zero. For this reason, the inherent noise level within average resistors does not change very appreciably over the range of temperatures encountered under normal working conditions.

Carbon resistors, which are almost universally employed in equipment, are likely to be as much as ten times more noisy than metallic types, and this fact should be borne in mind when producing items such as high gain microphone amplifiers.

As a matter of interest, specially designed resistors operated at high and/or low temperatures, are available for use as noise sources for equipment evaluation.

Shot Noise

Shot noise arises from the random emission of electrons from a hot cathode within a valve structure.

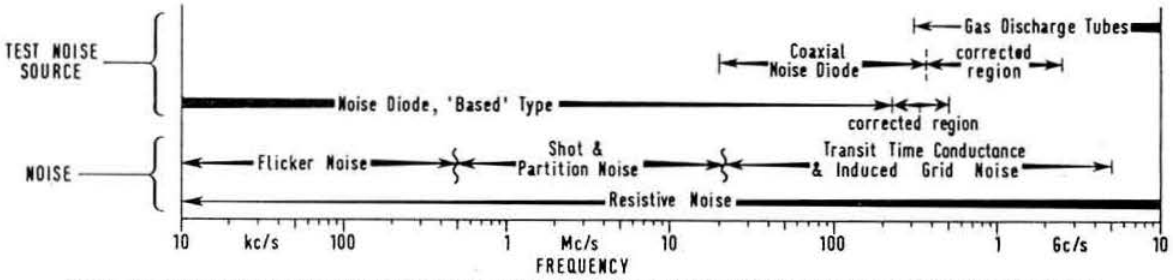

Fig. 1. Diagram indicating the frequency of various forms of noise and the standard noise sources used for test purposes.

There are two classifications of emission from the cathode or filament of a valve, one being designated " saturated emission " and the other " non-saturated emission." In the former, and considering a simple diode with a pure tungsten filament, the anode current will be directly controlled by the temperature of the filament, and when this is at its permitted maximum, the anode will " take-up " all the electrons available from the filament. There are no " spares " drifting around.

Under non-saturated emission conditions, there is much more emission available from the cathode/filament, than that which is being drawn by the anode. This gives rise to a space charge between the filament and the anode, and this has the effect of smoothing out some of the fluctuations in anode current caused by the shot effect. Most valves employed in equipment are operated under space charge conditions—i.e. non-saturated emission—and the anode current fluctuations are much less than in the case of the saturated emission diode used in noise generators.

Flicker Noise

This takes the form of large amplitude pulses, and is produced in some types of valves at low frequencies, being, generally, most troublesome in the frequency range 100 c/s-50 kc/s.

In high gain audio amplifiers, the presence of this noise form is most detrimental to satisfactory operation, and has led to the development of special " low noise " valves for this particular application. The EF86 and its associated types are examples.

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Partition Noise

In multigrid valves, the division of the total cathode current between the anode and the various other electrodes are subject to the fluctuations caused by shot effects. In turn, these additional electrodes will, by a process similar to modulation, cause increased random fluctuations in the anode current.

From this it will be appreciated that the fewer the electrodes in a valve the better, and moreover, why it is that a triode will always have a much lower noise factor than a pentode or other multi-electrode valve.

Transit Time Conductance and Induced Grid Noise

The random fluctuations in the electron stream emitted from the hot cathode—*see shot noise*—in passing through the grid structure on the way to the anode, will induce a noise voltage on to the grid from the electrostatic charge carried by the electrons themselves.

The magnitude of this will depend on frequency. At low and medium frequencies, this noise will be self-neutralized as the voltage induced by the electrons approaching the grid will be cancelled by an equal and opposite voltage induced by those receding from the grid. At higher frequencies, however, 20 Mc/s and upwards, the actual time taken by an electron to pass from cathode to anode will be an appreciable fraction of the operating cycle, the fraction increasing with frequency. This transit time, as it is known, results in a difference in phase between the electrons approaching the grid, and those receding from it. The result is that not all the induced voltage is cancelled.

As the frequency is raised, the magnitude of the current induced in the grid also rises. This approximates to a resistive thermal noise generator operating at a relatively high temperature. This effect is normally termed transit time conductance, the value of which is proportional to the square of the operating frequency.

In order to assess the merit of a valve for receiver purposes, two parameters are often quoted: (a) Equivalent Noise Resistance and (b) Noise Factor.

Equivalent Noise Resistance

This is defined as an ideal resistance which, when maintained at a normal operating temperature, would, if placed in the grid of a noiseless valve, produce anode current fluctuations equal to shot and partition noise of an actual valve of similar characteristics.

This method of assessment has been used for many years on the continent, but it is only really of value in the frequency range 50 kc/s to 20 Mc/s. It is of little or no value in equating a valve for suitability in v.h.f. or u.h.f. applications.

The equivalent noise resistance for various types of valves can be calculated as follows:

(i) *Triode* (Shot Noise only)

$$R_{eq} = \frac{2{\cdot}5}{G_m} \text{ ohms}$$

(ii) *Pentode or Tetrode* (Shot and Partition Noise only)

$$R_{eq} = \frac{I_a}{I_a + I_{g2}} \times \left(\frac{2{\cdot}5}{G_m} + \frac{20\, I_{g2}}{G_m{}^2}\right) \text{ ohms}$$

(iii) *Triode Mixer* (Shot noise only)

$$R_{eq} = \frac{4{\cdot}0}{G_c} \text{ ohms}$$

(iv) *Pentode or Multigrid Mixer* (Shot and Partition Noise only)

$$R_{eq} = \frac{I_a}{I_a + I_{g2}} \left(\frac{4{\cdot}0}{G_c} + \frac{20\, I_{g2}}{G_c{}^2}\right) \text{ ohms}$$

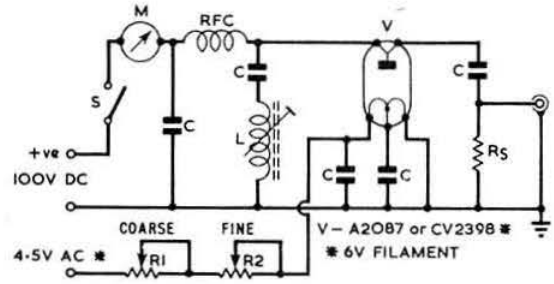

Fig. 2. A simple noise generator using a temperature limited saturated emission noise diode valve, suitable for most noise measurements above 20 Mc/s.

In the foregoing formulae, the value of I_a and I_{g2} is expressed in *amps*, while that for g_m and g_c are in *amps/volt*.

From these calculations it will be seen that the lower the equivalent noise resistance, then the better the valve. While this is true at frequencies where the induced grid noise is not troublesome, and while valves with a high g_m will produce the lowest equivalent noise resistance, this does not automatically make them the most suitable for every application.

Noise Factor

There is more or less a standard method of expressing the performance of a valve intended for service as an r.f. amplifier on frequencies above 20 Mc/s; this is quoted as its noise factor. Assuming that the first stage has adequate gain, this can also be used to state the performance of receivers and converters.

The measurement of noise factor is carried out using a diode noise source such as the A2087 whose noise performance can be calculated from

$$F = \frac{e}{2kT}\, I_d\, R_s$$

where e = the electron charge = $1{\cdot}59 \times 10^{-19}$ coulomb
k = Boltzmann's constant = $1{\cdot}372 \times 10^{-23}$ joules per °K
T = Temperature of source resistance in °K.
I_d = noise diode anode current in amperes.
R_s = Source resistance in ohms.

In cases where the normal operating temperature is of the order of 17°C—290°K—the formula can be simplified to

$F = 20\, I_d\, R_s$ as a ratio,
or $F = 10 \log (20\, I_d\, R_s)$ in decibels.

Noise diodes are available for frequencies up to about 500 Mc/s or so, but when measurements are made at or near the maximum frequency of the noise source, some precautions are necessary to avoid producing optimistic results, and corrections are often needed. For most purposes, however, the diode noise generator is an entirely reliable and stable source producing repeatable results, and when used up to

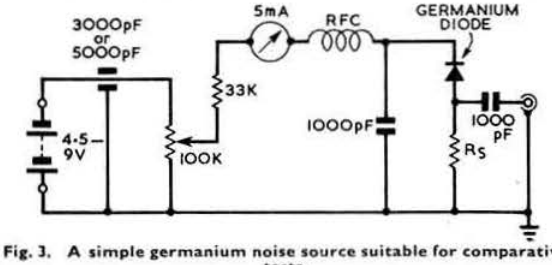

Fig. 3. A simple germanium noise source suitable for comparative tests.

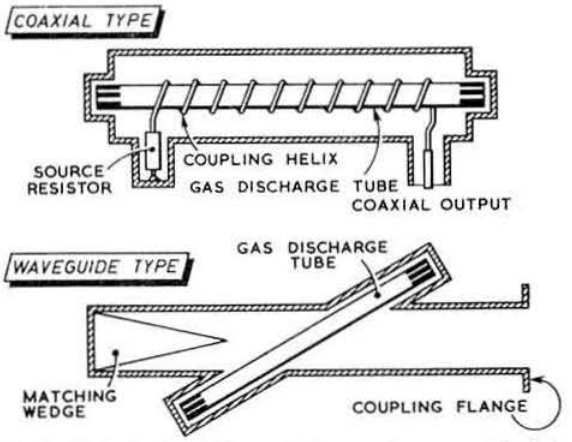

Fig. 4. Methods of coupling a discharge noise source tube into coaxial and waveguide circuits for measurements above 500 Mc/s.

about 150 Mc/s little or no correction is needed provided that a suitable diode is employed.

The circuit of a diode valve noise generator is given in Fig. 2. This will perform the tests required on most amateur equipment for frequencies above 20 Mc/s, and possesses a high degree of repeatability over long periods. It should be noted that if a CV2398 diode is used in place of the A2087, then the filament supply must be increased to 6 volts.

For comparative tests, and when repeatability over a short period is adequate, then the simpler germanium diode noise generator given in Fig. 3 will be found quite satisfactory.

Gas Discharge Tube Noise Sources

At frequencies of 500 Mc/s and above, it is usual to find that an inert gas discharge tube is employed as the noise source. Some special noise diodes however can be used up to 1000 Mc/s but corrections for transit time errors must be made, and it is for this reason that the gas discharge tube usually takes over.

In a gas discharge tube, the positive column of gas emits electromagnetic radiation, and this can be readily coupled into either a co-axial line or wave guide circuit. The usual methods are shown diagramatically in Fig. 4.

Conclusion

Although some of the noises specified above are produced by the functioning of valves themselves, it should not be thought that noise is the prerogative of the hot cathode valve alone. The transistor, while a " cold " device, can make equal, and often better, noises. Therefore any apparatus built to test valve amplifiers will be equally useful in evaluating transistor amplifier performance.

Suitable test procedures are given in detail in the *Amateur Radio Handbook*, along with further information on the subject of noise generally.

Electronics Course for Teachers

By D. Bond, BRS21555*

It has been felt for some time by the writer that in consequence of the vast strides which have taken place in the field of electronics over the last decade, there is an urgent need for science teachers to " rethink " some of their ideas of the scope of electronics and to learn something of the newer techniques of construction. Not least of all there is the need to " sell " electronics as an enrichment subject to the pupils.

With these thoughts in mind, a sub-committee of the Association for Science Education (Essex Branch), under the sponsorship of the Essex Education Committee, recently staged a four-day course at the Mid-Essex Technical College, Chelmsford. The course was very largely practical, and included instruction on soldering, and demonstrations of the use of Veroboard, Eyelet Board, etc. After lectures on the physics of the transistor, course members set to work to construct various transistor units, including multivibrators, receivers, photo-electric devices, and amplifiers. The beams of joy which spread across the faces of some of the members when these actually worked had to be seen to be believed!

The theme of " Electronics for Enrichment " was well reinforced by Ken Smith, G3JIX, who delighted everyone with a talk on his work with the Roding Boys' Club. Other lecturers included K. Bowden of the Mullard Education Service, Dr. Houghton, B. Pounder and C. T. Crellin, Science Adviser (Middlesex County Council).

Although we were very careful to avoid any suggestion that we were trying to brainwash the teachers into becoming radio amateurs, a station was set up by Jim Turner, G3AYZ, using a special call-sign G3ASE, and a total of 43 contacts was made, mostly on 80m. Few contacts were made on 20m possibly because the aerial was screened by large buildings. However, reports were RS5/6 from W2. The gear consisted of a KW2000 kindly loaned by G3ORT, a G2DAF transmitter and receiver (built by G3AMF), and a 10 watt transmitter from G3AYZ. The station was operated throughout by G3AYZ and G3EDM, ably assisted by s.w.l. Michael Marsh, A4024.

The inspiration for this Course came from an article in the November, 1962, BULLETIN describing a teachers course run at the Kent Summer School by D. J. Bradford, G3LCK, of Canterbury, to whom the writer is indebted for help and encouragement in the early stages of the planning.

The Association is greatly indebted to the following help from industry—Mullard Education Service, Philips Electrical (display of electronic kits), Erectronic Ltd. and R. Lamb Ltd. (Eyelet Board).

There is no doubt that this kind of course can have considerable impact on science teachers, and does much to encourage the enjoyment of a subject which can prove so valuable to our children in later years.

A general view of the "class" of teachers actively engaged in their separate projects.

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Four Cases of TVI

By E. M. Wagner, G3BID*

THE writer recently had four cases of TVI, some details of which may be of interest to readers. All except one appeared to have a connection with BBC 2.

Case No. 1 concerned neighbours who did not wish to have an outdoor aerial† as it seemed to them too ugly. At first it was difficult to see the answer to this one, but as politicians might say—" It presented a challenge " and so I decided to think about the problem.

There is a very large tree in the garden at G3BID, and it was decided to erect a TV aerial in this tree. Obviously the neighbours imagined this was for my own use.

This tree, at the bottom of the garden, is some distance from the house and was, therefore, clear of my own house wiring and at some distance—about 25 yards—from the transmitting aerial. When the television receiving aerials were installed, they were tested on my own television receiver. The feeder was then led over the garden fence and connected to the neighbour's TV set. That cured the TVI.

Case No. 2 was discovered when an irate neighbour telephoned. His troubles had been cured some time ago, but they had recurred. At this stage I began to suspect a connection with the introduction of BBC2. This gentleman had changed his TV set in order to receive 625 line TV.

So a full investigation was begun. It was soon found that the BBC1 aerial had collapsed. Arrangements had to be made to re-erect the TV aerials. After some time the aerials were renewed but the TVI continued. Further investigation showed that the firm in question had re-erected the ITA aerial but no aerial for BBC1. BBC1 was being received on an ITA aerial. No wonder there was TVI! Eventually a new aerial for BBC1 was erected.

Case 3 concerned an immediate neighbour who had been extremely co-operative and helpful. So I decided that as the array erected in my tree had proved so successful in Case No. 1, I would have an exact copy erected in my tree. This was done. But this time it did not effect the cure! This seemed odd as it was an identical array to the one which was successful in Case No. 1 and in similar location.

An investigation showed a fault in this TV aerial array. This was cured, but meanwhile Case 4 had occurred. This was also connected with a change of set connected with the introduction of BBC2. This particular installation had been dealt with 12 years before, and had given no trouble.

An examination of the aerial installation of Case No. 4 showed that the aerial had deteriorated to such an extent that it had nearly come down. Further, the lead had been cut by the gardener's secateurs and roughly cobbled. Lastly, when the lead to the actual set was touched, the central conductor came away from the coaxial connector. On the whole it was not surprising that TVI was being experienced!

Returning to Case 3 now, I had a fresh complaint and now found BBC1 being received on a BBC2 aerial.

The introduction of BBC2 has presented a whole series of new cases of TVI *not* because BBC2 itself is more liable to interference, but because the new sets have been made more sensitive to receive BBC2 and are often far too sensitive for BBC1. The receivers often require two separate aerial leads and frequently they are interchanged, the wrong one plugged in or even none at all. It is often possible in areas of high signal strength to receive BBC1 with no aerial, and only the BBC2 aerial plugged in. It is also possible to receive BBC1 with a BBC2 aerial. The trouble is only noticed when a transmitter locally opens up.

Throughout the whole of this long period of TVI with all the delays, re-erection of aerials, and other repairs, the Post Office engineers have been most helpful, most efficient and most competent. I cannot speak too highly of the assistance I have received from them. Without their help I should almost certainly have given up the struggle as one after another of these complaints arose.

I felt these notes might be helpful to others suffering from TVI at present and the increase in complaints is to my mind clearly linked with the introduction of BBC2 and the resultant change of sets and more complicated apparatus now often too complicated for the domestic viewer.

On the other hand it has drawn attention to the deterioration of the aerial systems which have taken place over the years. It must be remembered that the average viewer does not expect to have any maintenance done to his television aerials. The idea of regular servicing, which his car now receives, is totally unknown to television aerials and their associated leads, as can be seen if one notices how often one sees a $1\frac{1}{2}$ element or a $2\frac{1}{2}$ element array.

Lastly there are the new push-button sets. The contacts on these push-buttons corrode in our atmosphere. They then provide a rectifier or at least a non-linear load right inside the receiver which can quite easily cause the amateur's fundamental to modulate the incoming TV signal. This trouble is particularly noticeable where one or several of the push-buttons are rarely or never used. Then the corrosion increases. All push-buttons (whether on channels which are used or not) should be pressed and operated at least once a month if TVI from this source is to be avoided.

Clearly, with BBC2 now in existence, it looks as though the interference may well be worse in areas of high signal strength from the TV transmitters, since it is then that a TV picture can be received with the wrong aerial, with a faulty aerial and even with no aerial at all, and the faulty TV aerial is not really noticed until the amateur starts transmitting.

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† The Post Office expects the viewer to have an efficient aerial.

The Helping Hand

When XYL Edna Cooper of Newquay, Cornwall decided to study for the Radio Amateurs' Examination last year she modestly claimed it was merely a case of " If you can't beat 'em, join 'em!" In fact, however, it was really with the praiseworthy object of being able to help her husband with his studies. Her reward came when they both received their RAE pass certificates.

Eager to get on the air, Edna diligently practised c.w. through the winter and recently took her Morse test at Land's End GPO Radio Station. She is now G3UGO—who say's housewives have too much to do! Unfortunately her husband did not get through the Morse test and now he is so busy getting Edna's transmitter working he has no time left for Morse practice! There must be a moral here somewhere.

LC Calculations (Continued from page 516)

find L. Close S and retune C for resonance. Again calculate L by using formula A, then

$$k = \sqrt{1 - \frac{L_2}{L_1}} \quad \ldots\ldots\ldots\ldots G$$

Conclusion

In all measurements the connecting leads must be as short as possible in order to minimise further errors being introduced into the approximate results obtained, and as an aid to stability of the equipment, this should be earthed in a proper manner.

From the foregoing comments it will be appreciated that no exaggerated claims are made for the accuracy of the measurements obtained using the methods described which do not pretend to approach laboratory standards. Nevertheless, the answers which have been obtained using the methods given have been found to be more than suitable for amateur practice.

MATTERS MOBILE

By PAUL HARRIS, G3GFN

A Review of circuits and information of particular interest to Mobile Operators

WHILE the contents of this series will mainly be of interest to mobile operators, such is the nature of our hobby that no one section can be completely divorced from the others. Thus it is quite probable that those who have no active interest in mobile operation may find items of circuitry and ideas worthy of inclusion in fixed station equipment.

The object is to publish circuits and technical information, together with wrinkles, dodges and hints which either improve the performance of equipment under mobile conditions, or aid operating efficiency. In addition any matters pertinent to mobileers' interests will also be covered. Thus the scope will be wide.

Our hobby permits almost unlimited individuality in the construction of equipment. From this it seems reasonable to suppose that there must be hundreds, possibly thousands, of useful ideas, novel circuit arrangements and unusual " bitsa "—bits from this and bits from that—permutations which, while of potential interest to many, have never been published. This is probably especially true of the mobile brigade where nearly every installation is tailor-made for the vehicle concerned.

The purpose of this preamble is to suggest that if you have any tested circuits which are unusual and of value to your fellow mobile operators, and you are prepared to pass on the benefit of your ideas and experience, then why not send them to your conductor for inclusion in this feature?

All that is needed is a reasonable description and, where applicable, an easily understood circuit diagram or sketch. Particularly welcome will be photographs of equipment and installations.

A Halter Microphone

The recent hiatus over the Ministry of Transport's proposed order to make it an offence to talk into a radio transmitter whilst in control of a moving vehicle, must, if we are to be honest with ourselves, at least have caused us to carefully re-appraise our operating methods.

While talking when driving can hardly be more hazardous than listening to a normal car radio, there is no doubt but that some mobile microphones do leave a lot to be desired. There can be no argument against the statement that if one hand is engaged in holding a microphone, and perhaps pressing a P.T.T. switch at the same time, then under certain conditions, one's ability to steer is affected. Anyone who has tried to negotiate a sharp turn, or a roundabout, while using such a microphone will not dispute this statement.

A microphone arrangement which goes a long way to solving this difficulty is that used in most radio taxis. In this, the microphone head is mounted either on a swinging arm or a length of swan neck tubing. Even this is not perfect for although it leaves both hands free for control of the car, the driver has to maintain his head in a fixed position, and this restricts his field of vision. It has been argued that this is less serious than having one hand engaged, but this is debatable.

Some three years ago, the writer was shown an ingenious idea by G3KLM which has all the advantages of a fixed boom microphone, but solves the problem of having to maintain one's head in a fixed position.

94 Aldwick Road, Bognor Regis, Sussex

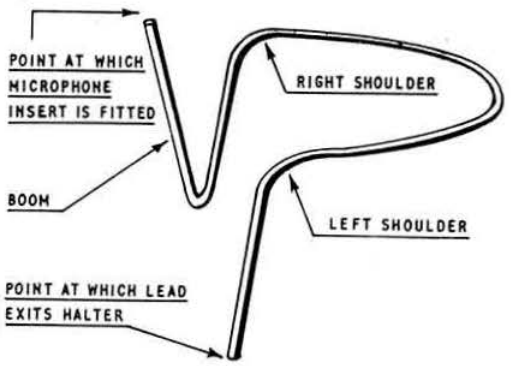

Fig. 1. General view of the combined halter and microphone mounting boom.

The device is shown in Fig. 1. From this it will be seen that it takes the form of a halter which is worn around the neck, and which incorporates a microphone mounting boom, the boom being positioned so that the microphone head is adjacent to the mouth of the wearer. No matter how much the wearer moves or turns, so the boom mounted microphone follows and maintains its proximity to the mouth. In addition to this advantage, since the microphone lead is run through the centre of the boom, this is kept out of harms way.

The gadget is fabricated in one piece from a length of $\frac{3}{8}$ in. diameter copper tubing—obtainable from all plumbers' suppliers. The *U* section of the halter goes around the neck of the wearer with the straight section running down the left hand side of the chest. On the right hand side, there is another, but shorter, downward running section which bends upwards again. At the point where this commences to rise, that is at the bend, it is angled so that its top is central to the *U*. This will then position the microphone head—which is fitted to this rising piece—adjacent to the wearer's mouth.

Any of the usual inserts may be fitted to the boom, and the lead routed through the tubing in the manner described. Once correctly shaped to the satisfaction of the individual, the gadget may be chromium plated, but just as good is to carefully wrap it with plastic insulation tape.

Compared to arrangements based on headphone bands, or frames of glasses, this halter leaves one virtually unencumbered. Incidentally, the writer has found that this assembly is very pleasant to use when operating a fixed station.

The only real disadvantage with this idea is that P.T.T. is not possible, but compared to its advantages, this is a small price to pay. However, it would be feasible to include a TRANSMIT/RECEIVE switch in the assembly by mounting this in a small box fitted to the end of the halter from which the lead exits.

A Simple Noise Limiter

Apart from i.f. noise silencers, one of the most effective noise limiters is the T.N.S.—*Twin Noise Squelch*—circuit featured in the *CQ Mobile Handbook*. Unfortunately, requiring two valves to achieve its performance, it does not enjoy the popularity which it deserves under mobile conditions where the expenditure of every extra milliamp has to be very carefully considered.

The writer recently tested the circuit of a series limiter used in the Eico 760 Citizens Band Transceiver. Whilst the T.N.S. still has the edge, this circuit far excels any others so far tried. Of particular interest is the manner in which it handles ignition noises. They virtually disappear. Needing

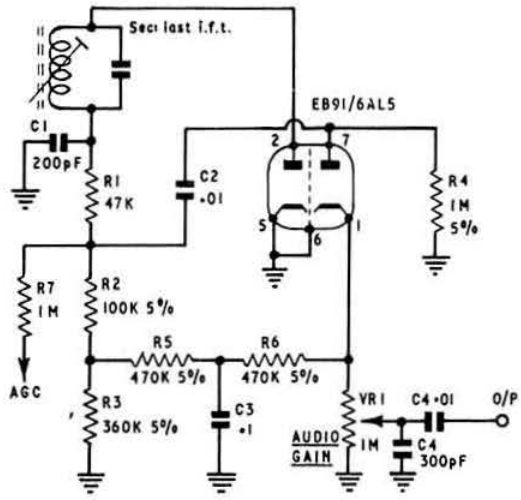

Fig. 2. Automatic noise limiter with good performance on ignition pulses. The circuit also functions as a diode detector and provides a.g.c.

only one valve, one half of which is used as the detector anyway, this limiter is ideal for inclusion in mobile receivers.

The circuit is shown in Fig. 2, and as will be seen, one gets a lot for a little. The circuit not only functions as a detector and a limiter, but also provides fast attack a.g.c., itself most desirable under mobile conditions. No particular comment should be needed on the circuit, expect to observe that *close tolerance* resistors must be fitted in the positions shown.

Constructionally, there are some points to watch. First, the valve-holder must be of low loss insulation to prevent noise pulses leaking across it and so bypassing the limiter. Secondly, the valve should be fitted with a screening can, and thirdly, R1 and C4 should take the shortest possible route between the i.f. transformer and the anode of V1a.

Since the circuit is self adjusting, there is no need to incorporate a limiter ON-OFF switch. As such switches invariably lead to leakage between input and output of a limiter, so degrading performance, if they can be omitted, then so much the better. If you should experience audio distortion to any degree with this limiter, it will be because the other fellow is riding his modulation far too hard. At 100 per cent modulation, clipping just starts.

Aerial Mounting

For those who like mobile aerial installations neat and reasonably unobtrusive, the Ekco car radio aerial type CA225/4 will be of particular interest.

The base of this unit, which may be wing or scuttle mounted, is moulded in low loss polystyrene, the underside of which is fitted with a stout rubber gaiter making it waterproof. The 200 ohm co-axial cable fitted to the unit when it is supplied may be easily removed, and 75/80 ohm, 50 ohm or 35 ohm cable substituted.

The special feature of this aerial is that the mounting base may be retained on the car by the use of an additional half-nut, so allowing the top section to be removed at will. For those who have " getting-in-the-garage " trouble, this is a boon. In addition, if you operate on more than one band, say 160m and 4m for example, then different aerials may be mounted on the same fitting by merely screwing them on to the protruding threaded stud. In the case of the two bands cited, on 160m a base loading coil would be fitted first, and the extending sections of the aerial to the top of the loading coil. When on 4m all that is needed is to fit the extending sections in the normal manner, and then draw them out to the optimum length.

One other advantage is that when away on holiday, or if you have to street park overnight, then the aerial can be removed easily.

Wiring Heaters for 12V and 6V Operation

Many items used for mobile are restricted in use simply because the heater circuits are wired for operation on 12V only, and it is not always convenient, or possible, to provide this voltage in the home station.

For many years the writer has been wiring the heater circuits of his mobile equipment so that it can be operated on either 12 volts or 6 volts. One advantage of this arrangement is that when testing newly constructed gear, this can be done by bringing into service an existing power supply in the fixed station. The mobile equipment can therefore be operated from the fixed station should the need ever arise, and furthermore, such a facility can avoid duplication of equipment.

This facility is provided by arranging the heater wiring of the valves in a balanced series/parallel arrangement according to Fig. 3.

First, the individual heater currents are noted, and then the valves are arranged in a manner similar to that of Fig. 3 so that the *total* current of the valves connected between points *A* and *C* is equal to the *total* current of the valves connected between points C and B.

Now unless you are particularly lucky, the current in the arm *AC* will not equal that in the arm *CB*. To balance the currents, a ballast resistor will have to be fitted to the side which is *short of current* to make up the deficiency.

With 12 volts applied between *AB*, and with the currents balanced, there will be 6 volts between *AC* and 6 volts

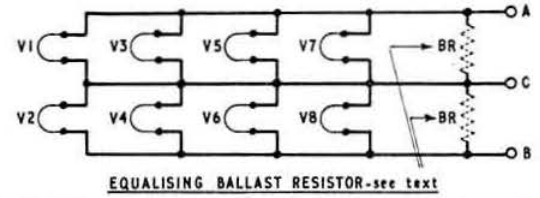

Fig. 3. Universal heater wiring allowing the optional use of a 6 volt or 12 volt supply.

between *CB*. From this it will be seen that the ballast resistor will have to dissipate the current difference at 6 volts. From Ohm's Law, the value of the ballast resistor may be determined. The *working* wattage will be $W = I^2R$, where I is the difference current. To ensure reasonably cool working, the resistor fitted should have a wattage rating of at least three times that derived from the foregoing calculation. One word of warning. Do be sure that the ballast resistor is fitted to the side of the circuit which is short of current.

In use, terminal *B* is connected to chassis. When operating on 12 volts, *C* is left open, and the supply connected to *A*. For operation on 6 volts, *A* is connected to chassis—along with *B*—and the supply taken to *C*.

If one of the valve heaters becomes open circuit, then the current of this valve will be shared by the remaining valves in its arm of the circuit. Rarely, if ever, will this cause any damage. Under such circumstances, since the equipment will not operate correctly, one is left in no doubt as to the fact that there is a fault.

When valves with a centre tap are used, such as a 12AX7 for example, one live pin is wired to *A*, the other to *B*, and the centre tap to *C*.

Notable Doubles

Two valves in one envelope are always of interest to the mobileer for they save current, space, heat, and cost. One

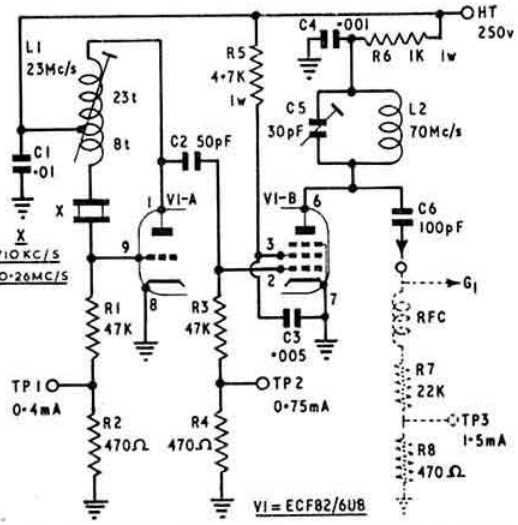

Fig. 4. Single valve 70 Mc/s driver. L1, 31 turns 28 s.w.g. enam: close wound on ¼ in. Radiospares former with iron slug. Tap at eight turns. L2, seven turns 18 s.w.g. air wound ¼ in. inside diameter. Turns spaced wire diameter. TP1, TP2 and TP3 indicate currents to be expected between test points and earth. Components shown dotted are grid circuit of following stage.

particularly useful little valve is the ECF82 which combines a triode and pentode in one envelope. The triode when used as an audio voltage amplifier will give a stage gain of about 60, and performs very well as either a crystal or variable frequency oscillator. As for the pentode, having a slope of 5·2mA/v it makes a good i.f. amplifier, or r.f. amplifier on the lower frequencies. In transmitter service, the pentode shows high efficiency as a doubler or trebler, but in this class of operation, care must be taken to ensure that the screen grid dissipation is not exceeded.

An example of the circuitry which can be woven around this valve is shown in Fig. 4. This is a crystal oscillator and multiplier sequence for a 4m transmitter, and will give 1·5mA of drive through a 22 K ohm resistor in the grid of a 5763 p.a. running 9 watts input. Thus two valves, an ECF82 and a 5763, will make up into a very compact, low power, 4m transmitter.

The American number for the ECF82 is 6U8. It has been noted that a 6U8A has recently been introduced, and from information available, this appears to be an improved version of the 6U8.

Thief-proofing Equipment

As some of us know to our cost, merely locking a car is not sufficient to deter a determined thief.

Since having been through the bitter experience of having equipment stolen, the writer has incorporated the following arrangement in his car. While it does not stop a potential thief getting at the equipment, nor from taking it out, once it is moved, even fractionally, from its correct position, the car horn sounds, and nothing can stop it. The resulting din is more than enough to deter a thief who, above all, does not want attention drawn to himself.

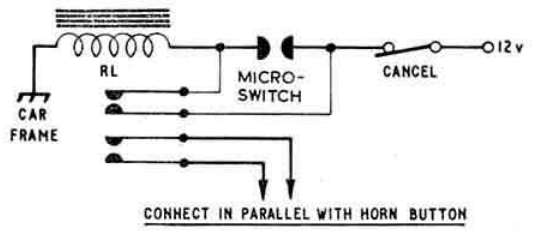

Fig. 5. Burglar alarm circuit. The "cancel" switch is normally ON. To stop the alarm this switch is opened.

The circuit arrangement is shown in Fig. 5. Its operation relies on the fact that the equipment is securely mounted, and that the back of the equipment presses on a microswitch firmly fitted either directly to the bodywork of the car, or to an arm anchored to the bodywork. If the equipment is moved, then the microswitch operates and sets off the alarm. At this stage it should perhaps be mentioned that the microswitch is of the " press to open " variety.

The operation is not quite as simple as has been described for the circuit is so arranged that even if the equipment is restored to its correct position, the horn does not cease to operate. It just goes on and on and on and on . . . This interlock is quite vital. For ease of circuit tracing, the primary wiring has been illustrated in heavy lines, while the interlock is shown in lighter lines.

The heart of the arrangement is the double pole relay fitted with contacts which close when the relay is energised. The primary circuit starts from the negative terminal of the battery and runs through the alarm-cancelling switch, and then through the microswitch to the relay energising coil to the frame of the car. As it stands at the moment, and with the equipment in position, the microswitch is pressed and in the off position. If the equipment is withdrawn, the pressure on the microswitch is released, the circuit completed, and the relay closes. One set of contacts on the relay wired in parallel with the horn button completes the horn circuit. At this stage, if the equipment is returned to its correct position, or the leads to the microswitch cut, then the horn would cease. To avoid this, an interlock is provided. This is achieved by arranging the second pair of contacts on the relay to be in parallel with the microswitch; thus once the relay is closed by the action of the microswitch, one set of the relay contacts maintain it locked " on."

To stop the alarm you either have to know where the cancelling switch is located, or dive under the bonnet to disconnect the battery—and no thief will hang around that long.

The value of this alarm switch depends on how the cancelling switch is concealed. Disguising is often better than hiding, and in the writer's car it is in full view of anyone who enters.

Shoestring Modulation

The writer is always intrigued by descriptions of modulators which, for d.c. inputs of 15 watts or less, employ push-pull modulating valves. On Top Band, or for any transmitter with a d.c. input of less than 15 watts, there is no need to go to such lengths to modulate the carrier in a satisfactory manner.

Taking Top Band as a practical example, a single 6BW6 will, if allowed to do so, run an input in excess of the legal limit. The interesting thing about the 6BW6 valve is that its impedance as a p.a. for 10 watts input (40mA at 250 volts) is near to its optimum load impedance as a single ended output stage for the same value of h.t. supply. The figures are: p.a. impedance, 6·2 K ohms; optimum load impedance, 5·5 K ohms at V_a and V_s of 250 volts. Since the 6BW6 as an audio output valve will deliver 5·5 watts, this is quite enough power to fully modulate a p.a. input of 10 watts. Indeed, under speech waveform conditions, and a reasonably accurate match, the audio output is likely to be quite a bit higher.

Using these facts, gleaned from the valve manufacturer's data, considerable simplification becomes possible. The

principal advantage is derived from the fact that the modulation transformer needs only have a 1 : 1 ratio, and where this ratio is required, with the arrangement to be shown, a full blown modulation transformer is quite unnecessary.

The circuit is shown in Fig. 6. In this a standard centre tapped audio output transformer is used in such a manner that, as far as the p.a. is concerned, it " looks " like a modulation transformer. The transformer has to fulfil two requirements: the impedance on either side of the centre tap should be equal to, or near to, the desired impedance—in this case between 5·5 K ohms and 6·5 K ohms; each half of the winding must be able to carry the current expected to flow through it. Many such transformers are freely available, and moreover, at a cost far below that of a " normal " modulation transformer.

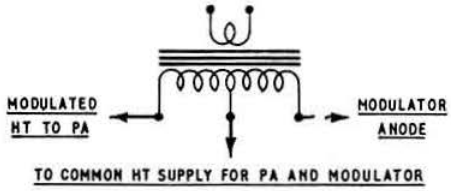

Fig. 6. Method of using centre-tapped audio output transformer as a modulation transformer.

If the equipment in which this idea is incorporated is a transceiver, then the modulating valve can be arranged to do double duty and serve as the output stage of the receiver. Under these conditions the speech coil winding on the transformer can be coupled to a loudspeaker in the normal manner. Naturally, arrangements have to be made to mute the loudspeaker during transmission, and in addition, the transmitter switching should be arranged so that the cathode of the p.a. is disconnected to avoid the p.a. valve acting as a diode connected to the far end of the output transformer while receiving.

While the 6BW6 has been specifically cited, this method is not restricted to this valve alone, neither is it essential that the p.a. and modulating valves are of the same type. Many combinations are possible as a study of valve data will show.

This system has been used by the writer in various low power transmitters and transmitter/receivers. There have never been any reports of undermodulation or poor quality. Quite aside from its advantages circuitwise, it materially assists in getting the proverbial gallon into the pint pot.

Field Strength Indicator

One problem faced by all mobile operators, irrespective of the band on which they operate, is to monitor the level of r.f. radiated by the transmitting aerial. It is neither practical, nor accurate, to use a field strength meter inside the car to determine what is going on outside.

One way round this is to use an external aerial coupled to an F/S meter inside the car, but unless one is prepared to have aerials sprouting out all over the place, hardly ideal.

A neat way of overcoming the need to fit a special aerial is to use a wing mirror as the pick-up for the internal F/S meter. All that is needed is to insulate the wing mirror from the bodywork of the car, and then run a lead from the fixing nut into the car.

On the l.f. bands this can be a plain lead, but on 4m, co-axial cable should be employed. If both l.f. and v.h.f. operation are undertaken, a co-axial lead should be fitted, but without earthing the outer braiding at either the mirror or the saloon ends. When used on the l.f. bands, the F/S meter should be arranged so that the inner and outer of the co-axial cable are connected together, thus turning it into a plain lead. On v.h.f. the F/S meter should be arranged to treat the lead as normal co-axial cable.

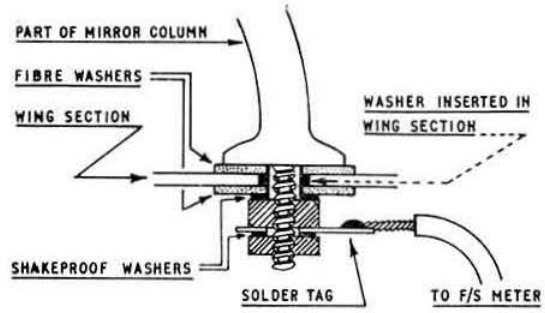

Fig. 7. Insulating a wing mirror to allow it to be used as the aerial for a field strength meter.

A method of bushing a wing mirror for this purpose is shown in Fig. 7.

Microphone Head Amplifier

Most of the diminutive inserts of Japanese origin—such as would be suitable for the halter-boom for example—have impedances ranging from 25 ohms to 250 ohms, and so require the use of a matching transformer. By the use of a single transistor in a suitable pre-amplifier, such a transformer may be dispensed with, and in mobile working this has certain advantages.

The pre-amplifier shown in Fig. 7 was designed specifically for microphones with this range of impedances, but of greater interest, employs a couple of " ideas " so that, although it is positioned at the microphone head, only a single screened lead is needed to (a) bring the output from the pre-amplifier to the main amplifier and (b) take the supply up to the pre-amplifier.

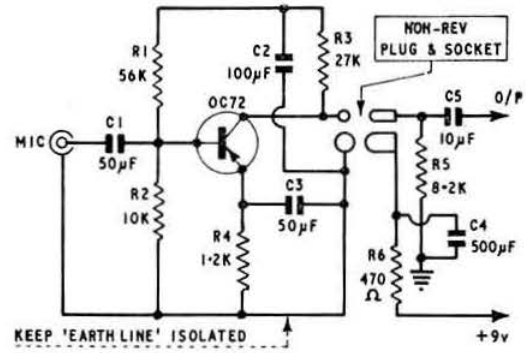

Fig. 8. Microphone pre-amplifier for inserts with an impedance of between 25 ohms and 250 ohms. This unit may be constructed in a small metal cigar case and used as a co-axial in-line amplifier.

The first circuit oddity to note is that the forward bias is taken from the collector. This forward bias is thoroughly decoupled by R3 and C2 so that none of the output at the collector is fed back into the base of the transistor. By using this arrangement, one lead is dispensed with, namely that usually needed to take the supply to the forward bias circuit.

The second oddity relates to the input circuit on the main equipment. Either a co-axial socket can be used, in which case it must be *fully insulated* from the chassis, or a two pin

(*Continued on page 525*)

RAEN Notes and News

By E. ARNOLD MATTHEWS, G3FZW *

LOOKING back it seems evident that most of the established RAEN groups have settled down to a stage of numerical stability, losing a member here, gaining one there, but all the time having a backbone of well-seasoned, reliable operators. **Surrey** county group is a typical example. CC **G3VK** presented his report of the year's work at the group AGM held on May 20 showing a net loss of one member. Steady progress has been made in equipping the group with 4m gear, although it has not been possible to establish v.h.f. equipment at G3POL. In anticipation of this expansion, G8SM and G3JEQ have made surveys of possible communication paths terminating at county Police HQ's. A v.h.f. station has been installed at Red Cross House, Farnham which will link with G3RCC at Croydon. The final aim is to properly fulfil all BRCS and police requirements and hold two base stations in reserve.

Three members, G3GOX, G2AVC, and G3VK, now maintain continuous listening watch on 70·36 Mc/s whilst they are at home (and awake!) and will reply to any call when required. This group ought to be the best informed in the country by virtue of the regular issue of colour coded circulars to members.

It has been found advantageous to allocate duties to AC's rather than give them an area of responsibility. This move has the approval of the RAEN Committee, and these officers will be known as Assistant Controllers, not Area Controllers.

A recent chat with **Cornwall** CC, **G2AYQ,** elicited the information that a section of the county RAEN was called out some months ago by the Police to provide communication for a search for a missing person. We gather that five members were engaged in the operation, which called for the use of walkie-talkies.

Essex Group continue active liaison with county police and exercises were held during April and May. The former was in the Basildon, Vange, Pitsea, Laindon and Wickford areas where telephone lines were assumed to have been disrupted by a severe storm. A total of nine stations (including six mobiles) were used to provide alternative communication with a control station sited in the Southend district.

The latter exercise, on May 16, involved co-operation between all three user services: control of /M stations, which were routed to various police stations where they had to collect and transmit messages, which were required to be collated into situation reports, and then relayed through link stations to control to provide an overall picture of the " emergency " situation. The control station had to deal with a " power failure " by bringing stand-by equipment into use. In all 11 fixed, 12 /M, control (manned by CC, G3PFL and G3PXR), sub-control, G2DQ, and Kent link station G6NU handled 64 messages. Four SWLs also assisted. During the exercise the Assistant Chief Constable (A. Burns, DSO) visited the control station and expressed satisfaction with the arrangements; he was much impressed with the message handling.

On June 26 the group gave a demonstration at a BRCS Branch event held at Melbourne Park, Chelmsford when five mobiles on 160m and two on 2m were linked with controls G3NYP (BRCS HQ, Chelmsford) and G3PXR respectively passed messages continuously from 13.30 until 20.00 BST. A large display board with the RAEN emblem in the centre carried a number of 15 in × 12 in photographs showing various aspects of RAEN work. There was also a static display of 4m equipment.

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We are happy to record the formation of a new group in Hertfordshire, at present covering the **Hitchin** area. G. A. Roff, G3TJI, 4, Uplands Av., Hitchin, has been appointed acting AC. The group is being kept small in numbers at present in order to facilitate development. Unusually, activity is on 10m, a band which was one of those originally recommended but since little used for Network purposes. However, there seems to be more mobile and portable equipment available in the group for this band than any other. It is possible that a move may be made to 4m later on. In the meantime it will be interesting to hear the results of the group's survey of the district's communication potentialities.

Norfolk Group has recently concluded a series of training sessions which they call " verbal exercises," designed to improve procedure and message handling. Instead of conducting exercises over the air, the members assembled at a meeting and sat round the room. Messages were sent " viva voce " and recorded on message forms. Errors were corrected as they arose, and correct use of message forms was ensured. The results are most obvious on the air and it is possible to pick out with ease the members who attended the course! The group is having message pads printed, and are indebted to G3OEP who has donated 25 pads to the group. The need for a system of filing messages has become apparent and boards have been designed for the use of fixed and mobile stations. As other groups may be interested in these, we may be able to give a detailed illustration in the next issue of the RAEN newsletter *Network News*.

For future activity, Norfolk BRCS has suggested that AC's contact their local divisional commandants and organize joint exercises in order to strengthen the ties between both organizations.

Matters Mobile (continued from page 524)

non-reversible socket with matching plug as shown on the diagram. The inner lead of the screened cable goes to the main amplifier via the capacitor C5. The resistor R5 is the load for the transistor collector circuit, which, it should be noted, runs from the live tag on the socket to chassis negative (earth). The screen of the cable is not earthed in the usual manner, but only earthed for signal currents by C4. The screened outer of the cable is continued, via the resistor R6 to a source of 9 volts positive. In point of fact, any voltage between 6 volts and 9 volts can be used, and this circuit has been arranged so that the source of this voltage is the cathode of one of the valves in the main equipment across whose cathode bias resistor this voltage exists. From this it will be appreciated that there is no need to arrange a separate supply for this pre-amplifier.

One point which will be apparent is that the screening of the linking cable is positive with respect to the chassis and other metalwork of the equipment by the supply voltage to the pre-amplifier. Thus the linking cable must be provided with a sheath over its braiding. If this braiding does become shorted to chassis or the metalwork, then it will short-circuit the supply to the transistor. Since the source voltage for the transistor comes from the cathode of a valve, under these conditions the valve would be running without bias. To protect against such an eventuality R6 is included in series with the supply source so effectively preventing damage to the valve concerned.

Conclusion

So ends the first edition of *Matters Mobile*. As was indicated in the preamble, if you are prepared to pass on the benefit of your ideas and experience, your contribution will be very welcome.

NEWS . . .

Collated by John Clarricoats, O.B.E., G6CL

European Fox Hunting Championships. The Fourth European Fox Hunting Championship competitions will take place in the vicinity of Warsaw, Poland, during the period September 13 to 17. Organized by the Polish National Amateur Radio Society, PZK, on behalf of IARU Region I Division, the competitions will be contested in accordance with the basic rules agreed at the 1963 Malmo Region I Conference. Full details of the arrangements, including travel information, can be obtained from PZK, P.O. Box 320, Warsaw. Accommodation for competitors and guests is being reserved at Hotel MDM, Place Konstytucji, Warsaw. Full board, including three meals, will cost about 50/- a day.

The Amateur Radio Society of Barbados received the unanimous approval of the IARU Societies participating in the recent ballot and has become the 64th Member of the International Amateur Radio Union. The ARSB has 50 members, 38 of whom are licensed radio amateurs. Headquarters is maintained at the Signal Station, Highgate, St. Michael. Power input up to 1 kilowatt is permitted on Region II frequencies after successful completion of a 12 w.p.m. test and a written examination equivalent to the UK RAE.

OSCAR and ARRL Awards. ARRL has decided that QSOs made via repeater satellites are not valid for their DX Century Club and Worked all States Awards. The explanation for this decision is that the Awards are made to recognize the personal achievement of an operator in attaining a particular goal by means of his regular station equipment and at his regular address. ARRL considers that the use of an external repeater device to complete a QSO transgresses the intent of the award. Richard A. Ross, K2MGA, Editor of CQ, disagrees on the ground that a time may come, sooner than expected, when amateur u.h.f. communications, via satellites, will be a common and routine affair.

Reciprocal Operating. Ecuador and the United States have exchanged notes permitting the amateurs of one country to operate their Amateur Radio stations in the territory of the other. The United States had previously signed agreements with Bolivia, Costa Rica and the Dominican Republic. (Just before this issue closed for press, news was received that the United States signed reciprocal operating agreements with Belgium on June 18, 1965, and with Australia on June 25, 1965.—ED).

Early Bird in the Public Service. With the official inauguration by British Prime Minister, Harold Wilson and US President Johnson on June 28, a public telephone service across the Atlantic using a Communications Satellite became available for the first time.

ASEE Exhibition Dinner will be held at the Hilton Hotel, London, on October 12, 1965, when the guest of honour will be the Rt. Hon. Douglas Jay, M.P., President of the Board of Trade. The dinner will mark the commencement of an extensive publicity campaign inviting engineers the world over to support and visit the ASEE Exhibition next March in London, when the largest display of electrical equipment under one roof will be on show. Tickets for the dinner are available from Electrical Engineers (ASEE), Exhibitions Ltd., 6 Museum Street, London, W.C.1, at £2 15s. 0d. each

The London U.H.F. Television Conference, originally planned to coincide with the period of the Radio Show, has now been postponed until November 22-23, 1965. Sponsored by the I.E.E., I.E.R.E., the Television Society, and the U.K. section of the I.E.E.E., the Conference will be held at the Institution of Electrical Engineers, London. Further information can be obtained from the Joint Conference Secretaries, I.E.R.E., 9 Bedford Square, London, W.C.1.

Amateur Radio Week in Illinois, has been proclaimed by Governor Otto Kerner for August 2 to 8. The proclamation document looks very impressive if the picture reproduced in June *QST* is anything to go by. How about asking the Lord Mayor of London to proclaim an Amateur Radio Week in the City during the Amateur Radio Exhibition?

Hot Seat Changes. Group Captain A. F. Ward, O.B.E., and Wing Commander Staff Brett, have succeeded Group Captain J. M. Davidson, and Squadron Leader (now Wing Commander), J. M. Railton, G8AB, as President and Vice-President respectively of the Royal Air Force Amateur Radio Society.

YL Traffic Manager. Mme J. Vandermeer, ON4AD, of Brussels, is probably the first YL ever to hold the job of Traffic Manager to a National Amateur Radio Society. Her appointment, for two years, was ratified at the recent UBA National Assembly.

RAE Syllabus. The Syllabus for the Radio Amateurs' Examination (No. 55) has been slightly amended, as has the list of recommended reference books. Copies of the revised Syllabus can be obtained from City and Guilds of London Institute, 76 Portland Place, London W.1, price 1s. 6d. (post free).

CQ de Radio Products Fair. DARC are to put on a special show at the Radio Products Fair to be held in Stuttgart-Killesburg, from August 27 to September 5. In addition to normal Amateur Radio links using telegraphy and telephony, there will be demonstrations of Amateur Television and Amateur Radioteletype. A television station built by German amateurs to conform to European transmission standards will operate in the 420 Mc/s amateur band to provide " Amateur TV as a Fourth Programme " for visitors to the Fair.

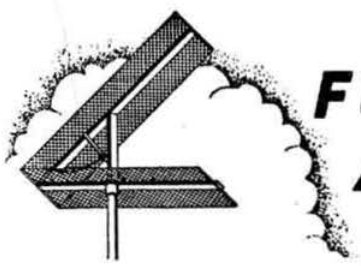
Steam Powered! H. B. Smith, W8VVD, recollecting what the world owes to James Watt, decided to design a steam-driven, single-transistor, flea-power transmitter which would radiate a c.w. signal readable up to a distance of three miles. He succeeded. The tiny generator produces between 10 and 15 milliwatts of power. Full story, July 1965 issue of *Popular Electronics*.

ARRL NCEF. June 1965 *QST* lists the full-time and part-time National Calling and Emergency Frequencies with the appropriate guard segments recognised by all U.S. radio amateurs. The full-time frequencies are 3550, 3875 and 7100 kc/s, 29.640, 50.550 and 145.350 Mc/s. The use of these frequencies represents a voluntary programme undertaken by amateurs to provide immediate emergency communication in any distress situation. The first five minutes of each hour are reserved for emergency calling only on the full-time frequencies.

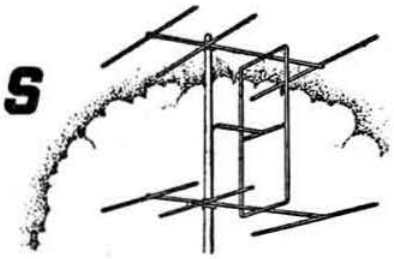
UK Car Radiophone Service. The cost of a licence for a telephone installation in a car has been fixed at £30 per annum. The installation must be approved by the Post Office. Charges are 1s. 3d. for three minutes in the Service area plus 5d for each extra minute. For long distance calls the nominal manually connected trunk call charge will be made plus an additional 1/- " radio fee". The service was inaugurated by the Postmaster General on July 5, 1965.

Sheer Coincidence—or was it? that the President and the two Past Presidents of RSGB who attended the General Assembly of UBA in Brussels recently, found themselves accommodated in a hotel which has three surplus radio stores as next door neighbours! Current price for a BC 221, 7500 Belgian Francs (£55).

Congratulations to T. H. Bridgwater, Chief Engineer, B.B.C. Television, on being appointed an O.B.E. in the recent Honours List. Mr. Bridgwater was associated with the Baird Television Comapny 1928-1932 and has been with the B.B.C. since 1932, except for war service with the R.A.F. when he was engaged in radar nav-aids. He is well-known in Amateur Radio and Amateur Television circles.



FOUR METRES AND DOWN



Great Sporadic E Opening on 144 Mc/s

By F. G. LAMBETH, G2AIW*

SUNDAY July 4 will probably go down in history as the first occasion on which a sporadic *E* opening of such magnitude has ever been recorded on 2m. It may be some years before we have anything like this again.

The duration of this event was approximately two hours during which many contacts were made with stations in Eastern Europe. Of special interest is the contact between EI2W and YU1EXY at a distance of approximately 1,394 miles. Reports have been received of a contact between G3MPS and a Rumanian station which may compare with or even excel the contact between EI2W and YU1EXY.

This particular opening has convinced a number of regular operators on 2m that it is more than likely sporadic *E* conditions prevail at 144 Mc/s, perhaps a little more often than is generally believed, but due to lack of activity it could go unnoticed. After the opening during the morning of July 4 many operators monitored the band around tea time to see if there was a return of the phenomena only to be disappointed, although there were indications at lower frequencies. New operators should note that the peak times for possible sporadic *E* at 144 Mc/s is usually late morning and again around tea time, the best times of the year occurring during the months of June and July. There is a school of thought which relates a maximum intensity of sporadic *E* to minimum sun spot activity; perhaps July 4 would go some way to confirm this statement.

G2AXI (Basingstoke) suspected that he was suffering i.f. break-through when he heard his first YU, and it was some time before he convinced himself that the signals he was hearing were actually being propagated at 144 Mc/s. After this initial set-back, he proceeded to work YU1NPW, YU2BOP (locator JF34J), HG2RD (locator IH79J), and called a number of other YU stations without success. However, he is naturally highly delighted with his two new countries which, incidentally it is perhaps worth mentioning, were worked on n.b.f.m.

G6OX (Englefield Green) was very pleased to make a c.w. contact with YU1EXY in Belgrade. He also heard numerous other YU stations and HG3GG.

G2JF, Wye missed the greater part of the opening except for the last 20 minutes, during which period a c.w. contact with HG3GG and a phone contact with YU1IO/P were recorded.

G5MR, Stelling Minnis, also reports a c.w. contact with HG3GG but was not as fortunate as other people in raising some of the other DX.

G2BLA/P, at Telegraph Hill four miles west of Hitchin, reports hearing I1, HA, HG, YU, YO and HB9.

G3UFA (Welwyn) informs us that G3INU, Stevenage heard a UA1 and G3TGE heard EA. According to the 27 day cycle it may be profitable to keep one's ear to the band just in case that prediction runs true to form and sporadic *E* reappears.

G3HRH, RSGB V.H.F. Manager, reports contacts with YU1MPW Belgrade and YU3OV/P, both at S9 on phone, during the last 20 minutes of the opening and actually had a personal visit from a HG amateur during the period when the sporadic *E* signals were coming in!

EI2W, in addition to YU1EXY/P, worked YU2GE and heard YU3OV/P (145·240 Mc/s) YU2HB, YU1CW, YU1IOP, YU1NOL, YU3OV, OE6BRG, OE3ORA and DL7HR. All the reports were good, mostly better than S7. The contact with YU1EXY/P is apparently a new European record.

G3DIV (Polegate) who had G3TDR with him at the time, at 09.10 GMT found a station on what appeared otherwise to be a more or less empty band. A little later an excited G station was heard calling "UY1CW" which turned out to be YU1CW. Before that, however, G3DIV identified an HG5 call. Several phone stations were heard speaking what sounded like Hungarian and G4LU was being called by one of the strong phone stations. However, one certain thing is that YO9KPB/P was heard on phone calling G3SDI, and passing the transmission to G3SDI "or anyone else". This led G3DIV to go on with s.s.b. plus a certain amount of carrier, which produced an immediate response with a 58 report and a QRA Locator MF47C. This was a solid QSO in spite of the generally unstable nature of sporadic *E* conditions. The QSO lasted about 18 minutes. The signal was so strong that background voices could be clearly heard. The portable QTH of YO9KPB is believed to be about 75 miles north of Bucharest.

GM3GUI (Friockheim), worked I1ACD at 11.16 GMT with reports of 58 both ways, the band fading at 11.25. Other stations heard were I1TCL (59) calling G3IOE, I1PDN (59) calling G3JYP and I1SVS (59++) calling CQ. GM3GUI reports also that GM3LAV worked two Italian stations during the Contest, on July 4.

G3MMW (RAF Locking) worked HG2RD at 09.30 GMT, reports being 58 both ways on phone. This is possibly the first Hungarian worked here by this mode, although it has already been done bym.s.

BRS 26389 (Southport) heard stations in France, Italy (Trieste) and Yugoslavia. On and off they were coming in from morning until the early afternoon. The aerial is a 6-over-6, only 30 ft/a.s.l.

GM3LDU (Glasgow) first noticed the opening at 10.30 GMT when several phone stations were heard strongly but with heavy fading. I1DRE was soon identified, and at 11.06 I1PDN, who was working G3JYP. Both Italian stations were peaking S9 with rapid fading to the noise level. Both were last heard about 11.20 GMT.

GM3GUO heard a YU station and **GM6ZV** heard I1DRE. Tropo conditions did not seem particularly good and G5YV was the most distant station heard by that mode.

G3XC (Indian Queens) says the Cornish V.H.F. Group set up two stations for the contest (G3XC/P and G3NVJ/P) to

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* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the **September** issue by **August 6** and for **October** issue by **September 11**.

test the relative merits of two sites. However, as G3XC/P worked two HGs and four OEs, and G3NVJ/P worked four and two OEs, they are still uncertain! Conditions were very poor to and from the rest of the UK.

GC2FZC (St. Peters Port) proves the widespread nature of the opening by quoting a QSO with OK3KDX (599) which appears to have been the first GC/OK contact on 2m. This was the only QSO, but OK3YY, OK2KPU, OK2IJU and OK2KTR were all called without success. It is thought that the intense European activity caused a falling off in home contacts as only G3XC/P, G3MDH/P, G3IGV/P and G3NJV/P were heard and worked: however the conditions to the mainland were not good.

GM3LAV, working portable in Berwickshire, heard YU2AKL/P, YU3MIJ and several others at about S7 mostly on phone.

Later, at about 10.30 GMT I1DRE, I1FCL/P and I1LPDM were heard and I1AIM and I1DAM were worked, 59 both ways on phone. Shortly after this the Italian station faded out. During the contest G3LRP and G3KQD/P were worked, and G5YV and G5LH heard.

GW3MFY (Bridgend) gives another angle, reporting a QSO with HG3GG at 10.10 GMT. He was called then by OE6BRG and OE5XXL, only to find they had vanished after he had reported to them! Also heard were HG5KEB/P, HG5KDQ/P, OE3GJW, OE6LOG, HG2RD, YU3DBJ and YU2BOP. **GW3CBY** (Swansea) worked YU and **GW3FSP** heard an Italian station. **G3MPS** worked four countries including YO! The fade-out was at about 11.15 GMT.

G3BLP (Woldingham) worked HG5KD/QP, HG3GG, YU2BOP and YU1NPW. YU1CW, YU1NDL, YU2BUP, YU2BYP, YU1BCM, YU2IES and YU1BCD were heard. EI2W reports that **GI5AJ** worked YU2HB, YU2BH/P and YU3DL/P during the opening.

BRS26095 (Marlow) gives the s.w.l. point of view from a very poor location in a valley of the Chilterns with 250 ft. hills all round. He heard YU2BOP, YU3VBJ, YU1EXY/P (working EI2W part of the time), YU1IOP, YU2JH, YU1NPW, OE6BRC and HG1KZC/P. The equipment is a 6CW4 converter into an Eddystone 888A tuning 28-30 Mc/s. By the way, we do welcome s.w.l. reports, at all times.

G3PVB (Northampton) had a very frustrating time, hearing and calling OE6BRG, YU1EXY/P, YU1IOP, NDL, NPW and YU2s BOP and GE (who was calling EA at one time!). A DJ/P in the Bavarian Alps was logged. No QSOs were made. G3PBV also reports that G3SIV (nr. Northampton), a newcomer to the band, heard his first continentals: four of the above YUs and two Italians.

G3IMV (Bletchley) logged 14 YUs, OE6BRG, HG1KZC/P and worked YU1IW/P, YO7US/P and had a half QSO with YU4BMN/P which faded as the opening ended.

BRS24733 (University of Manchester) has a very ordinary site 150ft. a.s.l. with a 6 element Yagi at 27ft. but this was good enough to bring him YU2GE, YU2HB working GI5AJ, YU3BH working contacts including G5YV, YU3DL/P, YU3UAB, YU3AAN and YU3APR/P all working c.w. with G3CCH. I1ZDL working G5YV and CE7HNI. During this time only local Gs were heard; even those on the hills did not appear able to work Southern England. This experience made the day for BRS 24733—the first signals ever heard by him on 2m from outside the British Isles.

G3JGJ (Moretonhampstead) went portable near home with a J66 (4 watts) and a 4 element Yagi at 12 ft. Having worked GC2FZC and GC3OBM, he then heard G3MPS calling YO9KBP. Later he heard HG5KDG (59+) calling CQ. (10.35 GMT) then OE6BRG calling CO. (He came back to G3NVJ/P.) G3JGJ despite many calls made no QSOs. The band had " closed " again by 11.15 GMT. The feature of the opening was that almost every signal was S9+.

G3OCB (Truro) reports on G3NVJ/P (nr. Redruth) and says they were surprised at 10.30 to start off with hearing French and German speaking stations—the conditions were apparently declining then! There was one station with a completely unrecognisable language with a " Slavic " touch about it, but he was dismissed as probably speaking some nearer obscure European dialect. In all, four HGs and two OEs were worked but no nearer Europeans were heard. After midday, only the usual G2 and GWs were noted.

G3RMB (Coventry) worked YU2BOP and YU1EXY/P both being first rate QSOs. Many more exotic calls were heard in the area around Northern Italy. A DJ station on the Bavarian Alps was putting out a signal comparable with that from local Gs. After G3XC and G3OCB were worked, another interesting QSO was with GC3KAV (Guernsey) and EI2W. The country total now stands at 16.

Another Midlands viewpoint comes from **G2BJY** (Walsall) who switched on at 09.45 GMT and immediately heard YU1CW. The opening lasted until 11.15 and YU1NDL, YU2GE and YU2JH were worked, with YU1MPW, YU1CW, YU3ZO and HG3GG heard. None of the nearer European countries nor GM, GI or EI were heard, in fact, conditions for G stations seemed poor!

G3KKA (Solihull) with G3UAW, was operating GW3RUF/P from a new site in Merioneth for reconnaissance purposes. A late start spoiled all their chances. There was only time for one DX contact with (YU1NDL) before the opening closed. They had a good day otherwise, however, and knew they couldn't pull up the score when they learned that G3BA/P had worked three YUs!

As a tailpiece, a letter from **OE6AP** (Graz) says that G6AG and G3FZL were the strongest signals there, and that many other G and GW stations were heard. **OE6TH** (also in Graz) confirmed this. The opening there lasted an hour.

Two Metre Notes

BRS26389 (Southport) would like to know where the amateurs hibernate between contests. Two very keen operators locally are G4GM (Accrington) and G3OPI (Watney Is.) who are on nearly every day. Otherwise, there seems to be generally little activity on the best band of all. The following areas are a few heard without turning the beam. **North:** Newcastle-on-Tyne, Berwick on Tweed, Brough. **South:** I.o.W., Folkestone, Poole. **East:** Kings Lynn, Lincoln, **West:** Cardiff, Snowdon and Limerick. BRS26389 started in the days of cat's whiskers and finds Amateur Radio the best of all hobbies. If only a few more amateurs would get on 2m they would give a lot of pleasure to the blind and bedfast amateurs of Great Britain.

G3XC says that the portable trip to the Peak District was only partially successful, no London stations being worked, and a contact with G3IGV/M (near St. Austell) had to suffice. G8ML (Cheltenham) in spite of his poor location and 12 ft high aerial was worked from all the different places, and G6GN (Bristol) put an excellent signal in all directions.

EI2W has now worked 100 counties on 2m. The four which completed the century were Mayo, Sligo, Roscommon

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

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3VHF	Wrotham, Kent	144·50 Mc/s	A1	North-West
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

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
June 29	11.29 GMT	70 c/s low
July 6	13.50 GMT	Nil
July 13	10.48 GMT	80 c/s low

and Leitrim, all with EI5AW/P on July 7. EI6AS and EI2A also worked EI5AW/P for the same four counties. EI5AW/P is GI3SLI (Downpatrick RAF Station).

G3OCB (Truro) found conditions at home only fair, but there has been a fair spread of QSOs as far as Wales, and the Midlands. The local lunch time activity still goes on, with G3XC, G3OCB/M and G3NVJ/M participating. G3LPB, G5ZT and G6XD and GW2HQ join in from time to time.

G3AZT (nr. Abingdon) is working QRP with transistors in both transmitter (150 mW) and receiver. He is to be found near to 144 Mc/s and worked as far as Wales during Field Day from Chipping Norton (portable). This list included his first transistor to transistor QSO with G3KMT/P (near Ludlow). G2JF has been worked from the home QTH at a distance of 101 miles.

Meteor Scatter Skeds with Austria

OE5XXL the club station of the Linz Amateur Radio Society is looking for m.s. skeds during August/October. Please write to Box 500, Linz, Austria.

DXpeditions

G3KXA sends final details of the expedition which he and G3UAW will be making to Scotland, commencing on August 27 (19.00 clock time) till 09.30 on September 6, using the call-sign **GM3RUF/P.** The frequency will be 145·95 Mc/s and it is hoped to visit Roxburgh, Lanark, Renfrew, Dumbarton, Stirling, Perth, Clackmannan, Kinross, Dumfries, with Ayr and West Lothian as reserves. G3BA will handle all skeds before and during the operation. Sked times are 07.30/09.30 and 19.00/midnight daily: will those interested please sked G3BA a s.a.e. with spot frequencies and a clue as to the desired times. G3KXA would particularly like to hear from those who had skeds and QSOs during the very successful June 1963 trip. The importance of skeds in these expeditions is proved by the fact, that in the 1962 trip G3FAN (I.o.W.) was worked in every county including Peebles because they knew exactly when and where to look for him, in spite of QSB and a sometimes very weak signal. There will be six in the party and " two of everything " with about 60/100 watts phone and c.w., so they hope to make a very useful noise on 2m. Good luck anyway.

G3JDM hopes to be portable on Kithurst Hill, Storrington, Sussex each evening at 20.00/21.30 GMT from August 17 to 25 inclusive, with a five element Yagi and 15 watts to an 832 (2m) and a 10 element Yagi and 5 watts to a QQV02-6 (70cm).

The **GB2GC** expedition station in Alderney is unlikely to be operative until Wednesday, August 18. As 2m is to be the main band, the station will call " CQ " in the following directions at the stated times.

17.00 GMT 15° N of W (towards Devon and Cornwall)
17.30 GMT 30° W of N (towards S. Wales and GI/EI)
18.00 GMT Due N (Midlands and North)
19.00 GMT 30° E of N (London and Home Counties)
20.00 GMT Beaming towards the Continent.

Frequencies will be 70·405, 144·15, 432·15, and 1296·45 Mc/s. The 2m and either the 4m or 70cm station will be active from 17.00/23.30 GMT each day. The 2m station may also be active from 06.30/08.00 GMT and for a period at lunch time each day.

The University of Sheffield ARS will have a station on for V.H.F. NFD using the call-sign G3MZY/P and concentrating on 70cm. A group including G3MZY, G8AAC, G8AET, G8AGN, G8AGQ and BRS26125 are building the station. They will also be on 4m and may be on 2m, 23cm and 3400 Mc/s if there is time. The Sheffield Amateur Radio Club is also preparing for the event; G3JRL/P will be the 2m station with G8NN/P on 4m and 70cm.

Four Metres

GW3LQE (Penarth) and a number of other stations in the Bristol Channel area have purchased surplus Pye Reporters in the last few months and these have been suitably modified with receiver tuning for the 4m band. Activity at present is mainly on Sundays, but as a large percentage of the stations are mobile, activity should also become widespread on weekdays. Channel 5 TV causes some trouble to fixed stations but recent tests show that there is little for mobiles to worry about. Those regularly active locally include GW3KZX (Cardiff), GW3LAD (Cardiff), GW4CG (Porthcawl), G3TWO (Bridgewater), G3SRL (Watchet), G3PWV (Minehead), all of whom are mobiles; G3EHY (Banwell) and of course GW3LQE. Working in the E. Midlands and East Anglia and travelling by car every Sunday evening permit plenty of mobile working for GW3LQE, but two recent Sundays produced only two QSOs and one QSO respectively over the seven hour 200 mile trip across a heavily populated part of the country. If 4m operators will go on and stimulate evening activity they might get some interesting QSOs! Incidentally Italian TV signals were S9+ on July 4 by sporadic *E*.

Sheffield district stations G3CGF/M, G3GJF/M, G3GVM/M, G3UAU, G3DHU/M and G3MZY/M are all on 4m using vertical polarization and a net frequency of 70·26 Mc/s.

Other stations in the West Riding on 4m are G3RND (Pontefract), G4PL (West Ardsley), G3PCJ/M, G3HHU/M and G3RLE (all in Bradford).

Seventy Centimetres

EI2W reports that EI4Q is on 420 Mc/s and has had a QSO with him. GI5AJ has also heard EI2W, whilst Harry himself has heard G3MPS (Bridgwater).

A very detailed sked report received from OH4HN, ranging from January to mid-June, and listing results with F9FT (230 km), F3LQ (70 km) and G3LQR (250 km) shows that good signals are nowadays the rule rather than the exception even when conditions appear to be poor. There are very few poor reports over long periods of conditions noted as " bad " and " poor " and it again appears to prove the contention that if you have skeds you can nearly always get QSOs, i.e. know where they are, and when they are there, and the contact is almost made to start with!

G3NBQ (Coventry) reports a high level of local activity; the best stations heard and worked were G3FP, G8AAA, G3GWL, G8AEX, G8ABB and G8ADC.

G3RMB (nr. Coventry) would like to appeal to local amateurs to adopt a more sophisticated approach to equipment designed for operation on this band. He says that many channels on 2m are occupied today by the high level radiation at 144 Mc/s from 432 Mc/s transmitters. The nature of these spurious signals appears to be an overmodulated effect occupying more than a normal channel width. The reciprocal also occurs, 2m being heard on 432 Mc/s. G3RMB has now worked five countries on 70cm.

Moonbounce

On July 3, between 21.45/22.15 **GW3MFY** (Bridgend) heard **KP4BPZ**, peaking 549 on 70cm. The aerial used was a 4-over-4 slot with the mast " bowed " to tilt the aerial. An AF139 pre-amp was in use.

G3TAE (Bournemouth) reports that G3OBD, G6XM, G8DL and himself set up a station for the moonbounce tests. They were successful in hearing KP4BPZ quite well, but were unable to make a QSO. At first there was no success, but after replacing the mast-head preamplifier the Puerto Rican station was heard at good strength being 20db above noise on average. The aerial was a 17 ft dish, with a disc and dipole feed. The preamplifier employed an AF139 at the focus. The converter was conventional and the i.f. at 25 Mc/s used an Eddystone 830 and an HRO. The signal was

tape recorded and some interesting pen recordings were also made. No British signals were heard: the only European apparently in QSO was an LX. All others appeared to be Ws and Ks. By the way, the transmitter at this end was a 4 × 250 in a co-axial circuit, with an input of 100 watts to the aerial. This was driven by a 4 × 150 70cm amplifier.

HB9RG had a two way s.s.b. contact with KP4BPZ during the tests on July 3.

G3LTF (Galleywood, Chelmsford) worked KP4BPZ twice by c.w./s.s.b. on July 24, and heard WA6LET, Stamford, California, at RST339. G3LTF also worked KP4BPZ at RST549 on July 3. **G3CCH** (Scunthorpe) is also reported to have worked KP4BPZ.

G3AHB (Slough) heard KP4BPZ's s.s.b. signals at RS34 and his c.w. signals at RST569 on July 24.

GM3FYB, GM3ENJ and others in Dunfermline heard KP4BPZ on July 24.

1296 Mc/s

G3NBQ (Coventry) has now completed a 3 ft dish and it is up at 20 ft. Results are as expected, i.e. a 9db improvement over the 60° trough. **G3GWL** also has a 3 ft dish and gets a similar improvement. A series of tests between them has shown that there were only about two points difference between signals on 23cm and 70cm. Gains obtainable from other dish diameters are listed as: 1½ ft 15db, 2½ ft 20db, 3 ft 22db, 4 ft 25db, 5 ft 27db and 6 ft 28db., whilst the best obtainable from a 60° corner reflector is 13db. G3BNL is now a good 569, using the dish (against 449 on the trough). Tests with G3KEF show that local screening is far more severe on 23cm and that it is essential to get the aerial well in the clear. With G3GWL the aerial height is sometimes critical for good signals.

G8ABB (Bletchley) is now receiving well on 23cm and has heard G3NBQ and G3GWL and some signals from the London direction.

G3BNL and **G3KEF** went to Beacon Hill (Leics) on July 2 and worked G2CIW and G3NBQ and heard G2FNW. They were heard by G3LHA. G3NBQ has received G3FP on several occasions on c.w and phone. G3MCS has an 8 ft dish at 30 ft but tests are still negative. G8ABD is ready for tests and G8ABP is building as is G3EEZ.

G3LHA writes that it's " all systems go " with him as far as 23cm reception is concerned. The converter is a modified K6AXN using a high *Q* break. The i.f. used is 27-30 Mc/s for 1296/1299 Mc/s.

G3LHA has heard G2CIW, G3BNL/P, G3KFD, G3GWL, G3NBQ and G3KEF. These have been worked crossband to 70cm. The aerial is now a mini-corner reflector with sides only 12 in long, giving at least 4db gain over the previous 16 element stack.

North-West Convention

The 1965 North West V.H.F./U.H.F. Convention and Dinner will be held at the Grosvenor Hotel, Deansgate, Manchester on Saturday, September 18 1965 from 13.30 onwards. The Convention Dinner will be at 19.30. A programme of visits to establishments of electronic or radio interest is being organised and visitors will be asked to state their preference on " booking in". G3CCH and G3LTF will give a talk on Meteor Scatter and Moonbounce activities, these will include recordings. A film show, Exhibition by the trade, competition for the best piece of amateur built equipment, etc, will be among the many other interests. The Convention station under G3UHF/A will be on 144 Mc/s from the hotel early morning onwards; a/P station on high ground to the south will look for distant mobiles. The usual raffle will follow the dinner, there will also be a prize for the winning ticket at dinner. YL's and XYL's will be welcomed.

Overnight accommodation at the Grosvenor Hotel or other alternative hotels is available at the usual charges. Tickets for the Convention and Dinner will be 25/-. Requests for tickets and accommodation should be made to Tom Davison, G3AGS, 18 Boardman Road, Higher Crumpsall, Manchester 8. Tel: Cheetham Hill 2762). All other information may be obtained from Geoff Barnes, G3AOS, 5 Prospect Drive, Hale Barns, Cheshire. Tel: Ringway 2415.

RSGB QSL BUREAU

WILL BE CLOSED

AUGUST 19 to SEPTEMBER 7, 1965

Both dates inclusive

No cards should be sent to G2MI during this period

A Fully Transistorized Converter for 432 Mc/s

The first line of the list of components on page 453 of the July, 1965 issue of the RSGB BULLETIN should read: C3, C21, 4pF Wingrove and Rogers airspaced trimmers.

On page 454 it is stated the supports for the oscillator-multiplier board are ⅜ in. long. They should be 1⅛in. long.

The GM0290 and GM0378 transistors are now being mounted in TO-15-2 encapsulations, with different base connections, and are accordingly designated GM0290A and GM0378A respectively. The leads are in-line, and with the pip downwards, the left-hand wire is the base, followed by the collector, emitter and case in sequence.

Written Long Ago

" What of the wavelengths around 1 metre? Something tells us that in this part of the spectrum will be found the solution of many present-day problems none perhaps more pressing than Television. By the creation of a chain of relay stations working on about 1 metre we believe it would be possible to institute a nation-wide television service. We visualize the present Alexandra Palace transmissions being picked-up at 30 or 40 miles north of London, relayed to a local area on 1 metre, and re-broadcast to a second relay station working on 7 metres for further local distribution and further relaying. In about three " hops " the Industrial Midlands could be given a commercial television service.

" The metre wavelengths also appear to offer a very suitable transmitting medium for A.R.P. work. If an emergency arose the need for strictly localized transmissions would be of paramount importance."

" The Metre Wavelengths "

John Clarricoats, G6CL
The T & R Bulletin, September 1938
Editorial

J. C.

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW*

JUST how much the character and size of mobile rallies has altered over the years is evident from the leaflet issued by **Oxford and District ARS,** who organised this commemorative rally in conjunction with the Society. Then, out of a total of only 40 amateurs who attended ten years ago, only 23 were mobile equipped. This year's rally at Headington College of Technology on July 11 had an attendance more like ten times those figures. It is probable that the attendance would have been greater had the day not been so rainy.

Local model enthusiasts had assembled a very interesting collection for their display, including an autogiro, a twin engined canard, and a " flying bomb " jet with a claimed thrust of 100 lb. at 125 m.p.h. G3OGJ, assisted by other members of BARTG, had three type 7 teleprinters giving RTTY demonstrations throughout the day. Oxford and District ARS exhibited a very nice range of cups and trophies they currently hold, together with some of their home-constructed D/F equipment.

Members of the RSGB Mobile Committee manned the Society bookstall, the children's Lucky Dip and sold tickets for the grand raffle.

Oxford City Police demonstrated a number of anti-theft devices from door locks to safes, including an infra-red burglar alarm, whilst out-of-doors they showed car and motor-cycle radios, walkie-talkies, u.h.f. f.m. point-to-point transmitters and receivers and a radar speed meter. Trade displays were made by Green Electronic and Communication Equipment, Taunus Electrical Services and L. Westwood.

During the afternoon a variety of films was shown, and a talk, " Reminiscences of Foreign Travel " was ably given by Mr. A. Broadbent, a lecturer at the college who has made a hobby of off-beat holidays.

Talk-in stations GB3RS operated on 160m by G3PZS and G3PMI and on 80m by G2DU, made contacts with over 50 and seven mobiles respectively, and GB2VHF operated on 2m by G3UGH and members of Harwell AERE RS, and on 4m by G3UGG and G3NCM made 11 and three mobile contacts respectively.

Thanks are due to G3JLE, the co-ordinator, and all who worked hard to make this commemorative event a memorable one.

At the Tenth Anniversary Mobile Rally in Oxford on July 11, 1965 From left to right, Mrs. Sylvia Margolis, XYL of G3NMR. Fred Parker, G3FUR (Chairman, RSGB Mobile Committee), the unidentified editor of a well-known Amateur Radio journal, and R. J. Boby, G3JLE (Chairman, Oxford and District Amateur Radio Society). *(Photo by G3NMR)*

Rallies

A discussion with **G3JFH** (Cheltenham) a short time ago has prompted some thoughts on the running of competitive rallies. Generally speaking opinion has been against these because "the sight of a number of mobiles haring round the countryside would be bad for the image of Amateur Radio." Oddly, this argument has not been applied to D/F contests! Competitive rallies, using teams of three (driver, navigator, and operator) could provide a considerable amount of interest for many amateurs. It is unfortunate that the highly competitive major motoring rallies, supported by manufacturers entering teams of professional crews, should have given a very false impression of the hazards attaching to the average small-scale event. The writer's personal opinion is that /M rallies could be run with no more risk than attaches to an ordinary trip to the usual sort of mobile rally, and would be attractive if they provided a test of wits and mental skill as well as operating ability. Thus the owner of a car beyond it's prime would be at no disadvantage.

Generally, such events as have been run have been small-scale attractions at normal mobile rallies, e.g., as at the RNARS Rally in May, but they might well be made into events in their own right if there is sufficient support. Readers' views will be welcomed.

One of the car parks at the College of Technology, Headington, venue of the Tenth Anniversary Rally. *(Photo by G3NMR)*

* 1 Shortbutts Lane, Lichfield, Staffs.

Some of those who attended the first mobile rally ever held in England on October 9, 1955, were also at the Anniversary Rally on July 11, 1965, including G3JKV, G3FZL, G3JLE, G3IIR, G2VB, G2LW and GM3COV.

(Photo by G3NMR)

(Difficulties are likely to be encountered in arranging rallies of the type suggested, which are subject to RAC rules and police regulations.—EDITOR.)

Forthcoming Rallies

Call-signs of the talk-in stations for the eighth **Derby** Rally to be held at Rykneld Schools, Derby on August 15 will be G3ERD/A on 160m. and G2DJ/A on 2m. The latter station may also operate on 4m. The usual programme has been enlarged and there is a full programme for the children including a miniature railway, model car racing, treasure hunt, etc. The star prize for the 40-prize raffle is an automatic washing machine. Bargains for all the family will be offered at the junk sale commencing at 4 p.m. and the rally will conclude with the usual children's film show.

We suppose that the First International Ham Convention being organized by ON4LV and others to take place in **Knokke, Belgium** on September 17, 18 and 19 might be classed as a mobile rally since they are apparently prepared for visitors arriving in all forms of transport from submarines to u.f.o.'s! A very full programme of radio and social events has been laid on. Two symposia will deal with u.h.f.'s and s.s.b. British amateurs who will be co-operating are G2JF, G6NOX/T and G6NDT/T. All-in accommodation from Friday evening until Sunday lunch, inclusive, and including sightseeing trips and special bus from Ostend to Knokke and return is 1,000 B.Fr. (about £7 5s.) and BUA will grant fare reductions. Further information and bookings may be had from M. Luc Vervarke, ON4LV, Lippenslaan 284, Knokke 1, Belgium.

The customary rise in mobile activity during the summer months has been much in evidence, and quite a number of home-constructed transceivers have been heard on 80m. **G3IWV** (Bournemouth) has been heard putting out a very useful signal from his QRP rig. **G3HVX** (Hereford) has built an extremely well finished transceiver for fixed or mobile use. This is intended to drive separate amplifiers which are left in the house or car. We understand from G3MVT that a single conversion filter-type circuit, with a 6 Mc/s filter is used to give coverage of 160, 80 and 20m bands. **G3BA** (Sutton Coldfield) is forsaking v.h.f.'s for a while and is installing his KW2000 in his car, using a home-brew aerial on 160m. **G3HZP** (Cambridge) was heard on holiday at St. Ives maintaining a regular daily sked with G3NBP. **G3KAP** (Dartford) also radiates a good signal on 80m.

Is this summer activity an apparent effect due to conditions or is it real? Many operators have their gear permanently installed in their cars, but for about two months last winter the only /M signals the writer heard on 80m were from HB and VE! Hardy G's such as G3BID and G5CP worked much DX at this time.

Cleaning "Bandspanner" Aerials

Despite seemingly adequate precautions to prevent the ingress of road grime to the inside of the body of these aerials it is found that the internal taps of the loading coil tend to foul up. The coil is 24 in. long and only $\frac{3}{8}$ in. i.d. and presented a problem until a suitable cleaning tool was found in the shape of a 12 bore shot-gun cleaning rod with a brush attached. The brush was padded out by winding a strip of rag round to make a push fit in the "Bandspanner" body and a suitable cleaner applied. A cork on the end of a piece of $\frac{1}{4}$ in. diameter rod would make a suitable substitute, provided precautions are taken to prevent the cork coming off and getting stuck in the coil.

Mobile DX Activity Sunday

The Amateur Radio Mobile Society is holding a Mobile Activity Event on Sunday, September 5, 1965, which is based on an idea by 7Q7PBD. The object of this contest is to score as many points as possible by contacting mobile operators in other countries and the winner will be presented with a handsome, engraved beer mug donated by 7Q7PBD.

The rules are as follows:

Activity period: from 08.00 to 20.00 GMT on September 5, 1965.

Frequencies: mobiles will attempt to keep within 10 kc/s of the following: 3740 kc/s, 3880 kc/s, 7040 kc/s, 7230 kc/s, 14,130 kc/s, 14,320 kc/s, 21,350 kc/s, 28,550 kc/s. Operation may be s.s.b. or a.m.

Scoring: (a) 20 points for mobile to mobile contacts outside your own continent. New prefix multiplier = × 10. (b) 10 points for mobile to mobile contacts within your own continent but outside your own country. New prefix multiplier = × 2. (c) 10 points for mobile to fixed contacts outside your own continent. New prefix multiplier = × 2. (d) 2 points for mobile to fixed contacts within your own continent but outside your own country. No multiplier. Maritime mobile or aeronautical mobile count as fixed contacts. W, VE, VK, ZS, PY call areas count as separate countries. Mobile stations may be stationary, but must be able to move immediately. No portable beams or groundplanes will be allowed, nor will external power supplies. Scores should be computed by adding all points and multipliers separately, then multiplying them together.

Logs for the Mobile DX Activity Event should be sent to the Contest Manager, Amateur Radio Mobile Society, 95 Collinwood Gardens, Clayhall, Ilford, Essex, England, not later than September 30. They should bear the following headings:

Time, Station, Band, Rpt. In, Rpt. Out, Points Claimed, Multiplier

Pen found at Oxford Rally

A good quality ball-pen was left at the reception desk at the Tenth Anniversary Rally at Oxford on July 11, 1965.

The owner may claim the pen by writing to Don Gilmour, G2VB, 35 Grangecliffe Gardens, London, S.E.25.

Progress

This s.s.b. stuff isn't so wonderful, it's only giving the phone men the efficiency the c.w. has always had.—*Mercury*, Journal of the Royal Signals Amateur Radio Society.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By M. E. BAZLEY, G3HDA*

A LETTER from SP5AHL to RSGB Headquarters provides this month's opening topic. SP5AHL has asked for help in obtaining QSL cards from " G " stations and he lists 37 stations which he has contacted over the past four years, who, during the course of a QSO have promised to QSL. He fully realizes that all stations are not interested in collecting QSL cards but, stated that surely during the course of a QSO this point could be made, instead of saying, " Sure QSL " when the station concerned hasn't the slightest intention of doing so. QSL collecting will always be a part of our hobby and recently, with the introduction of more and colourful certificates, requests for QSL's have taken an upward turn. There is no obligation on the part of any station to have to QSL, but surely, if a QSL is requested, the right thing to do is to give a truthful and honest answer. It is a known fact that stations who say they do not QSL never seem to suffer from shortage of contacts and in fact the person requesting a card is pleased to know that postage and the cost of a card will not be wanted. To some people the collecting of cards is more important than the contact but luckily these people are few and far between, as for the majority they relive the pleasures of past contacts whether they were a long pleasant conversation or two hours spent chasing a DXpedition in some rare spot. Like everything else in this world, if it is kept in proper perspective a QSL has a small part to play, and no doubt the absence of them would leave a small vacuum in this unique hobby of ours.

News from Overseas

Colin Richards, **9M2CR** sends news of a bogus 9M2, namely 9M2KW, for which the Malaysian Amateur Transmitting Society has been receiving QSL's and bundles of IRCs for his activities. Colin would be grateful if stations would make a note of this call (which has never been issued) and if he is heard please refrain from giving him the pleasure of a QSO.

VR1S writes to say that he has now received a fresh supply of QSL cards and at the moment, having made a pile of one thousand look " sick," he is suffering from writer's cramp. Pat is arranging 40m skeds with the writer and when they are fixed details will be published in *MOTA* for the benefit of those who are interested in 7 Mc/s DX.

From Art Carter, **VR4CR,** comes news of amateur activity in the Solomon Islands. At present there are six licensed stations, all of whom are situated on Vavaya Ridge in Honiara, and of these only VR4CN, 4CR and 4ED are at present active. VR4CN operates on 40, 20, and 15m phone while VR4ED runs nine watts into a dipole on 40 and 20m c.w. and is using a BC312 receiver with a separate vertical aerial. VR4CR is at present crystal controlled on 14088 kc/s, but is hoping to be active on 15m in the near future. VR4CR is not listed in any call book, therefore he receives no QSLs via the bureaux, and as the QSL policy is to answer only cards received, stations who contact Artare advised to QSL direct to PO Box G19, Honiara.

G3CWL, who holds the call **3A2DA,** wishes it to be known that he has been receiving QSLs for contacts reputed to have been made by him from Monaco during April of this year. Unfortunately, the mis-guided character who pirated this call requested QSLs via RSGB and operated only on 20m c.w. which is the usual practice of the legitimate holder of the call. G3CWL, who expects to operate from Monaco next year with the call 3A0DA, is naturally keen to have any information from anyone who may be able to help identify this pirate.

The club station of the Woomera Amateur Radio Club **VK5WC,** is active on 20, 40 and 80m at weekends. S.w.l. reports will be acknowledged if they do not log CQ calls, the report is correct and includes the call of the station being worked.

VO1FB still keeps monitoring Top Band throughout the summer months and is looking especially for " G " contacts every Sunday morning from 00.30 onwards. Recent contacts have included GM3TMK (23.50) on May 1, and G3ERN, G3TKF and 4U1ITU (03.42—04.09) on May 16. During NFD, though several /P " G " stations were heard between 23.45 and 03.57 only G3GWD/P was worked to provide VO1FB with his only June transatlantic QSO.

Four Nigerian amateurs who have recently left 5N2 are now located as follows: **5N2CKH** and **5N2SMW** have become G3OPJ and G3UGW respectively. **5N2RJM** can now be reached at Box 84, Freetown, Sierra Leone, whilst **5N2RSB** is with No. 2 Signal Regiment in BFPO 22.

DXpedition News

W6FET will be operating as **VP2MN** from July 30 until August 8. The main frequencies will be 14,040 kc/s c.w. and 14,120 kc/s s.s.b. with possibly some operation on 21 Mc/s if conditions are favourable. All QSL requests to W6FET at the address given in QTH Corner.

The recent DXpedition to Chatham Island by **ZL3VB** produced about three thousand QSOs with stations in all parts of the world and QSL cards for this trip are now being distributed by ZL2GX. Future plans include DXpeditions to 5W1, ZK2 and ZM7.

Don Miller, **W9WNV** and Chuck Swain, **K7LMU** will leave the West Coast of the USA on July 24 for the Far East and Pacific areas. This will be the start of a three month DXpedition to about ten rare DXCC countries and including several new ones to be announced as the DXpedition progresses. It is rumoured that one of the countries to be DXpedited will be Indonesia, for which Don holds a licence for one week's operation only. For those who can afford it contributions towards the cost of this DXpedition will be welcomed but all stations contacted will receive QSLs in the usual manner after the DXpedition is over.

The RSARS will be sponsoring two DXpeditions during September. **GB3LPC** will operate from Lundy Island from September 18 to September 25 and the main object is to work

* Please send all reports and news items to RSGB Headquarters to arrive not later than **August 12** for the **September** issue and **September 16** for the **October** issue.

VR4CR, Art Carter. See page 533

RTTY though s.s.b. and c.w. will also be used. Skeds can be arranged via G3LPC. The second station will operate from the Isle of Man on September 15 to September 26 using s.s.b. and c.w. on all h.f. bands. The call will be **GD3RWF** and skeds may be arranged via G3RWF.

Awards

The *Ex "G" Radio Club*, which was formed to establish contact with British born people domiciled abroad, to maintain and promote these contacts and assist each other as need be, offers a certificate for contacting six member stations Any mode may be used but the six shall not include more than four contacts from any one country or more than one contact in any one US call area. Net meetings are held on 14,065 kc/s, Saturdays at 21.00 and 23.00, and 14,345 kc/s on Sundays at 19.00. Further information, together with a list of members may be obtained by sending an s.a.e. to G4MJ.

The *Down Under Award* may be claimed by any station who has QSL confirmation proving contact with the following: 50 VK stations on three bands and in five VK areas (VK0-9) plus five Oceania countries. A GCR list, together with five IRCs to VK4SS, 35 Whynot Street, West End, Brisbane, Queensland, will secure this attractive certificate.

DXCC News

The latest DXCC Honor Roll (July *QST*) contains the following UK stations: **G2PL** 313/336, **G3FKM** 312/329, **G4CP** 311/335, **G3AAM** 311/335, **G8KS** 309/327, **G3FXB** 307/325, **G3YF** 304/326 and **G3AAE** 304/324, whilst in the Radiotelephone Honor Roll are: **G2PL** 305/325, **G3FKM** 305/319 and **G8KS** 303/317. The first number represents the total countries less any credits given for deleted countries whilst the second number represents the total DXCC countries confirmed including deletions.

As a matter of interest the DXCC department of the ARRL checked a total of 118,014 QSLs during 1964, issued 712 certificates and dealt with 2,823 endorsement applications.

Contest News

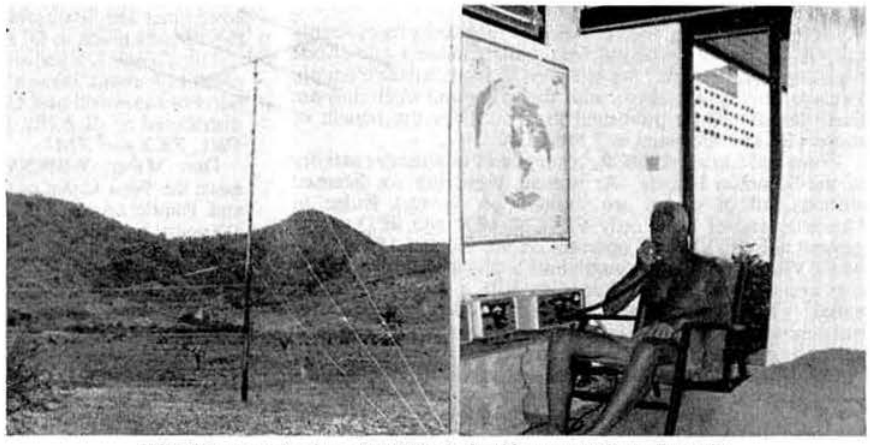
The sixth *All Asian DX contest* will take place between 10.00 August 28 and 16.00 August 29. This is a c.w. only contest and all bands between 160m and 10m may be used. For non-Asian stations each contact with an Asian station will count one point and the multiplier will be the sum of Asian countries worked on each band. Five figure numbers will be exchanged, RST plus two figures denoting the operator's age with the exception of YL's who use 00. All logs must be sent to JARL Contest Committee, PO Box 377, Tokyo, Central Japan to arrive not later than December 30, 1965. Complete rules and last year's results may be obtained by sending an s.a.e. to G3HDA. In connection with the fifth Asian contest **G2DC** and **G3EYN** were among the certificate winners.

The contest periods for the seventh *Scandinavian* activity weekends will take place as follows: c.w. section will run from 15.00 on September 18 to 18.00 on September 19 and the phone section from 15.00 on September 25 until 18.00 on September 26. Each completed QSO with a Scandinavian station counts one point and the multipliers are: LA, LA/P, OH, OH0, OX, OY, OZ and SM (all LA/P counts as one). An ascending serial number will be used and logs, which must be for multi-band operation only should be posted by October 15 to: NRRL Traffic Department, Box 6954, Rodelokka, Oslo 5, Norway.

The *Amateur Radio Society of India* and The *Radio Society of Ceylon* invites stations to participate in the second VU2/4S7 DX contest. The telephony section will take place between 06.00, October 23 and 06.00, October 24 with the c.w. section running from 06.00 October 30, until 06.00 October 31. Two points will be scored for each contact with a VU or 4S7 station and one point for each contact with the rest of the world. The multiplier will be the number of countries worked with the exception that each call area of W/K, JA, SM, UA, VK and ZL will count as countries for scoring purposes. An ascending serial number will be used and logs, which can be for either single or multi-band operation, must be post marked not later than November 30 and sent to: Radio Society of Ceylon, PO Box 907, Colombo, Ceylon. The same rules apply to the s.w.l. section with the exception that only VU or 4S7 stations may be logged.

Band Activities

The last month has been rather quiet DX-wise, no doubt due to the absence of major DXpeditions, though DX has been worked on all the h.f. bands from the UK in spite of the terrific short skip European QRM. On 40m the European net around 7043 Kc/s has been regularly working s.s.b. DX whilst on 20m the best times have favoured those who are prepared to burn some midnight oil. Fifteen and ten have not been so productive as last month though some good DX has been worked on these bands.



W2CQO operating from VP2GTA during his recent trip to Granada.

In connection with the monthly band reports, some readers wish to see them omitted altogether and the writer would be grateful to receive guidance from readers on this point. There are several alternatives to this suggestion which could be as follows: (i) Drastically cut the lists and only mention the very best of DX: (ii) DX reports only on 1·8, 3·5 and 28 Mc/s; (iii) if omitted or cut, is further DX information in the form of DX briefs required? (iv) Leave them as they are at present.

Thanks are due for this month's reports to: G2BOZ, G2RO, G3AAE, G3FKM, GM3ITN, G3KSH, G3SML, G4MJ, G8JM, BRS 24733, BRS 25429, BRS 26444, A2111, A2498, A3942, A4038, A4124, A4311, A4328, A4330, A4431 and A4489.

1·8 Mc/s C.W.: OK1XJ (21.15), OL1AEF (20.37), OL5ADK (21.00), OL8AAZ (21.15).

7 Mc/s C.W : CR6BX (19.00), OY2H (21.35).

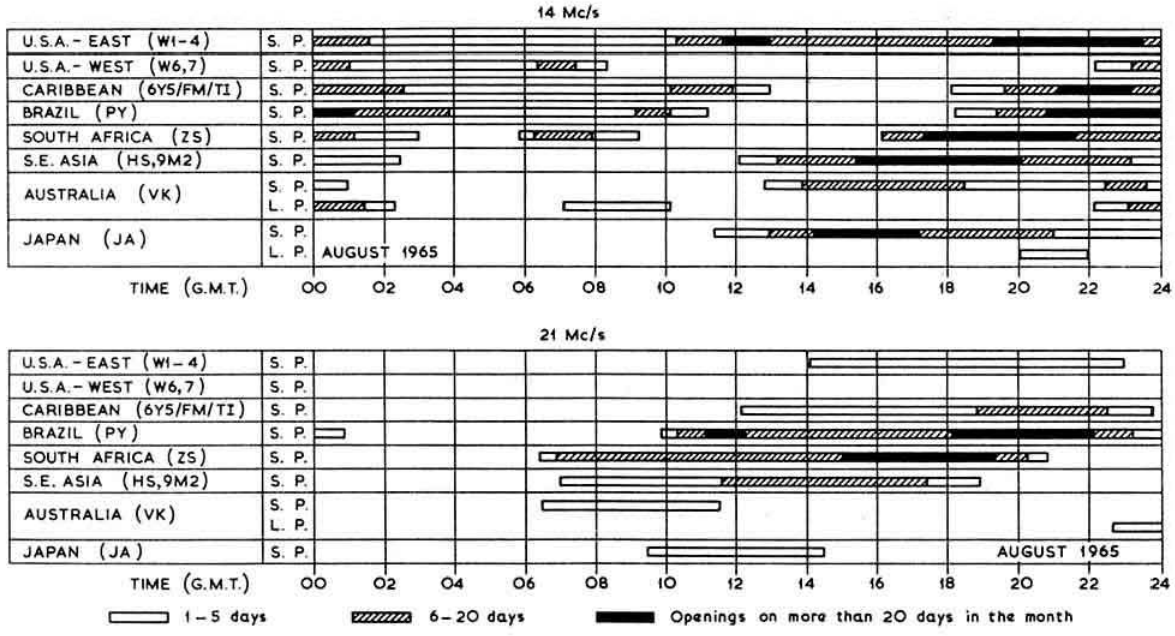
7 Mc/s S.S.B.: PX1EQ (21.00), PY7AOT (20.45), ZD8BC (22.20), ZD8HL (21.35), ZS1XR (22.13), ZS1XX (20.20), ZS1YX (21.50), ZS1ZH (20.49), ZS5GU (21.10), 5A2TR (20.54), 7Q7PBD (19.00), 9J2WR (21.05).

14 Mc/s A.M.: CT2AM (20.47), EA6URE (17.33), ON4CF/LX (09.47), PX1JQ (08.39), PZ1BI (21.32), VE8ZZ (19.21), 9G1SC (12.50).

14 Mc/s C.W.: CP5AQ (22.08), DU1OR (07.22), FL8RA (14.15), FG7XC (22.20), FM7WH (22.00), FP8CK (21.05), HP1IE (22.34), HR1HZY (23.20), JT1KAA (06.57), KM6CE (06.55), KR8CA (12.20), PJ2ME (21.50), UPOL14 (21.20), VP2AV (22.08), VP2KT (22.20), VP8HJ (20.40), VP8IB (21.45), VS9OSC (07.40), XE1OE (23.52), ZD7IP (08.00), ZD8TV (21.04), ZD9BC (16.30), 7G1Q (20.30), 9E3USA (18.38), 9N1MM (14.40).

14 Mc/s S.S.B.: AC3H (16.11), AC7H (16.28), BV1USA (14.45), CR4AJ (20.35), CP6GA (22.00), DU9FB (15.57), EL8D (16.21), FO8AA, 8AG, 8BI (06.15-07.00), FP8CK (20.47), FY7YF (21.47), HC8FN (23.11), HK0QA (22.38), HL9TY/P (13.59), HL9KW/P (19.40), HZ1AB (03.33), JY1AU (17.21), KJ6BZ (07.15), KH6BJ/KJ6 (07.30), KX6BQ (09.00), KX6BW (13.27), LX1CO/M (12.31), MP4TBM (04.18), PJ2MI (21.25), TG9OP (23.52), TJ1AC (17.48), TL8SW (17.37), VP1LB (00.33), VP1RP (07.26), VP2SK (22.04), VP2SM (22.51), VP3HAG (05.40), VP3JR (05.20), VP4VP (22.07), VP6MC (20.51), VR1S (09.00), VS9MB (04.00), VS9OC (16.25), VS6AJ (16.12), VS9PCZ (16.05), XW8AY (14.15), XW8AZ (18.35), YA7A (18.15), YN3FP (23.00), YN9JUL (23.00), ZD7GP (09.27), ZD8s (07.11-23.59), W2ZIA/ZK1 (06.37), ZP9AY (18.30), ZS3B (06.37), 3A2BF (20.04), 4M2A,3A,5A,7A (12.30-22.59), 4S7IW

PROPAGATION PREDICTIONS



Solar activity has recently increased more than had been anticipated. For this reason the propagation conditions during the last three months have been much better than predicted, especially on 21 Mc/s. During August the less favourable summer conditions will continue on the two highest frequency bands (28 and 21 Mc/s) but will, however, be better than during the same period last year, because of the increase in solar activity. During September the DX conditions will show a seasonal improvement and in October and November will be at their best for the year. As the monthly mean relative sunspot number for the coming autumn will be about 30, it is to be expected that DX conditions on 28 Mc/s too will improve compared with last year, whilst during August favourable conditions should make contacts possible with South America between 12.00 and 20.00 GMT and with Africa between 10.00 and 19.00. The most favourable period for Africa will probably be from 15.30 to 18.30. On 21 Mc/s on the other hand, South America and Africa should certainly be heard. The short skip conditions over distances from 250 to 1,250 miles should continue on this band as well as on 28 Mc/s during August. The night time DX conditions on 14 Mc/s will worsen slightly compared with June and July, especially towards the end of the month, as the autumn approaches with the longer nights and the F2 m.u.f.'s drop more quickly than during the summer. With the approach of autumn there will also be fewer opportunities to work DX via the long path. As spring approaches in the Southern hemisphere the evenings will produce more contacts with stations in South Africa on 21 and 14 Mc/s than during June and July. On 7 and 3·5 Mc/s the summer propagation conditions will remain almost unchanged, and on 3·5 Mc/s during the latter half of the night, local traffic will only occasionally be interrupted by the dead zone.

The provisional sunspot number for June 1965 was 15·5 with the period of greatest activity lying between the 2nd and the 9th of the month. The predicted smoothed monthly sunspot numbers for October, November and December are 25, 27 and 30 respectively.

W2GHK operating 4U1ITU during the centenary celebrations of the International Telecommunication Union.
(Photo by courtesy of Hammarlund Mfg. Co.)

(18.23), 5T5AD (07.15), 5W1AG (07.16), 5W1AZ (07.02), 5X5IU (19.50), 6Y5DM (23.35), 9L1JR (18.29), 9M8KZ (15.28), 9N1MM (17.04), 9X5CE (17.22).

21 Mc/s A.M.: CE2JT (20.40), CE3YU (21.00), CO1EG (20.50), CR6s (10.53-20.35), CR7ID (16.20), EP2BU (18.30), FG7TB (20.25), FM7WN (22.12), KP4AXC (21.18), KZ5JK (23.10), OD5BU (20.45), PJ2CZ (20.31), PZ1BK (21.05), TU2AP (17.43), VK6QL (07.30), VP4RS (21.40), ZB2A (19.55), ZS9G (13.58), 5X5JK (17.21), 9K2AD (17.46), 9L1WN (19.45), 9U5MV (09.34), 9X5MW (20.45).

21 Mc/s C.W.: CR4AE (22.23), EA6BD (19.32), EL8X (10.03), OA4AY (20.30), VR6TC (21.00), 9E3USA (15.25), 9K2AD (18.05).

21 Mc/s S.S.B.: CE3RC (22.06), CR5SP (19.00), EL2AQ (17.30), HP2EH (21.51), KG4AN (23.46), KV4CX (20.43), KZ5NS (23.02), OA4C (22.30), PJ2MI (22.48), TG9OP (23.25), TL8SW (17.50), YN1MAN (20.53), YN3FP (21.39), ZD7GP (17.31), ZD8TV (17.35), ZD8WZ (17.58), 4M3A (22.08), 4M7A (21.13), 5H3JR (20.32), 9L1MJ (18.00).

28 Mc/s A.M.: CR6BY (19.30), EA8DX (19.56), EA8ES (19.40), K2KZT/1 (21.11), LU's (16.50-19.00), TN8AW (20.16), PYs (18.12-21.41), ZEs (16.00-20.00), 5H3JJ (17.58), 5N2s (18.15-19.02), 5X5JK (18.21), 5Z4AA (18.30), 9G1s (17.00-20.00), 9J2s (15.00-19.00), 9X5RC (20.49).

28 Mc/s C.W.: CR6GV (17.42), CR7IF (15.50), ZD8BC (19.15), 5H3JJ (16.30).

28 Mc/s S.S.B.: KV4CX (19.24), MP4QAQ (19.40), PX1EQ (10.04), YV5ATM (21.02), ZD8HL (19.13), 3A2CP (13.52).

QTH Corner

CP6GA	Box 385, Santa Cruz, Bolivia.
CP8AB	Box 9, River Alto, Bolivia.
CR9AH	via W7ZAS, 2230 92nd Av., N. E. Bellevue, Washington, USA
F0BB	via ON4FU, 168 Krijgsbaan, Mortsel, Ant, Belgium.
FP8CK	via W2JAE, 22 Canterbury Road, Livingston, New Jersey, USA
FP8CV	via W2GKZ, 43 Cameron Dr., Huntington, Long Island, NY., USA.
HB0XCV	via DJ8SW, Achenbachstr. 145,4 Duesseldorf, West Germany.
HC8JG	Box 5757, Guayaquil, Ecuador.
HR1CGT, HR1HZY	via WA5CNP, 11611 Starwood Dr., Houston, 24, Texas, USA.
KX6BW	Box 65, APO 555, San Francisco, 96555, Calif, USA.
LX1DO	Box 26, Esch, Luxembourg.
PX1EQ	via DL9JL, Postfach, 7023, Stuttgart-flughafen, West Germany.
TN8AD	Box 1295, Pointe Noire, Congo Republic.
VP1LB	Box 18, Stann Creek, British Honduras.
VP1RP	via W4WZH, 704 Leslie Av., Glasgow, Kentucky, USA
VP2SK	Box 44, St. Vincent, British West Indies.
VP2MN	via W6FET, 11945 Cameo Place, Granada Hills, Calif., USA.
VS9ABM	via GM3MBM, 33 Lawrence Avenue, Craigendoran, Helensburgh, Dunbartonshire.
XE1NE	Box 2807, Mexico City, Mexico.
YJ8BG	Box 93, Santo, New Hebrides.
YN1MAN	c/o US Embassy, Managua.
YN4JG	Iglesia Morava En Nicaragua, Bonanza, Nicaragua.
3A0DL	via ON4FU (as F0BB).
4M5A, 4M7A	via Hammarlund.
5R8CB	EAM, S/A Trs., Diego Suarez, Madagascar.
6W8AG	Box 5167, Dakar.
7G1Q	via W3ZBG 209 Riping Rock, Dr., Silver Spring, Maryland, USA.
7X2BF	13 Rampe Louni, Avezki, Algeria
9M8KZ	via GW3IIEQ, "Silhill", Dinas Dinlle, Llandwrog, Caernarvon.
9Q5	QSL Bureau, Box 3748, Elisabethville, Rep. of Congo.

RSGB QSL Bureau: G2MI, Bromley, Kent.

Commonwealth Call Areas Table

	1·8	3·5	7	14	21	28 Mc/s	Total
G3KSH	—	26	24	76	26	—	152
5N2AAF	—	6	14	65	43	16	144
G3DYY	—	9	31	55	19	7	121
VO1FB	12	17	14	45	13	1	102
G8JM	4	—	—	73	15	1	93
G3AAE	—	—	7	51	24	1	83
G3LHJ	3	3	5	29	26	2	68
A2111	3	24	28	86	65	17	223
A4038	3	8	8	69	34	16	138
A2498	2	8	10	75	29	7	131
A4552	—	2	—	44	58	8	112
A2340	6	13	22	51	18	1	111
A4431	3	8	6	46	38	4	105
A4311	1	10	1	63	19	6	100
A4048	5	13	5	58	17	2	100
A3699	5	11	10	39	24	2	91
A4431	3	8	4	41	34	1	91
A3902	4	14	2	41	22	6	89
A3942	4	14	24	37	7	—	86

DX Briefs

W4BPD, Gus Browning and YA4A have commenced activity from Kabul under the calls of **YA7H** and **YA7A**; all QSLs to Hammarlund.

4M2A, 3A, 5A, 7A were special calls issued to Venezuelean stations during the recent YV contest. All QSLs to Hammarlund.

5W1AZ will be active on s.s.b. during the next month and all QSLs for s.s.b. activity should be sent via K6EXO.

CR5SP continue to be active on 21 Mc/s around 17.00 daily.

W9WNV's DXpedition (see page 533) should have commenced by now. The frequencies in use will be: *C.W.* 7,010, 14045/55, 21045/55 Mc/s; *S.S.B.* 7070/100, 14100/110, 21400/410 kc/s. Operation is expected from BY, BV1, XZ, XW8, YJ, 5W1, ZM7, HS, 8F1, VK0 (Heard Is), VK9 (Cocos), and FO8 (Clipperton) although not necessarily in this order. QSL cards should go via W4ECI.

* * *

Correspondents are thanked for their co-operation and acknowledgement is made to the West Gulf DX Club Bulletin (W5IEJ), the L1DXA Bulletin (W2FGD/W2MES), DX'press (PA0FX) and The DX'er (N. Californian DX Club). Please send all items to RSGB Headquarters to arrive not later than **August 12** for the September issue and **September 16** for the October issue.

QUA Associates

conducted by "JIX"

QUA Associates is pretty well established now. Judging by your letters, the comments in this column are read with a fair amount of enthusiasm, and a continuity has been set up from month to month. As the BULLETIN increases in size, so *QUA* . . . . . may become a true monthly feature. Most of the new " A " members drop a line, and it is hard to realise that *QUA* . . . . . has " always been " to them. Some remain in correspondence, and become the " regulars " who write in about developments in their areas from month to month. We have often " gone off " about activities which are or are not supported by "A" members. I have had to suffer (quite rightly!) a few digs and hints that for years nothing was in fact done on the social plane, and the older " A " members had not developed any talents for this kind of thing. These observers appear to be correct, because the new " A " members write with interest about exhibitions, camps and the need for local clubs in which they can serve the Movement. It is as though they see our ideas as the " usual." In view of this, I have kept up a few links with organizations like the London Boys' Club Federation and the County Youth Centres, so that something can be offered in the way of get-togethers for interested members and their friends. For instance, there is a meeting (camp) over the weekend September 18-19 organized by the London Federation and we are hoping to have a station on the air. All boys who would like to come along and join in are welcome, in fact I hope to see a number of " A " members there, especially new members and beginners. So, write to me if you wish to join in and we will discuss arrangements.

Changing the subject for a moment, I received a letter from a boy asking me about a personal problem. This confidence made me feel the importance of considering others, and I appreciate the honour and realise the responsibility of hearing about the fears and feelings of someone else. The problem involved personal relationships, and a feeling of being unwanted at a local club because of not being much good. Fortunately I had experienced this before, in the case of a lad who had the same doubts in my own group, so I hope I was able to make some suggestions. I mention the above, to show that even through the BULLETIN the real work rests with the members and individuals, and not really with coils, valves and QSLs *only*.

* * *

What has " C " to offer this month. First there is *Circuit* This is often heard in connection with race tracks, and means the complete path round from starting line to winning post. Our interests in circuits are not quite so outdoor, or competitive! But, circle is the word from which circuit is descended, and in electronic circuits this complete path round must always be present. When I was beginning to experiment with electricity, I was often told that " two wires " must always be used. This is one realization of the positive and negative, the to and fro nature of the current flow, but the idea of a complete circuit is more fruitful and gives a better picture. For instance, how about the " one wire " to an aerial?

In practice, a " circuit " such as a transmitter or receiver is really a large number of circuits all operating together. Each closed circular path (called a *mesh* by engineers) is a separate small circuit. There may be more than one circuit overlapping, thus d.c. paths might be quite different compared to the a.c. (signal) paths.

Coupling

Coupling is the operation of transferring signals from one circuit to another. Thus the aerial is coupled to the r.f. amplifier circuit in a receiver. The signal from the r.f. amplifier is coupled to the next stage, and so on. Coupling takes a number of forms. Broadly speaking, all coupling from one stage to another divides into two main types. First the " common component " type in which there is impedance shared by both the " meshes " of the circuits. Currents in one circuit set up currents in the other by means of the common component. The other is based on transformer action in which the link is formed by the magnetic field between the windings. Examples of coupling include resistance capacity coupled amplifiers, choke capacity coupling, transformer coupling, link coupling (a type of transformer coupling) and electron coupling, in which the circuits are coupled by the electron stream through a valve.

Cycle

Perhaps we have all ridden on a variety of this, but once again it is no concern of ours just now to discuss who won the tour of Britain! Cycle is one of those words obtained from circle hence its use to describe bikes. But, all alternating or vibrating " systems " can be thought of as events continually repeating themselves,—going round in circles as it were. Each circle is one event, or as we say one *cycle*. Thus an engine *cycles* (four stroke or two stroke), generator armatures rotate, producing alternations in the current which are in step with the revolutions. All these things are termed *cyclic phenomona*. Each cycle of an oscillation is a complete event and as each one ends another begins. The number of cycles occurring in a second is called the *frequency* and as you probably know already the frequency is often stated in thousands of cycles or kilocycles (kc/s), or in millions of cycles or megacycles (Mc/s) as well as in the basic cycles per second.

Capacity

Electrical capacity is very important in radio, and the components called capacitors or condensers are often found. The important action of capacity is the ability to hold charges of electricity, therefore to store *energy*. Also, the continual charging and discharging of electrical capacity when alternating voltages are applied, means that alternating currents flow, although not much if the capacitor is small. D.c. is blocked completely by a capacitor (it is like a switch open). The opposition to a.c. set up by capacity is called the *reactance* and is measured in ohms (although it is not the same thing as resistance). This reactance gets less and less as the frequency is increased. Therefore, if a.c. is required to pass, but d.c. must be blocked, a capacitor is the component used.

Cross-modulation

This form of interference is fashionable in the debates on receiver performance these days. As image interference and noise have been more or less eliminated, so the other types of interference have been left prominent in super-het receivers. The performance of modern communication receivers rests mainly in the i.f. amplifier. The amplification in this can be very great with modern valves, and by using crystal lattice or mechanical filters the " shape factors " of the response curve

or selectivity can be made very favourable for modern conditions. However, if a very large signal is breaking through the front of the receiver via the poor selectivity of the early stages it will cause trouble when it reaches the mixer stage (which is really a modulator circuit). This signal gets impressed onto all the other weaker stations that might be tuned in nearby. This is because of *non-linearity* (or distortion producing characteristics) in the mixer action (look up super-hets). The answer is to get rid of this signal by selective circuits ahead of the mixer, and/or reduce the size of all signals, so that the values of signal voltage at the mixer are so small that the effect is not produced (the signals must be large to produce cross modulation). Hence the lack of r.f. amplifiers seen in many modern receivers. Technically, cross-modulation is produced by *third order distortion* in the circuit concerned. The ex-army R206 is an example of a receiver that suffers seriously from cross modulation.

News from " A " Members

David Hendon, A3895, of Guildford, has been in the Society for more than 18 months, and his first letter to *QUA* . . . . . arrived recently. What a letter! I classified it straightaway as one of the " massive " variety. David obviously likes constructional work and transistors. At school, he says, he is the only remaining member of the electronics club—well David, what social work can you do with the members of the lower forms, that's the thing?

Trevor Thomas, A4473, who lives at East Molesey, Surrey, writes to say that he is very keen on short wave listening, and agrees with the recent views expressed concerning the QSL card situation. One highlight though, a card was received from OD5BZ on the day he wrote his letter to *QUA* . . . . . .

Michael Thick, A4561, is a new addition to the ranks of the " A " members: welcome to the Society. Mike included a circuit of the a.t.u. with valve monitor that is used at his station. He has an HRO and a home made t.r.f. receiver.

Eric Malley A4576, of Liverpool, wrote a letter explaining his support for a TV programme on technical hobbies. Eric also mentioned he is building a t.r.f. three valver. Let's hope it works f.b.

Yet another letter from **Paul, A4035** (quite an old timer in *QUA* . . . . now!). He explains that he is having a trip down to London from St. Helens to meet a French YL! (I wonder if she will see the " sights "—i.e. Tottenham Court Road Radio Emporia, hi.) I will slightly mis-quote Paul's final remark: " Put a Tiger in your π Tank."

James Collins, A4701, of South Woodford, is another new " A " member to whom we offer best wishes. I have had an " eyeball QSO " (as one modern amateur radio expression puts it) with Jimmy, and he told me all about an oscilloscope building project he is about to begin.

Finally, **BRS19313** drops us a line, mentioning a power unit that works battery equipment, such as the R1224 receiver, direct from the a.c. mains (i.e. h.t. and l.t.). There maybe readers who would like details about this. BRS19313's address is: Fred Bending, 108 St. Katherines Road, Exeter, Devon.

That's about all for this month, but remember if you would like to join in the event I mentioned earlier, I shall be pleased to hear from you, and we can discuss the arrangements. Once again 73 from JIX to all readers of *QUA* . . . . .

Please send all reports direct to Ken Smith, G3JIX, 82 Granville Road, Walthamstow, London, E.17.

Symposium for Radio Amateurs

Details of the Symposium to be held at the Residential Youth Centre at Ollerton, Notts, on September 11-12 were given on page 478 of the July issue of the BULLETIN. Further information may be obtained from S. Denner, 68 Hawton Road, Newark, Notts (Tel.: Newark 3757). Early booking is advised.

Second London S.S.B. Dinner

THE second London S.S.B. Dinner organized by Joe Steele, G3KZI, and Norman Fitch, G3FPK, was held at the Waldorf Hotel on May 29, 1965. In every respect it was a glittering affair, with visitors from all over the world. As one amateur was heard to remark, the calls to be seen and voices to be heard was like the s.s.b. section of the 14 Mc/s band during a DX contest.

The trade show opened the proceedings at 3.30 p.m. and those exhibiting included Courier Communications, Daystrom Ltd., Green & Davis Ltd., The Hallicrafters Co., The Hammarlund Manufacturing Co. Inc., K. W. Electronics Ltd., and Withers Electronics.

Stu Meyer, President of Hammarlund and W2GHK, put on a show of colour slides covering the company's " DX-Pedition of the Month " programme which proved to be a most interesting diversion.

Mr. John H. Gayer, HB9AEQ, Honorary President of the International Amateur Radio Club of Geneva, was the Guest of Honour and referred to the activities and aims of the club in his speech. Other speakers included George Pearson, G3AWZ, Dorothy Strauber, K2MGE, Sylvia Margolis, Stu Meyer, W2GHK, John Savage, G3MSS and H. W. Mitchell, G2AMG. On behalf of the organizers, Les Hill, G8KS, made a presentation to Miss Vera Jackson, John Gayer's secretary.

The raffle was drawn at 10.00 p.m. First out of the box was K9AWX's ticket and he chose the SR-160 s.s.b. transceiver which Hallicrafters donated. Syd Howard, G8TY, won the HXL-1 linear amplifier which Hammarlund donated. Other prizes included an antenna rotator donated by K. W. Electronics, a necklace of semi-precious stones from Eva Perenyi, PY2PE, and a lady's gold wrist watch and an electronic clock donated by the organizers.

Dancing and a cabaret followed the raffle draw and the event concluded at midnight.

The overseas visitors included EL7B, F7CL, F7CP and F8RU; I1CL; K2's HEA, HLB and MGE; K3JOO; K9AWX; OD5BZ; ON4's AD, CC, IZ and KP; PY2's PA and PE; SM5MC; VE3QA; VS9MP; W1BDF; WA1ASM; W2's GHK, JXH and NSD; WA2TQJ; WB2NAD; W8's MKZ, RLT and SS; YV5BNW; 5A1TW and 5A3TH.

The organizers, G3FPK and G3KZI wish to thank everyone who contributed in any way to the success of this venture and particularly to the guests whose support is of course essential. The next S.S.B. Dinner will be in May, 1967. N.A.S.F.

Basil's Outing

IT is no easy task to find some aspect of Amateur Radio that will have a universal appeal, particularly if an attempt is to be made to interest not only radio amateurs but their wives and families as well. It was with this in mind that Basil O'Brien, G2AMV, RSGB Region 1 Representative organized his second outing which took place on May 30, 1965.

The event consisted of a mobile treasure hunt to include three different categories of competitors:

(a) Those with cars but no radio equipment.
(b) Cars fitted with mobile radio equipment.
(c) Members interested in direction finding.

Several months prior to this event the route was planned and carefully reconnoitred to ensure that it did not follow busy roads. It covered some forty miles from the starting point in the Wirral peninsula to the destination, a lovely inn set in beautiful countryside in North Wales. The next task was to select various situations along the route that competitors would have to identify, and, having chosen them, prepare suitable clues for the guidance of participants. Some of the clues took the form of anagrams or a play on words, several of them being very amusing.

On the Saturday prior to the event a base station was set up in a tent erected in a field adjacent to the inn. This was to transmit clues for the mobile radio entrants and a signal for the direction finding parties. Twenty-one groups entered for the contest, eleven of which had cars fitted with mobile radio and five with direction finding equipment.

The treasure hunt commenced at 10 o'clock on the Sunday morning when all competitors assembled at the QTH of Norman Robinson, G3OOX. He was the starting marshall and assisted by others it was his task to see that each car left on time. Prior to leaving, each group was given an envelope containing route instructions which were to be used in conjunction with an ordnance survey map of the area. Also included in the envelope were the clues to identify the various objects and a sealed envelope containing the identity of the destination. This was a precaution in case any competitor got lost. The cars were despatched at five minute intervals and appropriate details transmitted to the base station in North Wales.

Competitors were reminded that speed played no part in the contest, the main point being to reach the destination using the correct route and to identify the fifty or so places to which the clues referred. The mobile radio participants had to contact the base station on four separate occasions from a given point in order to collect further instructions. These included an exercise in the use of ordnance survey maps and the collection of certain items en route. Direction finding parties were required to take three separate bearings from three given locations, the competitor with the least total error being declared the winner in that class. The base station was manned by G2AMV and G3CSG who were assisted by their wives and families.

On arriving at the base station the various entry forms were collected from the competitors who then retired to the inn for an excellent tea. Meanwhile the papers were marked and checked by the party in charge of the base station in order that the winners of the different categories might be found. After tea everyone gathered in the main lounge where the results of the contest were announced and the prizes presented by Mrs. O'Brien. Mr. H. Schroeder and family won the non-radio class with a mark of 88 per cent. Mr. D. Bagshaw, G3FNQ/M, and friends won the radio class with a mark of 87 per cent. Mr. L. Roberts, G3EGX, assisted by R. W. Evans won the Direction Finding Prize.

It was very evident that the competitors had greatly enjoyed their day out by the volume of applause which greeted G2AMV when he made a short speech after the presentation of prizes. Some ninety people, including licensed and non-licensed radio amateurs, their wives, families and friends had participated in an event that had clearly succeeded in interesting and amusing everyone. Not least among these were the operators of the base station G2AMV and G3CSG.

Much credit goes to G2AMV and his family who had spent many hours in meticulously preparing the treasure hunt. It is sincerely hoped that this will become an annual event.

G3CSG

The 160m base station in North Wales being operated by G2AMV and G3CSG (in hat).

Mounting the P.T.O. Coil Formers

The article entitled " The P.T.O. " published last month unfortunately did not include any details of the shape of the plug-in coil units, reference being made to a photograph which was omitted. Each coil carrier is formed from a rectangular sheet about 4 in. x 1½ in., with an arc of just over 180° cut out of one corner to fit the tuning knob. The three plug pins are close to the knob, and the coils are mounted at the far end.

News from Headquarters

Reciprocal Licensing Progress

The RSGB has been advised, during discussions with the Post Office on Reciprocal Licensing, that arrangements are in hand with a view to concluding reciprocal agreements between the United Kingdom and the United States of America and that the Post Office has initially written to the following countries to seek to enter into similar agreements: Austria, Belgium, Denmark, France, West Germany, Italy, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Yugoslavia.

IARU Region I Conference 1966

The next IARU Region I Conference will be held at Hotel Kvarner, Opatija, Yugoslavia, during the week commencing May 22, 1966. The Kvarner, top hotel in Opatija, is to offer special all-in conference terms of approximately £1 17s. ($5.10) to delegates and their ladies. In addition to an Administrative and Operational Committee it is proposed to set up a Credential and Finance Committee and a Technical Committee which will deal with u.h.f., v.h.f. and many other technical and scientific subjects. Further details of Conference arrangements will be published later.

International Amateur Radio Club

The Society is now able to accept subscriptions from UK amateurs who wish to join the International Amateur Radio Club of Geneva. The annual subscription is 35s. ($5US). Applications will be passed on to IARC for processing.

Membership application forms are available from RSGB Headquarters on request.

GPO Morse Tests

Provided sufficient applications are received, the GPO will be conducting Morse tests during the week commencing **September 13, 1965,** at the following Head Post Offices: Birmingham, Cambridge, Derby, Leeds and Manchester. Application forms may be obtained from the Radio Services Dept., Radio Branch, GPO Headquarters Building, St. Martins-le-Grand, London E.C.1. Completed application forms, to which the entrance fee of 10s must be affixed in stamps, must be posted to the Wireless Telegraphy Section to arrive **not later than August 19, 1965.**

Honour for G2NR

Congratulations to Dr. George Bloomfield, G2NR, of Welwyn Garden City, on being awarded the coveted Colwyn Medal for 1964.

The Colwyn Medal, presented by the late Lord Colwyn, a former President of the Institution of the Rubber Industry, is awarded yearly for conspicuous services of a scientific or technical nature having an important bearing on the rubber industry.

Proposed World DXpedition

An experienced "G" DX operator, in planning the DXpedition of a lifetime, has soon realised that "going it alone" is no fun and would leave little or no time for sightseeing and social activities. He is therefore looking for a congenial companion to accompany him on a cost sharing basis.

It is proposed to travel by air, using a Round the World tourist ticket costing approximately £500, and it is expected that the trip will last from about December 1 until about January 10, 1966. Accommodation at each stop-over country will cost about £4 per day.

The trip would suit a man on retirement or long leave but it is absolutely essential that he be a good operator and be familiar with both British and American gear. Operating will be 75 per cent c.w. and 25 per cent s.s.b. The know-how to cope with pile-ups is also a must.

Serious applicants are asked to write in the first instance to the Editor, RSGB BULLETIN, enclosing a s.a.e. and giving full details. Please mark the envelope "DXpedition".

Amateur Radio Retailers

RSGB Headquarters is compiling a list of radio dealers who sell equipment and components for the radio amateur and home constructor.

Members are invited to send details to Headquarters for inclusion on the list. Proprietors of such firms are also asked to submit details.

Claims for RSGB Certificates

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

Affiliated Societies

The following are now affiliated to RSGB:

OXFORD UNIVERSITY RADIO SOCIETY:
c/o A. J. Shepherd, 3 Cearn Way, Coulsdon, Surrey.

STEVENAGE AND DISTRICT AMATEUR RADIO CLUB:
P. J. Burgess, 51 Fawcett Road, Stevenage, Herts.

SCHOOL RADIO CLUB—THE BLAKE COUNTY SECONDARY SCHOOL:
c/o C. J. Morris, 24 Walhouse Street, Cannock, Staffs.

Representation

The following is an addition to the list of Affiliated Society Representatives:

TORBAY AMATEUR RADIO SOCIETY:
B. E. Symons, G3LKJ, 52 Reddenhill Road, Babbacombe, Torquay, Devon.

The following is an addition to the list of Area Representatives:

CHINGFORD AREA:
F. Ingleby, G3EHD, 14 Pretoria Crescent, Chingford, London, E.4.

On July 15, 1965, the President, Mr. E. W. Yeomanson, G3IIR, and Mrs. Yeomanson, accompanied by the Region I Representative, Mr. Basil O'Brien, G2AMV, and Mrs. O'Brien, attended a Royal Garden Party at Buckingham Palace.
(Photo by courtesy of TOPIC)

Mr D. A. Barron to open the 1965 RSGB International Radio Communications Exhibition

Mr D. A. Barron, C.B.E., M.Sc., M.I.E.E., Engineer-in-Chief of the Post Office, has accepted the Council's invitation to open this year's RSGB Radio Communications Exhibition at the Seymour Hall, London, on October 27.

John Rogers, ZE4JN

Among recent visitors to Headquarters was John Rogers, ZE4JN, G3UHC, who was passing through London en route for the United States where he is to be Telemetry Station Manager in the Dept of Physics and Astronomy, University of Iowa. The head of the department is Dr. James A. Van Allan, who is well-known for his discovery of the Van Allan Belt.

ZE4JN first became interested in satellite work as an amateur in Rhodesia where he set up a complete satellite tracking station.

Amateur Licences

At June 30, 1965, the number of amateur licences in force in the United Kingdom was as follows:

Amateur (Sound) Licences A: 11,237
Amateur (Sound) Licences B: 234
Amateur (Sound Mobile) Licences A: 1,893
Amateur (Sound Mobile) Licences B: 2
Amateur (Television) Licences: 165

RSGB Intruder Watch

Correspondence for the Intruder Watch should be addressed to the Honorary Organizer, RSGB Intruder Watch, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1.

Congo Society

The Union Congolaise des Amateurs de Radio (UCAR) is now active again after a period of more than four years. The Chairman and Secretary are 9Q5EH and 9Q5BV respectively, and the QSL Bureau is functioning from PO Box 3748, Elisabethville, Republique Democratique du Congo. The Union represents more than 200 radio amateurs in the Republic.

Enquiries Regarding Bulletin Articles

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

Silent Keys

We record with sorrow the passing of the following:

Lt.-Col. F. Rodman, G2FN, of Surbiton, Surrey.
K. G. Reynolds, G3DBH, of Mapperley Park, Nottingham.
D. Gordon, G3FJK, of Lancashire.
John Tullett, G3JTA, of Stevenage, Herts.
Edward Ashman, G3NSI, of Houghton-le-Spring, Co. Durham.
R. Webster, G3SWN, of Blackpool, Lancs.
H. Wright, G5PW, of Bramley, Leeds.
J. St. C. T. Ruddock, G8TS, of London, S.W.20.
W. S. A. Williams, BRS5431, of Gayton, Cheshire.
H. G. Vale, BRS21491, of Stourport on Severn, Worcs.
A. Long, BRS26584, of Bedford.
H. Ridge, G3HR, of Exeter, Devon.

Obituary

Alan Trevelyan Lee (ex-LYX—2DJ)

We record with sorrow the death of Alan Trevelyan Lee (ex-LYX—2DJ), who at the age of 72 years passed away on June 11, 1965 on board the Motor Yacht "The Bounty" on Oulton Broad. Mr. Lee was the son of a former Town Clerk of Derby and from an early age showed a keen interest in Model Engineering. Arising from a lecture he attended given by Professor G. P. Bailey at the Guild Hall, Derby in 1911, together with other Model Engineering enthusiasts he formed the Derby Wireless Club. As secretary of the Club he corresponded with many other interested wireless amateurs and in 1913 was closely associated with Rene H. Klein in the founding of the London Wireless Club. During the first World War he served as an Officer in the Royal Naval Air Service and later the Royal Flying Corps.

Mr. Lee had many interests, and was keenly occupied with his model passenger carrying railway which he constructed in the garden of his home at Littlecroft, Etwall, Derbyshire. In 1954, The Derby Wireless Club was incorporated in the title of the Derby & District Amateur Radio Society when, with other Club Founders, he was elected Honorary Vice-President, and again took a very keen interest in the Amateur Radio movement.

The cremation took place at Markeaton, Derby on June 15, and among the mourners were Mr. J. R. S. Grimwood Taylor, Mr. C. L. Drury (ex-XDB), Mr. G. E. Mart (ex-URX), Col. A. K. Haslehurst (ex-G5HT), Mr. L. Corbett (representing Derby Wireless Club), Mr. A. G. G. Melville (President), Mr. F. C. Ward, G2CVV, Region 4 RSGB Representative, Mr. B. J. Speakman, G3UBS, ASR, Mr. T. Darn, G3FGY, Deputy Region 4 Rep., and Mr. R. E. F. Street.

Edgar T. Wilson, G3FMI

Edgar T. Wilson died at the age of 61 on Whit-Monday 1965 after a short illness. He was a well-known timber merchant residing near Chester and his business was in Ellesmere Port. Apart from Amateur Radio which he took up comparatively late in life, he had many interests, and was a former Commodore of the Dee Sailing Club. He was one of the earliest operators on 2m in the North West, and whilst somewhat retiring by nature was an enthusiastic member of the Chester and District Radio Society. He supported many of the local activities and gave help generously.

His sudden death was particularly sad as his widow had only recently recovered from a long illness, he had just retired from business, and had almost completed building a bungalow in the Isle of Man in anticipation of retirement there to put GD well and truly on the v.h.f. map.

All his friends and local amateurs extend their sympathies to his widow and son. G3BOC

Jack Smith, GI5QX

All Northern Ireland amateurs deeply regret the death, on July 5, of Jack Smith, GI5QX. Jack became interested in amateur radio in the late twenties, and held the artificial aerial call 2AUM. He received the full call-sign, GI5QX in 1929. He was very active pre-war on all the DX bands, and also on 5m, and is still the only GI call to appear on the NFD shield. He was awarded the B.E.M. for his services during the war. He also represented the RSGB as regional representative. He is survived by his widow to whom we offer our deepest sympathy in her sad bereavement. F.A.R.

Area Representatives Badges

Badges for Area Representatives are now available from RSGB Headquarters, price 10s. each including postage.

Society Affairs

A Brief Report on the June 1965 meeting of the Council

A MEETING of the Council was held on June 14, 1965, at 6 p.m., and was attended by Messrs. E. W. Yeomanson (President), N. Caws, J. C. Foster, J. C. Graham, L. N. Goldsbrough, R. C. Hills, E. G. Ingram, R. H. James, A. O. Milne, L. E. Newnham, F. K. Parker, A. D. Patterson, J. Fraser Shepherd, G. M. C. Stone, J. W. Swinnerton, R. L. Varney (Members of the Council), J. A. Rouse (General Manager and Secretary), and P. C. M. Smee (Minuting Secretary).

Apologies for absence were submitted on behalf of Mr H. A. Bartlett and Mr L. N. Goldsbrough.

Region 1 Official Regional Meeting

Council thanked Mr Goldsbrough for his report on the recent very successful ORM at Blackpool. (A report was published in the July issue of the RSGB BULLETIN.—EDITOR.)

New Subscription Rates

Although the Council were meeting very soon after the BULLETIN announcement, they were gratified to note that most of the reactions received from members had fully supported their decision to raise the annual subscriptions.

Amateur Radio Mobile Society/Red Cross Pageant

The President reported that the local Essex RAEN Controller would arrange for participation direct with the Red Cross.

Staffing of Headquarters

The General Manager reported that he had interviewed various people for the vacant positions of Accounts Clerk and Editorial Assistant. None were suitable. A junior position offered to another applicant had been declined after initial acceptance.

Motor Vehicle (Construction and Use) Regulations

The President reported that the Ministry of Transport had informed the Society that a meeting would be held at which the Society could put its case. (A report on the meeting with Ministry officials was published on page 430 of the July issue of the BULLETIN.—EDITOR.)

"Daily Mail" Schoolboys and Girls Exhibition 1965

The *Daily Mail* had offered the Society a large stand at nominal cost and the Education Committee had immediately started preparations to make the RSGB exhibit an outstanding attraction. As reported in *Society Affairs* last month, an attendance of at least 250,000 is expected.

Membership

The Council approved 186 applications for Corporate membership and 87 for Associate membership. In addition, 21 applications for transfer from Associate to Corporate grade were accepted. The subscriptions of two members were waived: one on the grounds of blindness, the other because of severe disability.

Two applications for Life Membership were approved.

The Council granted affiliation to the Blake County Secondary School Radio Club of Hednesford, Staffordshire.

International Amateur Radio Club of Geneva

After considerable discussion, the Council decided by 10 votes to 2 that the Society would accept subscriptions from UK amateurs on behalf of the International Amateur Radio Club. Mr E. G. Ingram asked to be recorded as voting against the proposal.

It was agreed that the Society should be represented at the Club's Convention in Geneva on September 17-20 by the President, Mr E. W. Yeomanson.

Television Relay Systems

The Council received a report on a further case of interference to a wired television relay service by legitimate signals from an amateur station. Full details of the case would be considered by the GPO Liaison and TVI Committee and the necessary action taken.

Recommendations and Reports of Committees

The Council accepted recommendations from Committees relating to awards for the Second 420 Mc/s Contest 1964, the 144 Mc/s Open Contest 1965 and the Listeners' V.H.F. Contest 1965 (*V.H.F. Contests Committee*), a reception for foreign visitors to the Society's Exhibition in October and other arrangements for the same exhibition (*Exhibition Committee*), the provision of armbands for RAEN members and a new edition of the *RAEN Manual* (*RAEN Committee*).

The Minutes of the following Committee meetings were accepted as reports:

Scientific Studies (29.3.65), GPO Liaison and TVI (28.4.65), Exhibition (23.4.65), Technical (5.5.65), Scientific Studies (9.5.65), Mobile (12.5.65), Finance and Staff (13.5.65), V.H.F. Contests (26.5.65), Scientific Studies (28.5.65) and Mobile (2.6.65), RAEN (29.5.65).

* * *

The meeting ended at 10.45 p.m.

RAE Courses

Details of RAE courses commencing next month will be published in the September issue of the RSGB BULLETIN.

Information on additional courses at evening institutes, technical colleges and local radio clubs should be sent to RSGB Headquarters as soon as possible.

GB2RS SCHEDULE

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

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

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

CONTEST NEWS

— RESULTS — REPORTS — RULES —

80 Metre Field Day 1965

The Contests Committee has for some time felt that the support for the Low Power Field Day contest has been hardly sufficient to justify its continuation. Also, with the advent of one or two stations able to use high power transistors, the number of entries could drop even lower. With this in mind the Contests Committee have decided to alter the rules for this year's event as follows.

Since low power has become an obsolete title it will now be called the " 80m Field Day " and a power limit of 10 watts will be imposed. The weight restriction will be removed so that specialized equipment need not necessarily have to be constructed in order to enter. To retain the simple nature of the contest the number of operators and helpers will be limited to two and power may only be taken from h.t. and/or l.t. batteries.

With these changes it is hoped that many more stations will be induced to spend a day out in the field and that the regular competitors of the last few years will continue to give their support to this contest in September.

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

1. **Duration:** 10.00 GMT to 17.00 GMT on **September 12, 1965.**
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 transmissions.
4. **Scoring:** Five points may be claimed for each contact with a portable or mobile station, and one point 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 "; " 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 RSGB Contests General Rule 4. The declaration must be signed and the location as transmitted given.

(c) Entries must be postmarked not later than **September 27, 1965.**

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 from storage batteries or accumulators.
8. The General Rules relating to RSGB Contests, published in the January 1965 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.

Second 420 Mc/s Contest (Open) 1965

Members taking part in this contest are recommended to operate between 432-434 Mc/s in accordance with the British Isles 70cm Band Plan. As stations in this contest can work from more than one location they have the advantage of claiming the score for the best contact with any particular station. This applies equally to static stations who may work them at more than one site. A cordial invitation is extended to holders of Amateur (Sound) Licence B to take part.

Check logs from listeners are invited and may be credited towards the V.H.F. Listeners' Championship. Any comments on the rules will be welcome and will be considered when the rules for the next similar contest are made.

1. **When:** 18.00 GMT on Saturday, November 13, to 18.00 GMT on Sunday, November 14, 1965.
2. **The General Rules** of RSGB contests as published in the January 1965 issue of the RSGB BULLETIN will apply except as superseded by the rules of this contest.
3. **Eligible Entrants:** All operators must be fully paid-up members of the RSGB resident in Europe and hold a current Amateur (Sound) Licence. Multiple operator entries will be accepted provided that only one call-sign is used.
4. **Station locations:** Stations may be operated from more than one site.
5. **Contacts** may be made on any mode permitted in the Amateur (Sound) Licence except A2 (m.c.w.).
6. **Scoring** will be on the basis of one point per mile.
7. **Contest Exchanges:** RST or RS reports followed by the contact number and location (e.g. RST 599001, 4 north Macclesfield, Cheshire). This location must be identifiable without ambiguity on the Ordance Survey " Ten-mile " map. Alternatively, five-figure QRA locators may be exchanged. It is the responsibility of the receiving operator to obtain the information necessary to calculate his distances correctly.
8. **Entries:** (a) Logs should be tabulated in columns headed in this order: " Date/Time (GMT)"; " Call-sign of station contacted"; " My report on his signal and serial number sent"; " His report on my signal and serial number received"; " Location of station received"; " Call-sign of operator" (Multi-operator entries only); " Points claimed". Logs must show clearly when locations are changed.

(b) The cover sheet must be made out in accordance with General Rule 4 and the declaration signed. Multi-operator entries should be so marked and the operators listed. The QTH as sent, QRA if used, and the NGR full six-figure reference should be recorded for each location. Stations outside the area of the National Grid should show latitude and longitude.

(c) Entries must be postmarked not later than Monday, November 29, 1965.

9. **Awards** will be made at the discretion of Council to the leading fixed station, the leading portable station and the overall runner-up. The overall winner will receive a miniature cup and the other two stations certificates of merit.

Region 1 Field Day

Region 1 Field Day will take place on Sunday, September 12. Individual RSGB members may compete provided they are resident in Region 1. Rules and further information may be obtained from the Regional Representative, Basil O'Brien, G2AMV, 1 Waterpark Road, Prenton, Birkenhead.

RSGB QSL Bureau—New Postage Rates

Members sending envelopes to the RSGB QSL Bureau Sub-Managers are asked to make certain that stamps are affixed according to the new postage rates. The minimum letter rate is 4d. for 2 oz, instead of 3d. for only 1 oz. The separate 1 oz. to 2 oz. rate, previously 4½d., has been abolished, and is now, of course, included in the 4d. charge. Every additional 2 oz. costs 2d.

CONTESTS DIARY

August 14–15	- WAE Contest (C.W.).
September 4–5	- Region I IARU V.H.F. Contest. (see page 544)
September 4–5	- V.H.F. National Field Day. (see page 336, May 1965)
September 11–12	- WAE Contest (Phone).
September 12	- 80m Field Day.
September 19	- D/F National Final, Derby.
September 25–26	- 21/28 Mc/s Telephony/Receiving Contest. (see page 545)

October 2-3	— WADM Contest (C.W.)
October 9-10	— Raynet Rally.
October 16-17	— 7 Mc/s DX Contest (Phone).
October 23-24	— CQ World Wide Contest (Phone).
November 6-7	— 7 Mc/s DX Contest (C.W.).
November 13-14	— Second 432 Mc/s Contest.
November 20-21	— Second 1·8 Mc/s Contest.
November 28-29	— CQ World Wide Contest (C.W.).
December 5	— Fourth 70 Mc/s Contest (C.W.).

Rules for IARU Region I V.H.F./U.H.F. Contests

Five official v.h.f. contests shall be held each year under the auspices of the Region I IARU V.H.F. Committee but each national Society shall retain the right to organize such extra contests as it may see fit. The first four official contests each year shall be national (i.e., sub-regional) events designed to increase v.h.f. activity in the countries concerned, but QSOs with foreign amateurs are permitted. Rules for these contests are optional and any country may make its own, but the use of the international rules is recommended. The fifth official contest will be known as the IARU Region I V.H.F. Contest and will be arranged by a different Region I Society each year. The sequence will be Austria, Belgium, Denmark (1965), France, Germany, Great Britain, Holland, Italy, Yugoslavia, Sweden and Switzerland. For the International Region I V.H.F./U.H.F. Contest the official rules must apply.

Rules

1. Eligible Entrants. All licensed radio amateurs resident in Region I. Multiple operator entries will be accepted provided only one call-sign is used. Contestants must operate within the letter and spirit of the Contest and at no greater power than permitted in the ordinary licences of their Country. Stations operating under special high power licences do so hors concours and cannot be placed in the Contest proper.

2. Contest Stations. The first, second, fourth and fifth Contests will comprise the following sections:

i. Fixed stations, 2m.
ii. Portable/Mobile stations, 2m.
iii. Fixed stations, 70cm.
iv. Portable/Mobile stations, 70cm.
v. Fixed stations, 24cm.
vi. Portable/Mobile stations, 24cm.

The third contest will be operated on 70cm and 24cm only (Note 3). Portable/Mobile stations must operate from the same locations throughout the events.

3. Dates of Contests. The four general contests will take place during the first weekend of March, May, July and September each year; the third contest (70/24cm only) will take place during the last weekend in May. The sequence 31/1 or similar not to count.

4. Duration of Contests. The International Region I V.H.F./U.H.F. Contest will commence at 18.00 GMT on the Saturday and will end at 18.00 GMT on the Sunday, the exact times and/or time intervals being at the discretion of the organizing National Society, provided they fall within these two time limits. The sub-regional contests taking place during the first weekends of March, May and July will be held between 18.00 GMT on Saturday and 18.00 GMT on Sunday, the exact times and/or time intervals being at the discretion of the organizing national society provided that they fall within these time limits.

5. Number of Contacts. Each station can be worked once only on each band whether fixed, portable or mobile. If a station is worked again during the same contest on the same band only one contact will count for points, but any duplicate contacts should be logged without claim for points and should be clearly marked as duplicates.

6. Types of Emission. Contacts may be made on A1, A3, A3a or F3.

7. Contest Exchanges. Code numbers exchanged during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for the first contact on each band and increasing by one for each successive contact on each band. This exchange must be immediately followed by the QRA Locator of the sending stations (example 579021YG46E). QTHs may also be exchanged if desired.

8. Scoring. Points will be scored on the basis of one point per kilometre. The final claimed score must be shown at the top part of the first sheet.

9. Entries. Entries must be set out as shown in the example below. In the case of the International Region I V.H.F./U.H.F. Contest, two copies of the entry must be sent to the National V.H.F. Manager concerned postmarked not later than the second Sunday following the contest weekend. Late entries will not be accepted. The judging of the entries shall be the responsibility of the organizing Society whose decision shall be final. Submission of a log implies acceptance of the rules (Note 2).

10. Disqualification. Entrants deliberately contravening any of these rules shall be disqualified. Minor errors may result in loss of points. Errors in call-signs and code numbers will be penalized by deducting the following percentage of claimed scores for both stations.

One error: 25 per cent; two errors: 50 per cent; three or more errors: 100 per cent.

The claimed contact will be disqualified for (a) an obviously wrongly stated QTH, when no QRA Locator is exchanged; (b) a time error of more than 10 minutes (Note 1). Contest entrants will not be penalized for the failure of non-entrants to comply with these rules.

11. Awards. The winner of each section will receive a certificate. The top score on 2m, whether fixed or portable, will be awarded the Region I V.H.F. Trophy. The winner in the remaining 2m category will be awarded the PZK cup.

NOTES

1. In some countries it is customary to use a band indentification letter (A for 2m, B for 70cm and C for 24cm). Should this letter be used or not used no penalty will be exacted.
2. Not later than the seventh Sunday following the International Region I V.H.F./U.H.F. Contest the V.H.F. Manager or properly constituted Contests Committee will forward to the Society organizing the Contest one copy for each entry, after examining the logs and certifying them to be acceptable to the best of their knowledge.
3. The May 70/24cm contest will be known as the IARU Region I U.H.F. Contest.

Sample Contest Log Sheet

Contest.....Date.....Claimed Score.....
Section..... Call-Sign.....
Name .....
Home address .....
Location of station .....Latitude ..... Longitude.....
Height above sea level in metres .....
Transmitter ..... Input power..... watts..
Operating frequencies .....Crystal or v.f.o.....
Receiver .....Aerials .....

Date/ Time	Call-sign	Serial Sent	Numbers Received	QTH	Emission	Distance km	Points claimed

Declaration

I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the ruling of the organizing society shall be final in all cases of dispute.

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

V.H.F. Band Plans

All v.h.f. operators are reminded of the British Isles Two Metre and Seventy Centimetre Band Plans, which are sponsored by the Society. Observance of these plans will assist in DX working and in avoiding QRM to Service frequencies in the 144-145 Mc/s band.

Zone	2 metres	70 cm.	Area
1	144·0–144·1	432·0–432·1	Cornwall, Devon, Somerset.
2	144·1–144·25	432·1–432·25	Berkshire, Dorset, Hampshire, Wiltshire, Channel Isles.
3	144·25–144·5	432·25–432·5	Brecon, Cardiganshire, Carmarthenshire, Glamorganshire, Gloucestershire, Herefordshire, Monmouthshire, Pembrokeshire, Radnorshire, Worcestershire.
4	144·5–144·7	432·5–432·7	Kent, Surrey, Sussex.
5	144·7–145·1	432·7–433·1	Bedfordshire, Buckinghamshire, Essex, Hertfordshire, London, Middlesex.
6	145·1–145·3	433·1–433·3	Cambridgeshire, Huntingdonshire, Leicestershire, Norfolk, Northamptonshire, Oxfordshire, Rutland, Suffolk, Warwickshire.
7	145·3–145·5	433·3–433·5	Anglesey, Caernarvonshire, Cheshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Shropshire, Staffordshire.
8	145·5–145·8	433·5–433·8	Derbyshire, Lancashire, Lincolnshire, Nottinghamshire, Yorkshire.
9	145·8–146	433·8–434	All Scotland, Northern Ireland, Isle of Man, Cumberland, Co. Durham, Northumberland, Westmorland.

Two Metre Band Guard Channels: The following frequencies in the 144-145 Mc/s portion of the 2-metre band are tabulated on the schedule to the Amateur (Sound) Licence to be avoided as they are allocated to Service use: 144·0, 144·09, 144·18, 144·27, 144·36, 144·45, 144·54, 144·63, 144·72, 144·81 and 144·9 Mc/s. *Remember!* The safety of aircraft and human lives depend upon the interference-free use of the channels.

Rules for the RSGB 21/28 Mc/s Telephony Contest, September 25-26, 1965

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 September 25-26.

1. **Duration:** The contest will start at **07.00 GMT** on Saturday, **September 25**, and end at **19.00 GMT** on Sunday, **September 26, 1965.**

2. **Eligible Entrants:** The contest is open to licensed amateurs in all parts of the world. There will be two sections: (i) for single operators; (ii) for multiple operator stations. Entrants in the multiple operator section will not be eligible for awards under Rule 9 but will be eligible for certificates of merit.

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:** In the Single Operator Section only the entrant will be permitted to operate his station for the duration of the contest. In both sections all operators must be licensed.

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, W.C.1, 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 October 11, 1965. Log sheets are available from RSGB Headquarters.

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, GB, 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, GB, 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:** In the Single Operator Section, 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**.....

September 25-26, 1965 **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, September 25-26, 1965

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, **September 25, 1965,** and end at 19.00 GMT on Sunday, **September 26, 1965.** 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 October 11, 1965 and must be addressed to the **Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1, 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 purpose 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.

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.

★ ★ ★

The closing date for posting entries is October 11, 1965.

CLUBROOM

A Monthly Survey of Group and Club Activities

For information on membership or activities of a particular club, please apply to the person whose call is indicated at the end of the item. Full addresses may be obtained from a Call Book.

The **AEREAR Club** has found that the forward planning for NFD brought about a substantial increase in the total number of points claimed. This year's total was exactly three times that of last year, even though there were still a few gremlins around. Still on the subject of contests, they observe that the Midlands Group gave them some hot competition during the May 4m event, and despite a score of 9409 points, they feel that they have probably been beaten to the post. (*G2HJ*).

Basingstoke ARC also report an increase in their NFD score, which was up by 50 per cent on 1964. At the moment they are giving advance warning of the AGM to be held in September.

Bedford ARC have held their final meeting at the Harpur School, and hope that there will be accommodation for them in the new school building in the very near future. New members will be particularly welcome. (*G3OWQ*).

Bromsgove and District RC held its AGM on June 11 and elected the Committee for the coming year. The chairman is G2CLN and the Honorary Secretary J. Harvey, BRS19682. The programme will be finalised at the August meeting at the Co-operative Rooms, High Street, Bromsgrove—date from G2CLN. Morse classes are held on the second Friday in each month, commencing at 7.15 p.m. (*G2CLN*).

Cambridge ARC tell one of those nightmare stories which, fortunately for most clubs, remain only a dream. With all equipment ready to go for NFD at the club HQ, a group of members waited two long hours for a lorry to turn up. By the time the forgetful driver was contacted, the party had dispersed, wet and disappointed. (*G5BQ*).

Cheshunt and District ARC will not be having a meeting in August as so many members will be away on holiday. The September meeting is positioned for Friday the 3rd. At the July meeting they were pleased to welcome John Swinnerton, G2YS who gave a talk, and answered questions on, the RSGB. (*G3GBL*).

Chester and District ARC has a programme of five events for August, and one forward planned for September. Potential new members and actual visitors are most welcome. (*G3TZO*).

Clifton ARS has one very enterprising member, G3SYT, who has transistorised a fluorescent lamp for operation on 12 volts. It seems that a plague of them are now being bred, and the club station G3GHN/P should be visible for miles on VHF NFD. RAE instruction has commenced once more, and parallel Morse classes are being organised. (*G3JKY*).

Conway Valley ARC held its AGM in June, and with the new committee formed is planning a programme of activities to start in September. (*GW3HGL*).

The Leicester Radio Society's shack. The equipment at G3LRS is an Elizabethan transmitter, a 50 watt modulator, an Eddystone 680X, a 10 watt NFD tx and a 10 watt Top Band tx.

Crawley ARC's August meeting will take the form of the Annual Sale of Surplus Equipment. In control of the hammer will be G3FRV. All with junk—but especially those with money—will be welcome. (*G3FRV*).

Crystal Palace RC reports that the idea of providing a second station at NFD for any operator to " have a go " proved very successful, and in fact the station ran for the whole 24 hours clocking up a total of 585 points. The August meeting will take place on the 21st and will be a DXpedition tape talk illustrated with slides.

Echelford ARS ran an exhibition station on June 19 at the Hallifords Sea Scout Fete which created quite a lot of interest. The August meeting will be held on the 25th at the Links Hotel, Ashford when visitors will be welcome. (*G3DXA*).

The **Ex-G Club** will resume weekly meetings in September on the net frequency of 14345 kc/s. G stations are most cordially invited to take part. (*G2FUX*).

Havering and District ARC has a new club QTH at 54 Western Road, Romford. All SWL's and other interested persons will be very welcome. Meetings in August will take place on the 4th and 18th. (*G3TUW*).

Loughton and District RS has decided that Saturday is not a particularly good day to hold a Mobile Rally. While the rally was a success, attendance during the morning was well below expectation, but from about 2.30 p.m. onwards over 70 cars were booked in and attendance totalled over 300. There can be no doubt that from the varied and extensive programme of events all who attended this rally had plenty to see and do. (*G3JBS*).

Luton ARS seems to have survived the debate, H.F. *vs* V.H.F. without any spilt blood. Eventually the discussion developed into an evening of reminiscences and nostalgia—which come to think of it probably did everyone a power of good. No vote was taken as it was generally agreed that there was much to be said for both interests.

Magnus RS are holding a D/F event in July, while later in that month, G3TBM will be giving a talk on the radio control of model boats. (*G3PAW*).

North Kent RS still really cannot believe that for the first time for many years, they came through NFD without anything going wrong. Perhaps it was due to visits from a number of members of the fairer sex. Continuing her advice to ham widows, G2FNT's XYL comes over with a couple of smart ideas on how to get an evening's peace, otherwise known as giving the OM so much frustration that he just gives up: like removing the fuse from the plug-top and watching the ensuing frantic fault finding fiasco, hanging washing on the aerial, which loads it so much that the transmitter will not load. For further information join the NKRS! (*G3PUI*).

Northern Heights ARS has events planned for August 7, 14 and 18. At the Halifax Gala a demonstration station was installed, and a car equipped for mobile operation took part in the procession. At the end of June they had a mammoth surplus sale. Such was the size of the mound of equipment for disposal, and the number of people in attendance that there was hardly room to breathe in the clubroom.

Purley and District RC cleared its AGM in June and is now settling down to another year of work. The first of these meetings will take place on August 6, followed by another on the 20th. New members and visitors are always welcome. (*G3FQT*).

Plymouth RC reports that it had some of the best weather for years during NFD and this helped everybody to have an enjoyable time. On August 15 they are holding their inter-club picnic at Harrowbeer on Dartmoor. The venue is past Yelverton on the A386. The event is quite informal, but a talk-in station will be operational on 160 and 80, and also on v.h.f. All visitors, mobilers, swl's friends and families are invited to meet members of the Exeter, Kingsbridge, Torbay, Saltash and Plymouth clubs. (*G3PRC*).

Reading ARC had a very good attendance at the Mobile picnic with a total of 22 mobilers. The next meeting will take place on August 28 when G5XB will be giving a talk under the title " Aerial Systems made to Measure ". The big event of the year for the club will be its stand at the Reading Silver Jubilee Show on August 20-21, at which home constructed equipment will be on display and a demonstration station in operation. (*G3TOQ*).

Reigate ATS have had the pleasure of welcoming its first lady member, the XYL of G3OVL. On August 21, a meeting is to be held at the George and Dragon at Redhill, with the stated intention of running a quiz—on radio matters of course. Intensive preparations are under way for V.H.F. NFD when the club will be going into S.E. Sussex—which poses the interesting question of where do the S.E. Sussex boys go? Into Surrey? (*G3NKT*).

The **Royal Signals ARS** journal *Mercury* contains an excellent article under the title " Propagation—or how it gets there " by G5YN. Striking a nice balance between serious material and humour—and where would we be in this miserable world without the odd chuckle—this issue also contains an entertaining titbit headed " Potted Prefixes ". (*G3EJF*).

Salop ARS is still without a fixed abode and alternates between the Morris Hall and The Old Post Office Hotel. Badly needed are premises at a realistic rent where the club can set up its own station. Even though confronted with such very real difficulties, the club nevertheless has an excellent programme of events planned. New members, and visitors, are always welcome. (*G3RRN*).

Saltash and District ARC is having a mobile evening out on August 13, which, even without G9BO, sounds a bit of a dicey date. On the 27th there will be a constructors evening. Membership is on the increase with quite a few new faces. (*G2DFH*).

Shefford ARC recently acted as hosts to members from Bedford, Cambridge, Luton and Stevenage clubs when nearly 80 people listened to a talk on Laser Tubes by Miss Mary Dann.

Slade RS have two events planned for August, one on the 6th, and the other on the 20th. Each Wednesday evening, slow Morse practice is held at the club station.

Southgate and Finchley Group are putting on a stand at the Southgate Show which is being held on August 27 and 28, and observe that it will need all hands to the pump to get things organised on time. Preceeding this on August 12 will be a junk sale, and it is hoped that, like the forerunners, it will be a bumper event. From the Newsletter we gather that The Southgate Horticultural Society has asked the club to erect and operate a station during their show. To your conductor this seems to be almost the pinnacle of public relations.

Stourbridge and District ARS report that good attendances are being maintained at monthly meetings, and are very encouraged by an increase in young members who take full part in all the society's activities. Meetings are held on the first Tuesday in each month at Foley College, Stourbridge.

Surrey Radio Contact Club recently held its annual Treasure Hunt which differed from those of past years in that this time it was organised by people outside the club. The current matter under consideration is the V.H.F. NFD, and this year they are hoping to be able to include a greater number of v.h.f. enthusiasts.

South Birmingham RS has meetings planned for August 19 and 21, the latter being an exhibition station at the Marston Green Flower Show. Recently Daystrom Ltd of Gloucester (Heathkits) gave a comprehensive demonstration and talk to a meeting which was attended by 44 persons, a number of whom were welcomed visitors. The current *Newsletter* contains a very thorough description of the goings-on during NFD. (*G3TQO*).

South Dorset RS had an outdoor meeting in July at Hardy's Monument with Top Band, 4m, 2m, and 70cm portable equipment. The August meeting will form the Society's participation in the Weymouth Model Engineering Exhibition from August 3-7 inclusive. Enquiries from persons interested in membership are always welcome.

South London Mobile Club has now obtained its own permanent shack on the premises of the 1st Wandsworth Common Scout Group HQ. Signal reports on the club station G3SLM will be particularly welcomed. Meetings are still being held at Clapham Manor Baths commencing at 8 p.m., those for August being scheduled for the 14th and 28th. Potential members are always welcome. (*G3SLM*).

South Shields and District ARC is holding its AGM on Friday September 3 at Trinity House Social Centre, Laygate and is hoping that all members will make a really determined effort to attend. Regular meetings are held each Friday starting at 7.30 pm. (*G3KZZ*).

University College of North Wales has had its AGM, and the 1965/1966 programme will start on October 14. Full details can be obtained from GW3SWL.

Verulam ARC will be holding its August meeting on the 18th at which Jack Hum, G5UM, will be talking about " 70cm and things UHF-FY ". For the September meeting G3NCK has been able to secure the loan of the film " Friendship Seven " which, from a radio interest point of view, will be better than any gigantic colossal colour epic at the local flicker box. (*G3EKU*).

Caithness ARS is flourishing, but is bedevilled with the sticky problem of finding suitable meeting places. Nevertheless, meetings will be held every three weeks for the rest of the year. Anyone visiting the wilds of John o' Groats will be given a warm reception if they like to turn up at one of the Caithness meetings. Details from (*GM3GUJ*).

Chelmsford ARS. It was fortunate that the weather remained fine for Chelmsford's second D/F hunt, for G3KPT buried himself in a ditch to hide the transmitter. Three members managed to find him before the time limit was reached. (*G3EIX*).

Manchester and District ARS has four meetings lined up for August. The 7th will be on RAE practice and operating night, the 14th a discussion night, the 21st a c.w. practice and operating night, and a lecture will be given on the 28th. (*G3RTU*).

East Worcestershire ARG. *G3HZG*, the secretary, will be pleased to hear from anyone touring in the area. The W1BB lecture has inspired everyone to take the club Top Band transmitter apart and re-build it for the next transatlantic tests. The winter session of lectures will open in September with a talk on " Cryogenics and perhaps the Radio Amateur ". (*G3HZG*).

Stoke-on-Trent ARS. In recognition of his 50-year interest in radio, G8IX was made an Honorary Member at a recent meeting of the Society. One of the junior members will be providing a working closed circuit TV demonstration on September 9. (*G3EBU*).

HELP US TO HELP YOU

This feature can materially assist your membership, and wh n sending contributions the general rule should be to provide too much information rather than too little. In addition, due to pressure on space, as it is not possible to print the full name and address of club secretaries, will you please ensure that a call-sign is included to whom interested persons can apply. Without such a call-sign the club item can lose a great deal of its potential value.

The deadline date for the **September** issue is August 6.

The deadline date for the **October** issue will be September 11.

WELL, WOULD YOU USE A HANDMIKE?

We are glad to say that this gruesome picture was staged by the Amateur Radio Mobile Society and the Police at a recent Red Cross rally to emphasise the dangers of using hand microphones when operating mobile. While no accident has ever been attributed to operation of radio equipment, all mobile operators are strongly advised to follow the RSGB Mobile Safety Recommendations last published on page 384 of the June issue of the BULLETIN.

(Copyright photograph by G3NMR)

Forthcoming Events

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

REGION 1

Ainsdale (ARS).—August 4, 18, September 1, 8 p.m., 77 Clifton Road, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. (Morse tuition from 7.30 p.m.)
Bury (B & RRS).—August 10 ("TVI Troubles," by G2BTO), 8 p.m., Old Boars Head, Crompton Street (private room).
Chester.—Tuesdays, 8 p.m., YMCA, except first Tuesday in each month.
Crewe & District.—August 2, September 6, 8 p.m., Earl of Crewe Hotel, Nantwich Road.
Eccles (E & DAC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft, Eccles. Every Thursday, Club Top Band net at 20.30.
Liverpool (L & DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.
Macclesfield.—August 3, 17, 31, The George Hotel, Jordongate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.
Manchester (SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.
Morecambe.—August 4, September 1, 125 Regent Road.
Preston.—August 10, 24 (all meetings start with Morse practice at 7.30 p.m.), St. Paul's School, Pole Street.
Southport (SRS).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport.—August 11, 25, September 8, The Blossoms Hotel, Buxton Road, Stockport.
Wirral.—August 4, 18, September 1, 7.45 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Bradford.—August 17, 31, 7.30 p.m., 66 Little Horton Lane.
Catterick.—Tuesdays and Thursdays, 7.30 p.m., Club Room, Vimy Road.
Durham.—Every other Thursday, 8 p.m., Bridge Hotel, North Road.
Halifax (Northern Heights).—August 4 ("D/F Equipment" by M. Niman, G3LGN), August 7 (Visit to Calder Hall Atomic Power Station, Cumberland), August 14 (Demonstration Station at Halifax Agricultural Show), August 18 ("Top Band DX-ing" by Stew S. Perry, W1BB, recorded talk), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., rear of 3 Trinity Road.
Sheffield.—August 6 (V.H.F. NFD Planning), August 13 (Audio Group), 8 p.m., 8 Sandbeck Place.

REGION 3

Birmingham (Slade).—August 13, 27, 7.30 p.m., The Church House, Erdington.
(South).—August 19, 7.30 p.m. (Talk by George Brown, G5BJ), Friends Meeting House, Moseley Road, Birmingham. August 21, Exhibition Station at Marston Green Flower Show.
Cannock (CCARS).—August 5, September 2, 7.30 p.m., The George Inn, Walsall Road, Cannock.
Coventry (CARS).—Mondays, 8 p.m., Westfield Road, Coventry.
Dudley (ARC).—Fridays, 8 p.m., Art Gallery, Dudley.
East Worcs. Amateur Radio Group.—August 12, 8 p.m., Redditch Old People's Centre, Park Road, Redditch.
Salop (ARS).—August 12, 7.30 p.m., Morris Hall, Bellstone, Shrewsbury.
Stratford-upon-Avon (ARS).—Fridays, 7.30 p.m., Masons Arms, Sanctus Road, Stratford-upon-Avon.
Stourbridge & Dist. (ARS).—August 20, 8 p.m. (Informal) Bell Hotel, Stourbridge. September 14, 7.45 p.m. (Auction Sale), Library, Foley College, Stourbridge.

REGION 4

Derby (D & DARS).—August 4 (Surplus Sale), August 11 (Meeting at Rykneld School—Rally Preparation), August 15 (Eighth Annual Mobile Rally), August 18 (D/F Practice—Social Evening), August 25 (Quiz Night), September 1 (Surplus Sale), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Heanor (H & DARS).—August (No meetings), September 21 (Social Evening), 7.30 p.m., Heanor Technical College, Ilkeston Road, Heanor, Derbys.
Loughborough (LARC).—August (No meetings —Club Room renovation), September 10 (Components Sale), 7.30 p.m., Club Room, Bleach Yard, Wards End, Loughborough.
Mansfield (ARS).—Fridays, 7.30 p.m., The New Inn, Westgate, Mansfield.
Nottingham (ARCN).—Tuesdays, Thursdays, Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.
Newark (Magnus GS).—Tuesdays, 3.50 p.m., Junior Physics Lab., Magnus Grammar School, Newark.
Worksop (NNARS).—Tuesdays (RAE Class), Thursdays (Lecture), Club Room, 13 Gateford Road, Worksop, Notts.

REGION 5

Cambridge (C & DARC).—No organised meetings during August.
Cambridge University (CUWS).—Meetings suspended for Long Vacation.
Luton (L & DARC).—Meetings suspended during August. Normally 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, Cambs.
Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Herts.
Shefford (S & DARS).—Thursdays, 7.45 p.m., Church Hall, High Street, Shefford, Beds.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street, Cheltenham.

REGION 7

Acton, Brentford & Chiswick (ABCRC).—August 17 ("Transistorised Double Superhet," by G3IGM), 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick.
Ashford (Middx.) (Echelford ARS).—August 11, 25, 7.30 p.m., Links Hotel, Ashford.
Bexley Heath (NKRS).—August 12, 26, 7.30 p.m., Congregational Hall, Chapel Road, Bexley Heath.
Barnet (BRC).—August 17, 8 p.m., Red Lion Hotel, Barnet.
Chingford (Group).—August 20. Secretary, Loughton 2397.
(SRC).—Fridays (except first), 8 p.m., Friday Hill House, Simmons Lane.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the White Hall Hotel, Bloomsbury Square, London, W.C.1

at 12.30 p.m. on Fridays, August 20 and September 17, 1965.

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

Croydon (SRCC).—August 10, 7.30 p.m. Blacksmiths Arms, South End.
Dorking (D & DRS).—August 10, 8 p.m., Wheatsheaf, Dorking.
East Ham.—Tuesdays fortnightly, 7.30 p.m., 12 Leigh High Road, East Ham.
East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.
Edgware & Hendon (EADRS).—August 9, 23, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Enfield.—August 19, 8 p.m., George Spicer School, Southbury Road.
Gravesend (GRS).—August 18, 7.30 p.m., RAFTA, Club, 17 Overcliffe.
Guildford (G & DRS).— August 13, 27, 8 p.m., Guildford Model Engineering Society in Stoke Park.
Harlow (DRS).—Tuesdays, Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.
Harrow (RSH).—Thursdays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harrow.
Holloway (GRS).—Monday, Wednesday, 7 p.m., RAE and Morse, Friday, 7.30 p.m. (Club), Montem School, London, N.7.
Hounslow (HADRS).—August 9, 23, Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford, (nr. Seven Kings Station).
Kingston.—August 5, 19, 8 p.m., YMCA, Eden Street. Fridays (Weekly Morse classes at 2 Sunray Avenue, Tolworth).
Leyton & Walthamstow.—August 17, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E.10.
London U.H.F. Group.—August 5 (Members' Surplus Disposal), 7.30 p.m., Bull and Mouth, Bloomsbury Way, Holborn.
London Members' Luncheon Club.—12.30 p.m., third Friday every month.
Loughton.—First Thursday every month, 7.30 p.m., Loughton Hall (near Debden Station).
New Cross (CARS).—Wednesdays, Fridays, 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood & South London (CP & DRS).—August 21, ("DXpedition," Tape talk with slides), CD Training Centre, Bromley Road, Catford, London, S.E.6.
Paddington (P & DARS).—Wednesday, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W.2.
Purley (P & DRC).—August 20, 8 p.m., Railwaymen's Hall (Side Entrance), Whytecliffe Road.
Reigate (RATS).—August 21 (Radio Quiz, by G3NKS), 7.30 p.m., George and Dragon, Cromwell Road., Redhill.
Romford (R & DRS).—Tuesdays, 8.15 p.m., RAFTA House, 18 Carlton Road.
Scout ARS.—August 19, 7.15 p.m., Baden Powell House, Queens Gate, South Kensington.
Science Museum (CSRS).—August 17, 6.30 p.m., Science Museum.
Sidcup (CVRS).—August 5 (G2MI on QSL Bureau), September 2 (Mullard Film "Transistors"), 7.30 p.m., Congregational Church Hall, Court Road, Eltham.
Slough (SARS).—First Wednesday every month, 8 p.m., United Services Club, Wellington Street.
Southgate & District.—August 12, 7.30 p.m., Atlasta Lodge, Tottenhall Road, Palmers Green, N.13.
St. Albans (Verulam ARC).—August 18 ("G8 Plus three and 70cm), 8 p.m., Marconi Service Works, Hedley Road.
Sutton & Cheam (SCRS).—August 17, 8 p.m., The Harrow Inn, High Street, Cheam.
Uxbridge.—August 16, 8 p.m., St. Andrews Scout Hut.
Welwyn Garden City.—Sunday, August 29, 3 p.m. (V.H.F.-NFD Rehearsal), G5UM.
Wimbledon (W & DRS).—August 13, 8 p.m., Community Centre, St. Georges Road, Wimbledon, S.W.19.

LOOKING AHEAD

September 18.—N.W. V.H.F. Convention.
October 10.—Manchester Amateur Radio Convention, Belle Vue.
October 16-17.—Eighth Jamboree-on-the-Air.
October 27-30.—RSGB International Radio Exhibition.
December 17.—RSGB Annual General Meeting.

Details of Mobile Rallies are given below.

REGION 8

Crawley (CARC).—August 11 (nformal Meeting). For details contact G3FRV. August 25 (Junk Sale), 8.0 p.m. at Trinity Congregational Church Hall, Ifield.

REGION 9

Bristol.—August 20, 7.15 p.m., Small Physics Theatre, Royal Fort, Bristol University, Woodland Road, Bristol 8.
Burnham-on-Sea (B-o-SARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford St., Burnham-on-Sea.
Camborne (CRAC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, near Camborne.
Exeter.—First Tuesday 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 (SADARC).—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.
Torquay (TARS).—August 28 ("Pre-war in VU2" by J. Bennett SWL), Club HQ, Belgrave Road, Torquay.
Weston-super-Mare.—First Friday in each month, 7.15 p.m., Victoria Hotel, Weston-super-Mare.
Yeovil (YARC).—Wednesdays 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Cardiff.—August 9, 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 11

Bangor (UCNWARS).—No meetings during the summer. Meetings will resume on October 14.
Llandudno (CVARC).—No meeting in August.
Prestatyn (FRS).—August 25 (arrangements for V.H.F. Field Day), 8 p.m., Railway Hotel, Prestatyn.

REGION 14

Glasgow.—First and Third Wednesdays in each month, Christian Institute, 70 Bothwell Street, Glasgow, C.2.

REGION 16

Basildon (BDARS).—August 18 (Visit to Grays Thurrock telephone exchange). September 7 (Visit to Southend Municipal Airport). Details from G3IJB.
Chelmsford (CARS).—No meeting in August. September 7, 7.30 p.m. (AGM), Marconi College, Arbour Lane, Chelmsford.
Great Yarmouth (GYRC).—Fridays, 7.30 p.m., The Manager's Office, The Old Power Station, South Quay, Swanston's Road, Great Yarmouth. Details from G3HPR.
Ipswich (IRC).—August 25, 7.30 p.m., Civic College, Ipswich.
Norwich (NARC).—Mondays, 7.30 p.m., the Club Centre, 140 Oak Street, Norwich. Details from G3TLC.
Southend (SDARS).—Meetings alternate Fridays in the Executives' Canteen, E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Details from G3NPF.

RSGB NATIONAL MOBILE RALLY

Woburn Abbey, Bletchley, Buckinghamshire

(by permission of His Grace the Duke of Bedford)

SUNDAY, SEPTEMBER 12, 1965

* Park opens 11 a.m.
* State Apartments open.
* More than 3,000 acres and 2,000 animals.
* Children's Playground, Pets' Corner and Boating Lake.
* Restaurants and Snack Bars.
* Specially reserved rally car parks.

TALK-IN STATIONS
on 2, 4 and 160m

Organized by the RSGB Mobile Committee

Olympic Sound Studios Junk Sale

Angus Mackenzie, G3OSS, has asked us to announce that a Junk Sale will be held at 11 Carton Street, off the west end of Blandford Street, London, W.1 (opposite Olympic Sound Studios) at 11 a.m. on Saturday, September 4, 1965. All the proceeds will go to charity.

MOBILE RALLIES 1965

August 15.....Derby Mobile Rally

Ryknеld Schools, Derby

G3ERD/A ... 160m
G2DJ/A ... 2.4m
} talk-in stations

Organized by the Derby and District Radio Society

August 30.....Peterborough Mobile Rally

River-side Park, adjacent to swimming pool, Peterborough

G3DQW ... 1.980 Mc/s
G3EEL ... 1.920/144.47 Mc/s
G3RED ... 70.26 Mc/s
G3KWY ... 145.35 Mc/s
} talk-in stations

Organized by the Peterborough and District Amateur Radio Society

September 12.....RSGB National Mobile Rally

Woburn Abbey, Bedfordshire

Organized by the RSGB Mobile Committee

September 12.....UBA International Mobile Rally

See page 385, June, 1965

Organized by the Brabant-Sud and Brabant-Sud Est Section of UBA

September 26.....Harlow Mobile Rally

Magdalen Laver Village Hall, Magdalen Laver, near Harlow

Organized by the Harlow and District Radio Society

RSGB PUBLICATIONS

The Amateur Radio Handbook (Third Edition)	36/6
Radio Data Reference Book	14/–
Amateur Radio Circuits Book	8/6
Amateur Radio Call Book	5/9
Service Valve Equivalents (Fifth Edition)	3/6
S.S.B. Equipment	3/–
Communication Receivers (Second Edition)	3/–
The Morse Code for Radio Amateurs (Third Edition)	2/–

ARRL PUBLICATIONS

Antenna Book, 10th Edition	18/6
A Course in Radio Fundamentals	10/–
Hints and Kinks, Volume 6	10/–
Mobile Manual for Radio Amateurs	23/6
Radio Amateur's Handbook (*1965 Ed.*)	42/6
Buckram Bound	50/–
Radio Amateur's V.H.F. Manual	18/6
Single Sideband for the Amateur (Fourth Edition)	23/6
Understanding Amateur Radio	18/6

CQ PUBLICATIONS

Antenna Roundup	23/6
CQ Anthology, 1952-59	23/6
CQ Anthology 1945-52	16/–
CQ Mobile Handbook	23/–
CQ New Sideband Handbook	24/–
Diode Source Book	13/–
Electronic Circuits Handbook	22/9
RTTY Handbook	30/–
Shop and Shack Shortcuts	29/6
Surplus Schematics	19/–
Television Interference	14/–

73 MAGAZINE PUBLICATIONS

Care and Feeding of a Ham Club	8/–
Index to Surplus	12/–
Simplified Math for the Hamshack	4/6
V.H.F. Antenna Handbook	15/–

EDITORS AND ENGINEERS PUBLICATIONS

Radio Handbook (16th Edition)	78/–
Transistor Radio Handbook	42/–

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.)	30/–

BRITISH PUBLICATIONS

Guide to Broadcasting Stations (*Iliffe*)	5/6
Log Book (*Webbs*)	6/3
Log Book, hardbound (*Martins*)	18/9
Manual of Transistor Circuits (*Mullard*)	13/6
Radio Amateur Operator's Handbook (*Data*)	5/6
Short Wave Radio and the Ionosphere (*Iliffe*)	12/–
Short Wave Receivers for the Beginner (*Data*)	6/6
Transistor Radios, Circuitry and Servicing (*Mullard*)	5/9
Understanding Television (*Data*)	40/–
Wireless World Radio Valve Data (*Iliffe*)	8/6

MISCELLANEOUS

G3HSC Rhythm Method of Morse Tuition Complete Course with three 3 speed L.P. records + books	84/–
Beginner's Course with two 3 speed L.P. records + books	60/6
Single, Advanced (9-42) or Beginners (0-15 w.p.m.) + books	50/–
Three speed simulated GPO test. 7 in. d.s. E.P. record	11/6
RSGB Morse Instruction Tape (900 ft.)	35/–
RSGB Morse Practice Tape (450 ft.) (both at 3¾ i.p.s., up to 14 w.p.m.)	20/–
Easibinders, round backed, gold blocked, for RSGB Bulletin	16/6
Call-sign Lapel Bar*	5/6

SHACK AIDS

British Isles Two Metre Band Plan	6d
QRA Locator, Western Europe	5/6
RSGB Countries List	1/–
Panel Signs, transfers (*Data*)	
Set 1: Receivers, Amplifiers	3/9
Set 2: Test Equipment	3/9
Set 3: White Wording	4/9
Set 4: Black Wording	4/9
Set 5: Dials, Clear Background	4/9
Set 6: Dials, Black Background	4/9
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RSGB Tie (Maroon or Navy Blue Terylene)	16/–
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Tie Clips (with RSGB Emblem)	5/–
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RSGB PUBLICATIONS, Dept. G
28 Little Russell Street, London, W.C.1

FOUR MORE PUBLICATIONS

The Radio Amateur's V.H.F Manual

By Edward P. Tilton, W1HDQ

This new addition to the ARRL family of books opens with an authentic history of amateur v.h.f., and progresses through 13 chapters to provide a complete reference of operating and equipment techniques above 50 Mc/s. The design and construction of apparatus right into the microwave region is covered in detail, and to aid the explanation it is profusely illustrated with photos, charts and diagrams.

ARRL **Price 18s. 6d.**

The Care and Feeding of a Ham Club

By Carole Hoover, K9AMD

If your club is completely lacking in drive, and attendance is now merely a duty, it is quite possible that perusal of this book by 73 Magazine could help to re-vitalize it. Organization, publicity, and even the proper way to welcome visitors and prospective new members are covered.

73 Magazine **Price 8s.**

Simplified Maths. for the Hamshack

By William E. Smith, K8LFI

It is only too easy to forget how to juggle equations and manipulate formulae, and unfortunately with a technical hobby such as radio a mathematical ability is often called upon. This useful little book by 73 Magazine has been specially written to re-acquaint enthusiasts with the techniques of handling Ohm's Law equations, squares, square roots, powers, frequency/inductance/capacitance, logarithms, etc., and even provides instruction in the art of using a slide rule.

73 Magazine **Price 4s. 6d.**

Index to Surplus

Compiled by R. E. Pafenburg, W4WKM

This is a comprehensive bibliography of magazine articles dealing with the conversion and amateur use of surplus electronic equipment. References to over 600 articles published in the five major American magazines between 1945 and 1961 are arranged by equipment type and date of publication.

73 Magazine **Price 12s.**

RSGB PUBLICATIONS, Dept. B

28 Little Russell Street, London, W.C.1

SSB EQUIPMENT

The outstanding G2DAF transmitter Mark 2 and the companion linear amplifier, of particular merit because it requires no external bias supplies, were published fairly recently in the RSGB Bulletin. These issues, understandably, went out of print very quickly, and consequently this booklet has been produced to satisfy a great demand. The articles on the crystal or mechanical filter transmitter are printed in their entirety, and there is enough information to build the linear using either QY3-125 or 813 valves.
First Edition. 24 pages. Price 3s. post free

ANTENNA ROUNDUP

The cream of the articles about aerials published in *CQ* between 1950 and 1961 can now be easily found, together, in *Antenna Roundup*, a valuable collection of material published by the Cowan Publishing Corp. All of the chapters—Antenna Theory, V.H.F. Antennas, Beams, Quads and Horizontals, Vertical and Mobile Antennas, and Accessories—were compiled particularly with the object of dispelling much of the mystery surrounding the properties of aerials.
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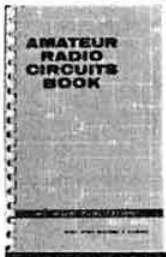
AMATEUR RADIO CIRCUITS BOOK



Just over 150 circuits from the RSGB Bulletin and several other sources are contained in this one RSGB publication. It covers an extensive range of subjects from simple oscillators, S-meters, a.t.u.s, modulators and i.f. filters to complete transistor transmitters, stabilized power supplies and test equipment. Only the vital information relevant to each circuit is listed—verbose descriptions are not to be found anywhere. It is printed on durable paper specially for the workshop, and lies flat at whatever pages it is opened.
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SERVICE VALVE EQUIVALENTS

There must be a vast quantity of ex-government valves lying idle simply because the owners have no idea of their characteristics. Nearly all readily available sources of valve data describe only commercial types, but these books are applicable to service valves if used in conjunction with the RSGB *Service Valve Equivalent*, which lists the commercial equivalents of CV, Army, Navy and Air Force types, and there are also three pages on semiconductors. A small expense for the service it renders.
Fifth Edition. 48 pages. Price 3s. 6d. with postage

SHOP AND SHACK SHORTCUTS

There is an amazing assortment of information for the amateur in *CQ*'s *Shop and Shack Shortcuts*. It is a gold mine designed to improve shacks, save time and increase the efficiency of equipment. The chapter headings are the best guide to its contents: Improve your Shop Technique; Tips on Crystals and Holders; Coils and Condenser Hints; Ideas for the Shack; Improve your Phone Rig; Hints for Improved C.W. Reception; Receiver Improvements; Transmitter Improvements; Antenna Improvements; Power Supply Ideas; V.H.F. Hints; For the Mobileer; Test Equipment.
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FOR SALE

G3ERB regrets delay lists redundant equipment offered last month, now ready. Several hundred items including 300 valves, power supplies, TR 1986s complete/stripped, T/P gear. LARGE S.A.E. please. No callers. BRT 400 receiver available October. 56 Kings Lane, Bebington, Cheshire.

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WITHERS 2m mobile rig for sale, £50. Includes transmitter/receiver, P.S.U. halo and mounting, 5EL YAGI, new, perfect, sold car. Box No. N7215, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

HEATHKIT R/C Bridge and Valve V/M, both factory wired, mint condition. Buyer pay carriage, £8 each. DX 40 modified phone, 60W c/w, 40W a/m, remote tuned V.F.O., £25. Phone: GIF 5367, GM3GHF.

GELOSO G.209 R.X double conversion a.m., s.s.b., in unused mint condition, complete with manual, £35 for quick sale. G3RDZ, 38 Ash Close, Peterborough.

MINIATURE 500 ohm carbon pots at 2s. 6d. each. Germanium Rectifier GJ7M at 1s. 9d. each or 17s. doz. *Silicon Rectifiers*. 800 P.I.V. 750 M/a at 3s. 6d. each or four for 12s. 1000 P.I.V. 1 amp at 4s. 6d. each or four for 16s. 60 P.I.V. 200 M/a at 8d. each or 5s. doz. *Zener Diodes*. VR 8 at 4s. 6d. VR 9 at 7s. 6d., VR 10, VR 12, VR 35, VR 425, VR 475, VR 625 all at 4s. 6d. each. J. Birkett, 9 Steep Hill, Lincoln. Phone 20767.

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BULLETINS November '57 to December '63, ARRL Handbook, Antenna Handbook, Monitors, etc., £2 the lot. WANT 200 ohm Dummy Load resistor. 118 College Hill Road, Harrow Weald, Middlesex.

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S.740 £20; Bulletins 1948—1960, S.W.M. 1956—1961 10/- per volume; carriage extra; books, components, etc. s.a.e. requirements.—126 Malvern Avenue, Harrow, Middx.

TWO 4—125. £5 each and one 4—250 with base £7. K. G Thompson, 21B Cleveland Road, London, E18.

PYE P.T.C. 114, 2·5 watt, 4 metre, mobile/portable transceiver, narrow band I.F., speaker/control unit, 12 volt input, complete ex./crystals, manual. £8. CR.100/8, E.F.80/E.F.85, R.F., N.L., Other mods., manual £17. Deliver 30 miles. 14, Landscape Dene, Helsby, Cheshire, Helsby 2625.

BAMBOO POLES FOR CUBICAL QUAD ANTENNAS, ETC. ALL SIZES. S.A.E. BRINGS LIST.—WHINES & EDGELER, BAMBOO PEOPLE, GODMANSTON, DORCHESTER, DORSET.

GOVERNMENT SURPLUS Electrical and Radio Equipment. Our new catalogue No. 16 ready now, 2/6 Post Free, cost refunded on purchase of goods over £2. Arthur Sallis Radio Control Ltd., 93 North Road, Brighton.

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COMPLETE STATION—G8TS. deceased. G2D.A.F. S.S.B. Receiver—and 200w P.E.P. Transmitter. Mosley T.A.33 JNR beam with variety of other items. Send S.A.E. for lists. 'Phone to view. Mrs. Ruddock, 85 Grand Drive, Raynes Park, S.W.20. 'Phone—Liberty 4572.

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DX 100 U for sale, going SSB. Late 1963 construction, factory tested, new condition. £60, carriage extra. G3RAQ, 12, Christchurch Avenue, London, N.W.6.

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CLEAR OUT SALE: mainly ex-Service equipment. T1155 and T1154 with power pack, T/R 38, 144 Mc/s receiver. 1000 volt power pack. Valves and many other parts. All cheap. Require space. Offers for whole or part to Dr G. A. Kellner, Kidmore End 2176 (weekends) where the equipment is or MOU 1396 weekends.

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KW 160 tx mint with Z-match unit inc dummy ant and 12v relay supply £15, new 6146 15/-, VR105 2/-, VR75 2/-, 2 in. square meters 5ma 50ma 10/- each, Eddystone microdensers power packs, etc. G3AAV, 30 St. Chads Avenue, Leeds 6.

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BAND-SWITCHED A.T.U. 80-10m, 150 watts to match 75 ohms unbalanced into 66 ft. centre fed ZEPP, 70 ft 600 ohms feeder. Firth, 7 Deyn Court, Lowes Barn, Durham.

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MANUAL FOR CR100 (b28). H. E. Rowe, Stowey Court, Warden Road, Minehead, Somerset. Tel: Minehead 1054.

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

WHEATSTONE PERFORATOR wanted, three key punch type and auto sender for same. Ashley, 45, Castle Road, Causewayhead, Stirling, Scotland.

WANTED Top Band Command RX or similar for mobile use 12 volt. All letters answered. G3LTU 72, Rutland St, Grimsby.

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MORAY FIRTH AMATEUR RADIO SOCIETY requires Amateur bands only receiver, price to £45 cash. GM3SDZ, 3 Park Place, Lossiemouth, Moray.

MISCELLANEOUS

"MOBILE NEWS" pays £2 per thousand words for technical articles of mobile interest. Submit to Honorary Editors, Amateur Radio Mobile Society, 95 Collinwood Gardens, Clayhall, Ilford, Essex.

CASES, chassis, panels. ANYTHING in metal; send your drawings, for quote. Stove enamelled, hammertone, or plain, in any colour.—Moss Watson, 40 Mount Pleasant Street Oldham, Lancs. (Main 9400).

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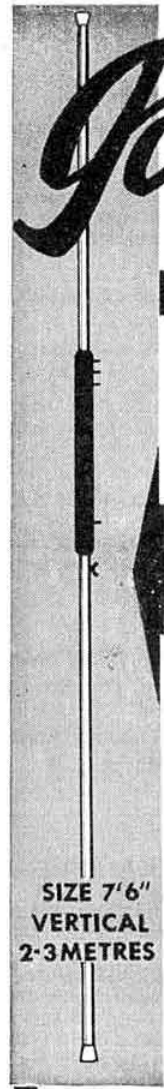
One unestablished post at Thorntonhall, Glasgow for a man at least 21 on August 1, 1965.
QUALIFICATIONS: Sound theoretical and practical knowledge of wireless engineering and wireless communications equipment, including V.H.F. apparatus required. Appropriate C and G or similar qualification an advantage. Must be able to drive private and commercial vehicles.
STARTING SALARY: £792 (age 21) to £929 (age 25 or over): scale maximum £1,067.
WRITE: Establishment Officer, Room 364, St. Andrew's House, Edinburgh 1, for application form. Closing date September 18, 1965.



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(a) **Experimental Officers** to supervise operations under the officer in charge.

(b) **Assistant Experimental Officers** to work in teams on a shift basis.

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(a) Suitable university degree, Dip. Tech. or H.N.C. (age over 26).

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Salary

(a) £1,319-£1,675.

(b) £549 at age 18—£983 at age 26 or over to £1,201 max.

Overseas Allowances for officer and family at Port Stanley posts.

Further particulars from The Secretary, Radio and Space Research Station, Ditton Park, Slough, Bucks.

SCOTTISH HOME AND HEALTH DEPARTMENT

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SALARY: £1,091-£1,285.

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