RSGB BULLETIN

APRIL 1965
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Mr. George Wallace (Norwich, North): To ask the Postmaster General, if he will seek to negotiate reciprocal arrangements with other countries whereby visiting licensed amateurs may be allowed to engage in amateur radio transmissions within the country being visited.

(Tuesday, 16th March, 1965.)

MR. BENN: Yes Sir. Subject to certain conditions being met, I shall in future grant licences to engage in amateur transmissions in this country to licensed radio amateurs who are nationals of countries which are prepared to grant reciprocal facilities to United Kingdom licensed radio amateurs. I shall shortly be taking steps to negotiate such arrangements as my hon. Friend describes.

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Current Comment

discusses topics of the day

Reciprocal Licensing

MARCH 16, 1965, will go down in the annals of Amateur Radio as the day on which the Postmaster-General, The Rt. Hon. Anthony Wedgwood Benn, answered a simple question put down by Mr George Wallace, M.P. for Norwich North, and opened the way for world-wide operation by United Kingdom radio amateurs.

Mr Wallace's question on the order paper was straightforward: it read

" To ask the Postmaster-General if he will seek to negotiate reciprocal arrangements with other countries whereby visiting licensed amateurs may be allowed to engage in amateur radio transmissions within the country being visited."

Mr Benn's reply, equally to the point and unequivocal, was:

" Yes Sir. Subject to certain conditions being met, I shall in future grant licences to engage in amateur transmissions in this country to licensed radio amateurs who are nationals of countries which are prepared to grant reciprocal facilities to United Kingdom licensed radio amateurs. I shall shortly be taking steps to negotiate such arrangements as my Hon. Friend describes."

It will almost certainly be some little time before the negotiations to which the Postmaster-General referred are successfully completed but the most important step has already been taken and before long amateurs of other nationalities will hold UK licences. UK amateurs may equally look forward to operating in other countries.

It is expected that one of the first to conclude an agreement with Great Britain will be the United States of America where the regulations allowing foreigners to be given permission to operate came into force on March 29. Several other countries—Belgium, Germany, Holland, France, and Portugal, for example—should quickly follow suit. In the fullness of time it is to be hoped that reciprocal licensing between all countries will be a matter of course.

The Postmaster-General's announcement came after many years' work by RSGB to obtain some relaxation of British licensing conditions to permit visiting foreign amateurs to operate in this country and so to obtain similar facilities for UK amateurs in other countries. It was not, however, until comparatively recently that real progress was made. Last year, it will be remembered, foreign amateurs were allowed to operate certain special events stations, first at the Amateur Radio Mobile Society's Rally, later during a visit of Belgian amateurs to RSGB Headquarters and, perhaps most important, at the RSGB International Radio Communications Exhibition in October.

For some time it had been apparent that there was a possibility of some change of policy eventually, but credit must be paid to Mr George Wallace, M.P. (father, incidentally, of RSGB Associate member M. G. Wallace, A1954) for his very great assistance in recent weeks. In addition to his obvious help in asking the question in the House of Commons, Mr Wallace's advice to the President and Executive Vice-President has already proved to be invaluable. Mention must be made, too, of the patience and understanding of the Director of Radio Services at the Post Office and his staff.

Reaction to the news that Britain was willing to enter into reciprocal arrangements with other countries was swift and many members telephoned, telegraphed or wrote to Headquarters congratulating the Society on the outcome.

One enquiry made by a number of members referred to the conditions under which foreign amateurs will operate in the United Kingdom. Lest there be any doubt, they will operate under British licence conditions, not those of their home countries.

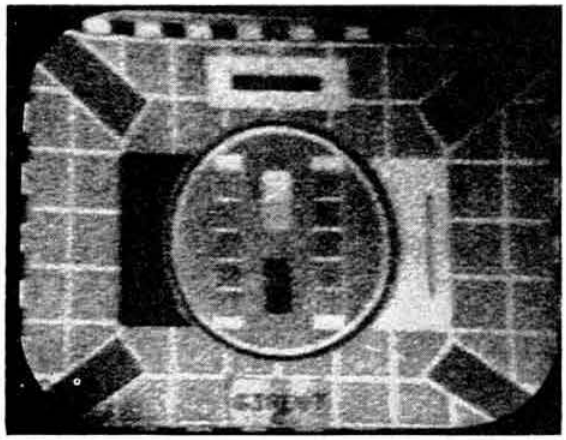


Fig. 1. An amateur TV signal amplified in the normal way, using a cascode valve pre-amplifier in the shack.

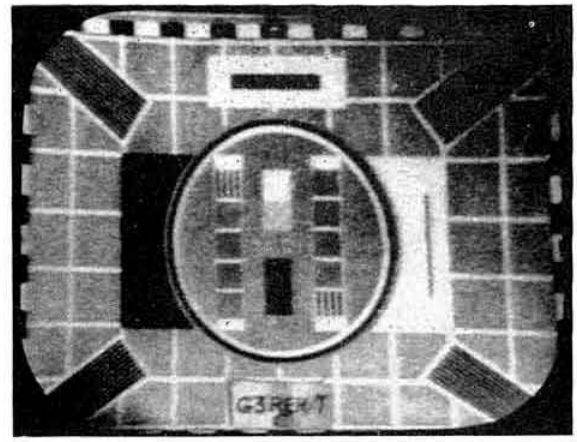


Fig. 2. The same transmission as in Fig. 1, but using the transistor mast-head amplifier in front of the valve converter.

A MAST-HEAD PRE-AMPLIFIER FOR 70CM

BY I. M. WATERS G6KKD/T G8ADE*

ALTHOUGH originally designed for inclusion in an Amateur Television system, the mast-head pre-amplifier to be described should prove of interest to all operators concerned with the 70 cm band. It is, of course, well known that for the effective reception of u.h.f. signals, a high gain aerial system and a low noise receiver front-end are essential in order to secure the best possible signal-to-noise ratio. In amateur television applications, the signal-to-noise ratio has a direct bearing on the quality of the picture, and a noise factor which may be acceptable for speech communication may well be far from satisfactory for television. It is this which prompts the continued search for the " ultimate " in equipment performance in this direction.

Signal Reporting

In the development of equipment, one of the difficulties encountered is in securing a satisfactory basis upon which to correlate " S " meter readings obtained on a communications receiver, and the system employed in reporting the quality of amateur TV signals which is to specify the ratio of peak noise to peak signal voltage. This is due to the inherent variations found between " S " meters, and the difference of opinion as to whether an " S " point is 3db or 6db.

As a general basis upon which comparisons can be made, Table 1 will enable operators hearing television signals on their communications equipment to judge the quality of the picture which would be seen on a suitable vision receiver.

While it may be felt that this Table is at a tangent with the main purpose of this article, it does provide the first known attempt to relate the two methods of reporting signals, and may well be useful in cases where television signals are the only basis upon which comparisons of relative equipment performance can be made.

* 1 St Audrey's Way, Lynn Road, Ely, Cambs.

Practical Considerations

The gain of the aerial used by the writer is limited by the size of the array that can be supported safely by a 60 ft. mast. In practice this is about 12db and is given by an array of 16 quarter wave driven elements with a wire mesh reflector.

Fig. 1 shows a television picture received from G3REH/T using this aerial system. This station is situated some 24 miles from the writer, and runs quite low power employing a 6J6 " power " doubler p.a. at 6 watts d.c. input. Estimated e.r.p. taking into account transmitter efficiency, feeder loss, and the gain of a 64 element stack, is about 15 watts peak white. The results over this circuit make interesting comparison with parallel data for the BBC-2 stations on a somewhat similar frequency.

The writer's aerial was connected to the receiving equipment by 60 ft. of co-axial feeder type BICC T3032 having a matched loss of 2·5db at 430 Mc/s. The converter is a GEC design employing A2599 and A2521 valves in a cascode r.f. amplifier followed by a crystal mixer. The cascode r.f. amplifier has a noise figure of about 8db at the frequency concerned, and the gain is such that the noise figure of the following crystal mixer does not contribute significantly to the overall performance. The bandwidth of the following i.f. amplifier is restricted to about —3db at 2·5 Mc/s.

Improving Performance

It had been realized for some time that results could be improved if the 2·5db " input attenuator " in the form of the feeder could be avoided by placing a pre-amplifier at the top of the mast. However, the problems posed by arranging power supplies for such an amplifier, enabling the station to transmit as well as receive, and the weight loading limitations at the top of the 60 ft. pole deterred progress to a practical solution.

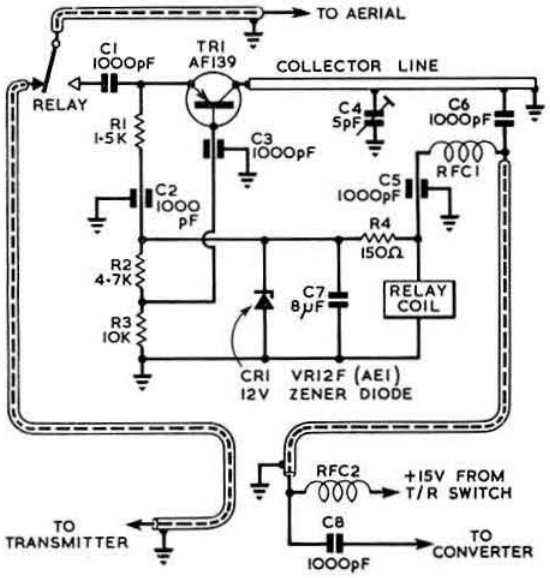


Fig. 3. Circuit of the mast-head pre-amplifier.

With the availability of transistors capable of both gain and noise figures superior to valves, a mast head pre-amplifier became a practical proposition.

Fig. 3 shows the circuit employed. In many respects this is similar to that described by D. Mann, G3OUO/T in Issue 51 of *CQ-TV*,* except that in this design a more recently introduced transistor, the Siemens AF139, is employed.

* *CQ-TV* is published by the British Amateur Television Club.

TABLE I

"S" Meter	Ratio of peak noise voltage to peak signal voltage	Subjective assessment of picture quality
Less than S7	Peak noise greater than peak signal	No picture resolvable on a normal receiver
S7	80 per cent	Picture may just lock. Unviewable.
S8	40 per cent	Very noisy. Pictures of bold objects just viewable. Resolution limited by noise to less than 100 lines.
S9	20 per cent	Noisy but viewable. Resolutions about 300 lines.
S9 + 10db	6 per cent	Some noise. Acceptable quality.
S9 + 20db	2 per cent	Good quality, noise only just discernible.
More than S9 + 20db	Difficult to measure with normal equipment	Excellent quality and noise free.

In compiling the above table, the following assumptions have been made.

(i) One "S" point is 6db.
(ii) S9 is a signal level that is just noise free on a communications receiver with a 4 kc/s bandwidth—i.e. AR88 on selectivity position 2—with the gain adjusted for comfortable listening to a 100 per cent modulated 'phone signal.
(iii) The 405 line television system is used with a receiver having a single sideband i.f. response — 3db at 2·5 Mc/s.
(iv) The same r.f. front-end, aerial, r.f. amplifier, mixer, etc., common to both systems.

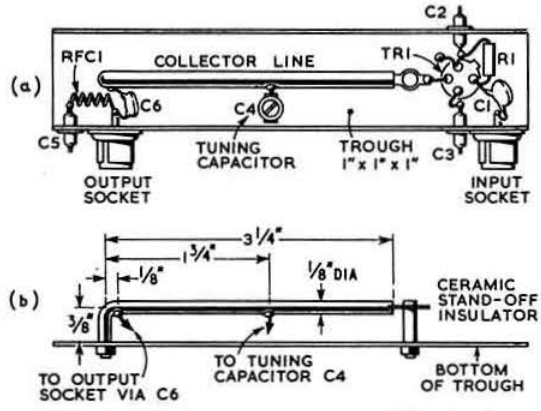


Fig. 4. Constructional details of the amplifier chassis.

This allows an even higher standard of performance to be realized.

Fig. 4 details the construction of the major portion of the pre-amplifier, and as will be seen this takes the form of a trough line. At u.h.f. layout becomes all important, and those intending to construct this pre-amplifier are urged to follow the illustration as faithfully as possible; if this is done, no particular difficulties should be encountered. Only one item requires special mention and that is the collector line tuning capacitor (C4). This is a sub-miniature ceramic barrel trimmer.

Fig. 5 illustrates how the pre-amplifier, changeover relay, and associated cabling, together with the balance of the pre-amplifier components, are disposed within a polythene box obtained from Woolworth's. This box not only serves

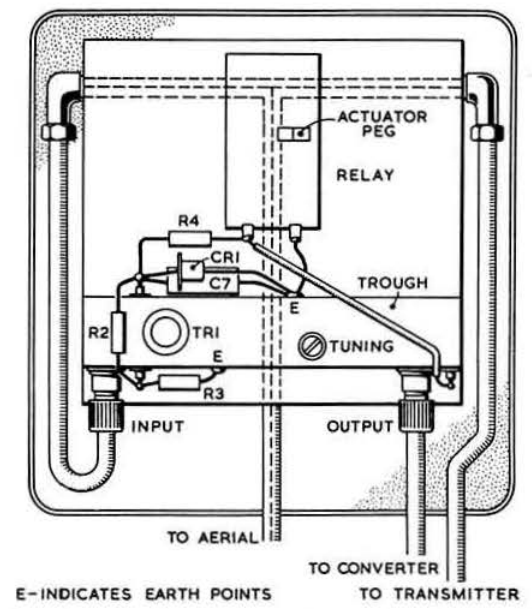


Fig. 5. Suitable positions for the transistor amplifier and relay within the polythene box which is fitted to the back of the aerial reflector.

to house the components, but also to protect them from the ravages of the weather.

It is essential that a co-axial relay be employed for the switching function. The cost of such an item is, however, normally prohibitive, and in the writer's case an ex-Government relay type 78A was employed and this has been found quite satisfactory. This particular relay was taken apart and rebuilt to give just the contact sequence required.

The completed assembly is, in the writer's case, fitted to the rear of the aerial system, two feeders connecting it to the operating position. The original length of T3032 is used for the transmitter, while that taking the output from the pre-amplifier to the converter is a less expensive cellular polythene TV down lead. The gain of the pre-amplifier is such that this lower quality feeder cable may be used on the " receive " circuit without degrading the overall noise ratio performance.

The relay is de-energized on transmit, and in this condition the transmitter is connected directly to the aerial system. On reception, a 15 volt positive supply is fed up to the pre-amplifier via the " receive " co-axial cable to operate the change-over relay. This supply, regulated by a Zener diode, and decoupled by a suitable capacitor, is also used to power the pre-amplifier. The main requirement of this feed system is that the r.f. chokes at each end of the line shall be highly efficient at the operating frequency. Poor chokes may well cause appreciable signal loss.

Transistor Protection

Initially there was some doubt as to whether r.f. leakage across the relay while transmitting would cause damage to the transistor. At an input of 150 watts to the transmitter, and even after allowing for transmitter feeder losses, quite appreciable r.f. would be handled by the relay.

Trials were therefore conducted with the aerial assembly on the ground, and the current flowing in the emitter-base junction of the transistor measured as the r.f. power was slowly increased. It was found that by adjusting the length of the co-ax between the relay and the " input " socket—see Fig. 5—this current could be reduced to less than 1μA at full transmitter power. At G8ADE/G6KKD/T, the length of cable which gave this reading was 4 in.

The arrangement of the pre-amplifier and its cabling is such that it is inherently " fail-safe." This is to say that, should the pre-amplifier become faulty, then the station is not promptly closed down until it can be repaired. Under such conditions, the transmitter feed-line can be restored to its original function with the necessary change-over facilities reinstated in its line at the operating position.

Results

Fig. 2 is a photograph of the television picture received from G3REH/T with the pre-amplifier in operation. When compared with Fig. 1, the improvement should be pretty obvious. The BULLETIN pictures may not in fact show the improvement as clearly as they might, due to some loss of definition in the blockmaking process. A somewhat better comparison was given by the photographs on the front of the March BULLETIN.

In practice a waveform monitor indicated an improvement of 2 : 1 in voltage ratio, or 6db, which is accounted for by the removal of the 2·5db feeder loss, and the improved transistor noise figure compared with the original valve pre-amplifier which produced a more useable signal. It may therefore be concluded that the design is successful, and that it will bring about a considerable improvement in the performance of equipment on the 70 cm band.

Acknowledgments

The writer particularly wishes to acknowledge the co-operation of stations in the East Anglian TV Net without which this article could not have been written.

MOBILE RALLIES 1965

April 11..... North Midlands Mobile Rally

Trentham Gardens, near Stoke-on-Trent, Staffs.

See " Mobile Column " for talk-in arrangements

Organized by the Midland Amateur Radio Society

May 22, 23..... ARMS Mobile Rally

RAF Station, Croughton, Northants.

As May 22 is the US Air Force Open Day, many thousands of visitors are expected. There will be a large trade show, a tombola, and all the usual " Barford " attractions.

Organized by the Amateur Radio Mobile Society

May 30..... RNARS Mobile Rally

RN Signal School, HMS *Mercury*

Organized by the Royal Naval Amateur Radio Society

June 6..... RSGB National Mobile Rally

USAF Base, Wethersfield

Organized by the RSGB Mobile Committee

June 7.....Saltash and District ARC Mobile Rally

Calstock

Organized by the Saltash and District Amateur Radio Club

June 20.....Hunstanton Bucket and Spade Party

G3JEC Station Refreshment Rooms Car Park

Further information may be obtained from C. E. Wegg, Cobgate, Moulton, Spalding, Lincs.

G3ANM/A————1980 kc/s: talk-in station

June 26, 27..... Bodensee-Treffen, International Radio Amateur Meeting

Constance, Lake Constance, Germany

Events will include an " Amateurs' Fair," several Fox-Hunts (D/F events) and mobile competitions. Bookings for accommodation should be sent to Verkehrsverein, Konstanz-Amateur Radio Meeting 1965, Konstanz, German Federal Republic

June 27..... Longleat Mobile Rally

Longleat Park, on the Frome-Warminster Road, A362

Organized by the Bristol RSGB Group

July 11..... Tenth Anniversary Mobile Rally

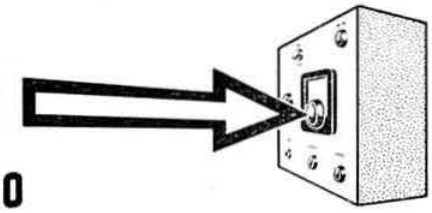
Organized in conjunction with the RSGB by the Oxford and District Amateur Radio Society

July 11..... Torbay Mobile Rally

Junior Leaders Regt., Royal Signals, Rawlinson Barracks, Denbury, Newton Abbot, South Devon

Organized by the Torbay Amateur Radio Society

PROGRESSING THROUGH AMATEUR RADIO



Part 4

By K. L. SMITH, G3JIX*

FOR a continuous flow of charge—in other words, a direct current—a complete conductive path must exist between the negative and positive terminals. But there is another property of conductors that is very important, and that is their capability of storing electric charge. If a conductor, which is insulated from its surroundings, is connected to the negative terminal of a source of e.m.f., electrons will be driven on to it. Just how many will depend on the surface area of the conductor. Similarly, if connected to a positive e.m.f., electrons are attracted off. It is easy to see that charge will reside on the surface of conductors, because the repulsion causes it to move outwards and cluster on the extremes. The amount of charge forced out on to the conductor depends on its shape and size, as well as on the value of the e.m.f. The larger the e.m.f., then the greater the charge driven on. The property of a conductor to hold charge is called its capacity.[1]

Therefore charge $\propto$ capacity $\times$ e.m.f.

or $Q \propto C \times V$

Q and V have already been fixed, or defined, but the size of C can be varied. If C is chosen to make the proportionality an equality then we obtain a value for the unit of capacity. Unit capacity is that which accepts one coulomb of charge when one volt is applied. It is called a Farad.

We can now write:

$Q = C \times V$ (Q—coulombs, C—Farads, V—volts)

Artificially Increasing the Capacity

The effect of bringing another conductor near to, but not touching, the first is to increase its capacity. The nearby conductor has an opposite charge and concentrates the charge on the first over the region of overlap, leaving more "space" as it were to accept more charge. Such a device therefore tends to condense the charge, and it is aptly called a condenser [2], although capacitor† is more often used nowadays. The capacity of a condenser obviously depends on the area of overlap and the distance apart, the capacity increasing with larger overlap, but decreasing with a greater separation of the conductors. It also depends on the type of insulator between them.

* RSGB Education Committee.

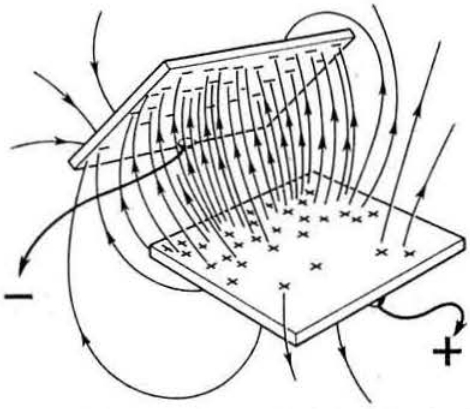


Fig. 1. Conductors which are close to each other "condense" the charge over the region of overlap. Such devices greatly increase the electrical capacity of a circuit into which they are connected.

Fig. 2. Just as much charge flows on to one plate of a capacitor as flows off the other, thus ensuring the rule that as much current passes one point in a simple circuit as any other is obeyed.

The conductors are called the plates, and the insulator between them is called the dielectric. The effect of the dielectric is to increase the capacity relative to that when air is between the plates, the number of times it does so being called the dielectric constant. See Table 1.

In operation, if Q coulombs of charge move on to one plate of a condenser, Q coulombs move off the other; or what is the same thing, if we charge up a condenser by Q coulombs, one plate has $-Q$, the other $+Q$. This is always true. The effect of placing a condenser in a d.c. circuit is to allow current to flow while charge is on the move to fill it up. When it is charged, the current stops. If it is removed from the circuit and the plates connected together, the charge flows off; that is, the condenser empties.

Construction of Condensers

Condensers are made in various ways [2, 3], particularly the paper dielectric and mica types. Variable condensers are common, and we shall mention them in more detail in connection with tuning. Electrolytic types are also very common.

The construction of the paper types usually involves the

† The more modern word is used almost exclusively in RSGB publications.

TABLE 1

Material	Dielectric Constant (K)
Paper, wax or oil impregnated	3·4 to 4·5
Mica	7·0
Ceramics:	
(a) Magnesium Silicate, low K	5·4 to 7·0
(b) Titania, Rutile medium K	70 to 90
(c) Titanate, high K	about 1000 to over 7000

— the remaining electrolyte may boil and the can blow up—

use of long strips of waxed paper, separating strips of tin or aluminium foil. The whole thing is rolled up and sealed into either a rectangular metal can, or a tubular one, or else moulded in plastic. Wires are connected to the separated tin foil strips and brought out through insulators. The capacity of these paper types ranges from about 0·001 to 8 microfarads (8 μF). The thickness of the paper dielectric determines the voltage working, and this is marked on the case. If the applied voltage is greater than the working voltage then the dielectric is likely to break down, thus short-circuiting the plates. Mica types fall into two classes, metal foil separated by mica sheets, and mica sheets upon which is sprayed the metal forming the plates. These silvered plates are then stacked to form the condenser, which is called a silvered mica type. Mica is a very good insulator and can withstand high voltages. Capacities range from about 5 picofarads (5 pF) to 0·005 microfarads or so. The mica stack is usually moulded in plastic or protected by a wax covering.

Many modern condensers are made by coating a ceramic material (a type of earthenware or clay) with metal. The forms taken by the ceramic condensers vary from tubular to disc shapes. Types are also made which screw on to metal panels, and a connection can be made either side or both at once. The other plate is connected direct to the chassis via a nut which also serves to bolt the component down. These are called feedthrough condensers. Fairly large capacities can be obtained, although the size of ceramic condensers is small, because of the high dielectric constant of the ceramic material.

Electrolytic condensers are made to give very large capacities: anything from 1 μF to 1000 μF or more. Aluminium has the ability to form a very thin but tough oxide coating and this acts as a good dielectric. The extremely thin coating, together with the very large surface area produced by etching the aluminium, accounts for the very large capacities available. The oxide film is produced electrically by using the correct electrolyte, so that even if the condenser is said to be " dry," it is still found to be damp when opened. Originally, electrolytic condensers were filled with liquid electrolyte. One must always take care to connect the terminals round the right way in circuit, or the aluminium plate loses its coating. Also, after a long spell of inactivity the coating may be lost, and the condenser must be " reformed " by applying the voltage in small steps over a period of time. If the condenser passes a great deal of current because of these effects, the remaining electrolyte may boil and the can blow up, usually making a mess of the equipment in which it was contained. Even when operating normally, though, electrolytic condensers have a small leakage current flowing through the dielectric all the time.

Variable condensers usually have air as the dielectric between the plates. One set of plates is fixed, while the other set moves in and out of them, thus varying the overlap and therefore the capacity. Further details of variable condensers and ganging them will be discussed with the appropriate circuitry later.

Alternating Current

Of great importance to us is the type of e.m.f. which periodically changes its direction. This gives rise to a current which moves first one way then reverses. The most common form of this alternating current is one which rises smoothly to a maximum value, decreases to zero, rises to a maximum in the reverse direction, and then falls to zero again; repeating this cycle of events steadily all the time. The maximum value reached is called the *peak value* or *amplitude*. The time for one cycle to occur is known as the *period*, and the number of cycles occurring in one second is called the

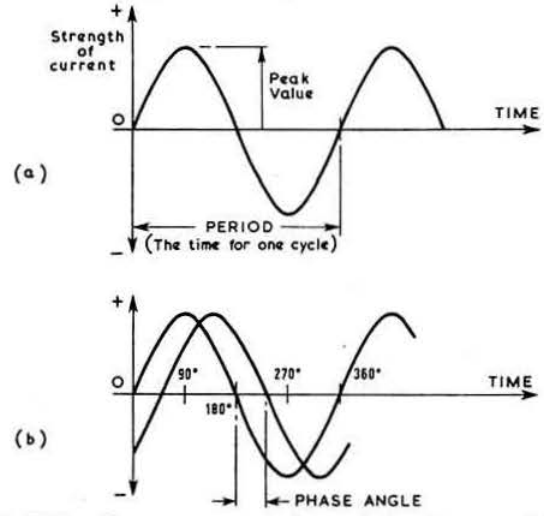


Fig. 3. These diagrams are a graph of the variation of current with time; in other words, current as a "function of time"; $I = f(t)$.

frequency. The *peak-to-peak* value is twice the amplitude. The shape of the wave-like graph of the variations either of voltage or current with time is known as the *sine* curve, from the mathematical function which produces this type of curve. If two sine curves are compared, the time for one to reach, say, the positive maximum may not coincide with the time that the other reaches it. The difference is called the *phase* between the two waves. One cycle is made up of 360° (from

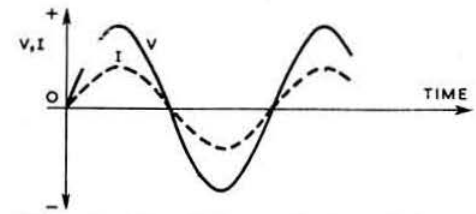


Fig. 4. When the voltage, V, changes, the current, I, changes in step with it. This is true in all resistive circuits.

a circle); one half-cycle is 180°, and so on. The phase is usually stated as a fraction of a cycle, in degrees, and is then known as the phase angle.

A.C. with Resistance

If an alternating voltage is applied to a resistance, then by Ohm's Law the current will be proportional to the voltage. In other words, the current will rise and fall with the voltage. The two are said to be *in phase*.

A.C. and Condensers

Now apply an alternating voltage across a condenser. Very interesting effects are noticed. Current rushes into the empty condenser to charge it up. When it is fully charged up to the peak voltage, the current has ceased flowing. But, being an alternating voltage, the supply falls towards zero volts, and the condenser "empties back" the charge it gained. On the reverse half-cycle, the condenser charges and discharges as above, but the other way round. Notice that with no voltage across the plates, the current into the condenser is at a maximum, but when the voltage is at a maximum, there is no current because at that point the condenser is fully charged. The current is thus out of phase with the voltage. In the case of condensers fed by a.c., the current *leads* the voltage by 90°, or quarter of a cycle.

An alternating current appears to flow through a condenser, although it is really the device charging and discharging all the time.

If a condenser requires a certain number of coulombs to charge it to the applied voltage ($Q = CV$), then the charge has to go on to the plates, off again, then on in the reverse direction, and finally off again, all in the time of one cycle. This motion of the charge means that much current is flowing (alternating, of course). If the frequency is increased, then the same amount of charge must move at a greater rate because the time for one cycle is less. If the frequency is doubled, then the current is doubled. The condenser, now accepting a greater current, is offering less opposition to the higher frequency supply. This opposition to the flow of a.c. is called the *reactance* (X_c) of the condenser, and is measured in ohms. Reactance is not the same as resistance, in spite of the common units, ohms. For one thing condensers give back the stored charge and take no energy from the supply. A resistance always consumes energy and gets hot. If the frequency is changed, then the reactance changes inversely; it is also inversely proportional to the value of capacity.

Therefore $X_c = k \frac{1}{fC}$

where X_c = reactance (ohms)
f = frequency (cycles per second)
C = capacity in Farads
k = constant of proportionality.

"k" turns out to be equal to $\frac{1}{2\pi}$, because of the mathematics of sine waves.

$$\therefore X_c = \frac{1}{2\pi fC}$$

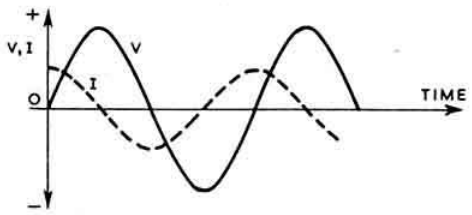


Fig. 5. In the case of a capacitive circuit, the current varies a quarter of a cycle out of phase with the voltage. Notice that the current leads the voltage

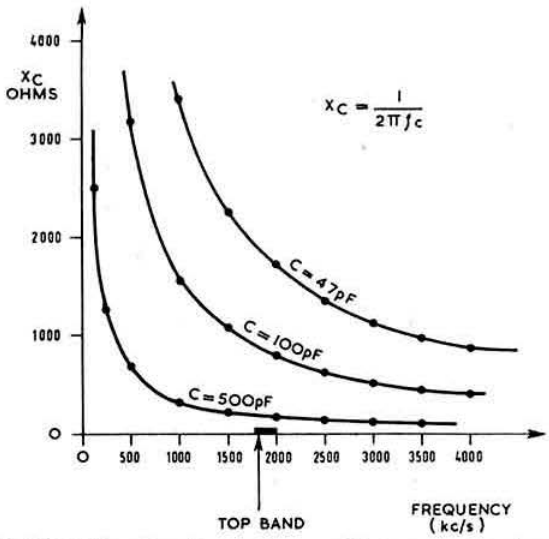


Fig. 6. Variation of reactance in the case of three condensers, showing the inverse proportion with frequency, and the effect of altering the value of C. 100 pF has a reactance of about 800 ohms at the frequency of the 160m amateur band (Top Band).

Condensers figure prominently in all radio circuits because they have this property of stopping d.c. but allowing the effects of a.c. to pass, with increasing ease as the frequency goes up.

Further Properties of A.C.

The alternating current whose frequency is twice some fundamental value is called the *second harmonic*; that which is three times the fundamental the *third harmonic* and so on. The remarkable thing is that any repetitive waveform, whatever its shape, can be broken down into the *fundamental* frequency, plus the second, third, fourth harmonics, etc. In other words, all alternating waveforms are made up of sine waves mixed in the correct proportions of amplitudes, phases and frequencies to build up the shapes observed. All these frequencies are called the components of the signal. Voice and music signals are made up of complicated vibrations of this type. These signals can therefore be looked upon as a large number of sine waves within a band of frequencies, in this case called the *audio band*. This band covers the low

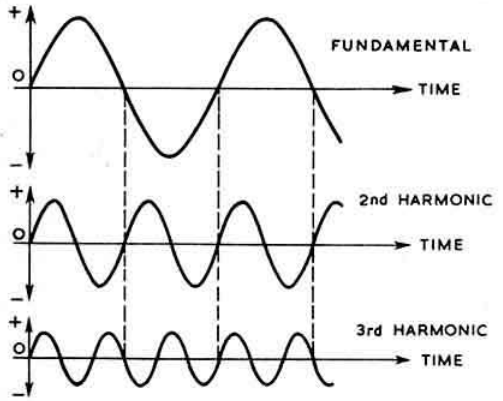


Fig. 7. Harmonics are related to the fundamental as shown. The second harmonic is exactly twice the frequency of the fundamental, the third is three times and so on.

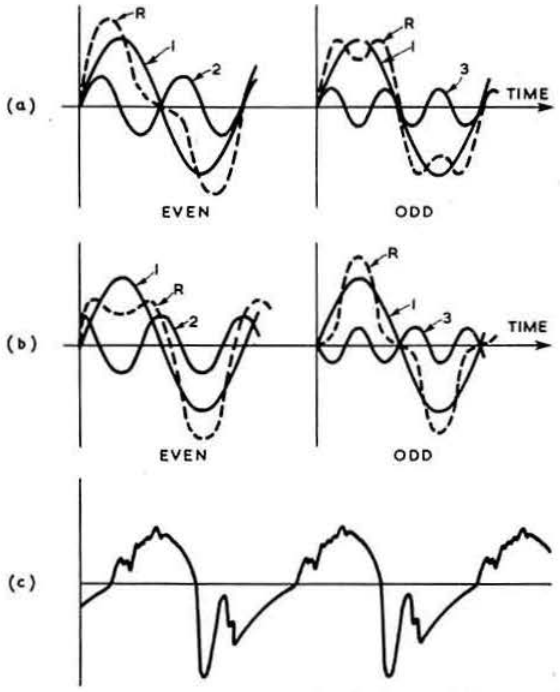


Fig. 8. (a) This shows the cases of adding fundamental plus second and fundamental plus third harmonics respectively, with one phase relationship. The effect of a different phase is shown in (b). 1 and 2 are the components of R, the resultant. (c) A wave form that might be typical of a modulator or record player a.f. signal. It would contain many harmonics, both odd and even.

frequencies from about 16 to 18,000 cycles per second, to which the ear is sensitive. Vibrations above this frequency band are not heard. Children can hear to higher frequency limits than most adults. Vibrations above audibility are known as *ultrasonic*.

Note that if one of these complex signals is applied to a resistance, current flows in proportion at all frequencies, but if a condenser is involved then the higher frequencies find an easier path because of the variation of reactance with frequency discussed earlier. This effect is one way in which signals can be distorted. If a whole band of frequencies is to be passed, the condenser is usually made large enough to offer little reactance at the lowest frequency of interest. Sometimes a.c. and d.c. occur mixed, the result often being called pulsating d.c., and the polarity may always remain positive or negative, the variations being a ripple on top of the d.c. level. It is profitable to look upon this situation as a separate a.c. component mixed with a pure d.c. voltage. A condenser stops the d.c. component completely, but allows the effects of the alternating part (usually a signal) to pass.

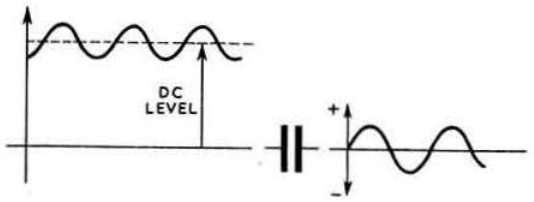


Fig. 9. Diagrammatic picture of the effect of a capacitor on a signal mixed with a d.c. component. Only the a.c. signal "passes" the capacitor. Used in this way the device is called a blocking capacitor.

SUPPORTING PROGRAMME TWO

Another mathematical function which turns out to be of great importance and therefore interest is known as the *sine curve*. As we saw earlier, the way one quantity changes with the variation of another upon which it depends can be written as an equation, or drawn as a graph. The equation here is:

$$y = \sin \theta$$

where θ is Greek " theta," for angles.

This may not mean much to those who have not come across trigonometry. The curve in Fig. 10 is the graph of the function and it can be obtained easily by turning a line through equal angles, and taking the heights of the end above the horizontal in each case, as shown [4].

The rotor of an alternator turns steadily in a similar way to this, and produces an alternating voltage of sine waveform. If the graph is arranged to start at the peak, then the curve is called the *cosine*. We say that the cosine wave is 90° out of phase with the sine. Thus current in a condenser fed with a sine wave voltage is a cosine wave. It is remarkable how the mathematics of triangles turns out to be deeply involved with all vibration and wave motion.

The division of the circle into 360° dates back a fair time and is connected with navigation. A much better way of carrying out this division is to take the length of the radius of the circle, and set it off round the circumference. It is found that it goes about 6·283 times. This number is written 2π (π is the Greek letter pi). Thus we say that the radius

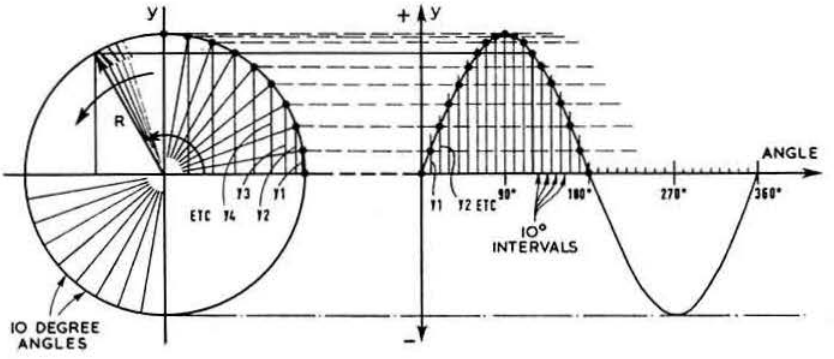


Fig. 10. The tip of the rotating "spoke" R is at some distance y above the horizontal. Plotting the various ys as on the right produces the sine curve. $y = f(0)$ where $f(0) = \sin 0$ this time.

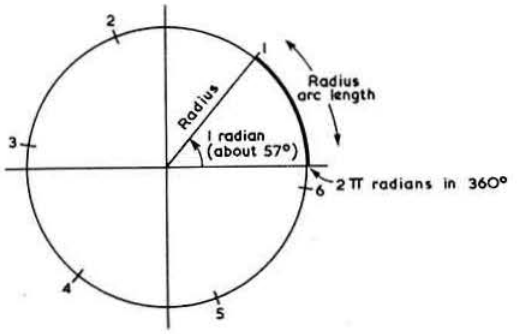


Fig. 11. If the radius of a circle is set off around the circumference, it will be found to fit about 6·238 times, that is, 2 π times. The arc formed by each radial length at the circumference produces a radian, and therefore there are 2 π radians in 360 .

divides the circumference 2π times. The angle produced by a length of circumference equal to the radius is called a *radian*. If this is the case, then there are 2π radians in one circle, or 360°; or, of course, in one cycle of a waveform. This is where the π's come from in radio formulae.

Things to do

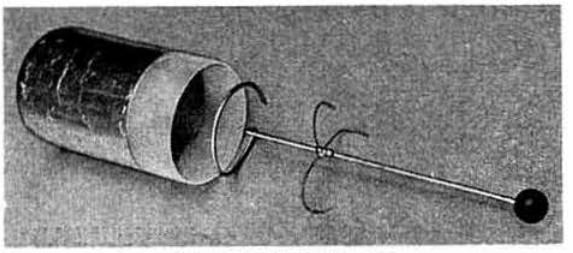
An Electrophorus

This device produces small quantities of electric charge for experiments, and enables some of the statements about charge to be seen in action.

Cut the bottom out of an old polythene bowl or bucket, thus obtaining a disc of the material 6 in. to 8 in. in diameter. Fix a piece of sealing wax, or a short length of polythene rod (the inner insulation from a length of thick co-axial cable is very suitable), to the centre of a circular piece of brass or copper about the same size, or slightly smaller than the disc of polythene. A countersunk wood-screw through the centre is suitable for this. To operate this instrument, the polythene disc is first rubbed with a cloth, thus charging it. The metal disc should now be placed on top. While it is on the polythene, touch it momentarily with a finger. This action earths the charge of like sign to that on the polythene. Lift off the metal disc using the insulated handle; it will be found to carry a charge of opposite sign to that on the polythene and a spark should be seen if a finger is brought near. The gas may be lit with this spark, and a crackle can be heard on a radio set nearby when the disc is discharged. To obtain another charge, place the metal disc on the polythene again, touch, and lift off. You will not find it necessary to rub with the cloth every time.

The Condenser: The Leyden Jar

If you obtain a polystyrene beaker and a few sheets of foil from chocolate wrappings, then by coating the inside and outside of the beaker to about halfway up a condenser is formed. The foil coatings make up the plates, and the polystyrene is the dielectric. The connection to the inner coating is conveniently made by standing a stout wire into the beaker, bent as shown in the photograph. A small ball of tightly rolled up foil is placed on top of the wire. Charge up the device with the electrophorus by touching the disc on to the ball. A fairly large number of increments will be required to develop a good voltage, but when the condenser is charged, it can give quite a jolt if you touch the inner coating, so be careful not to be caught unawares. If you discharge it with a piece of wire, a fat, bright spark with an accompanying crack shows that a significant amount of energy was stored. This form of the condenser was the very first, and is known as the Leyden Jar.



A home-made Leyden jar.

A.C. and Condensers

Connect a paper condenser of 2 μF and at least 400 volts working in series with a 40 or 60 watt lamp. Plug this circuit into the 230 volt, 50 c/s a.c. mains. Notice that the bulb lights, even though a good insulator exists between the plates of the condenser. This is evidence for the statement that " a.c. flows through a condenser." A warning is appropriate here, especially for any of our younger readers: ***always take care when using anything connected to the mains supply. It should always be respected as dangerous.***

References

[1] Grimsehl. *A Textbook of Physics*, Vol 3. Chapter 1, Section 13, Electricity and Magnetism. Blackie.
[2] *RSGB Amateur Radio Handbook*. Chapter 1, Fundamentals.
[3] G. W. A. Drummer. *Fixed Capacitors*. Pitman.
[4] Abbot. *Teach Yourself Trigonometry*, Chapter 3. E.U.P.

Manchester Amateur Radio Convention

The newly-formed Northern Radio Societies' Association is to hold an Amateur Radio Convention at Belle Vue, Manchester, on October 10.

One of the suites at Belle Vue will be used for lectures and there will be demonstrations of amateur radio and TV equipment. The programme will include events for mobile enthusiasts and radio controlled boats and aircraft.

A special radio amateurs' version of Granada TV's *University Challenge* will be held in the evening with TV personality Bill Grundy in the chair.

The member societies of the new association are Ainsdale, Bury, Eccles, Granada, Liverpool, Manchester, North West V.H.F., South Manchester, Stockport and Wirral.

THE MULTI-SLOT

A High Efficiency Compact Multi-band Aerial for Confined Spaces

Developed by PROFESSOR SEBASTIAN VIZZ, D.C.L.I., L.I.F.O. (Hons.)*

ONE of the most important advances in aerial design to take place in recent years was made by Professor Vizz in 1958, but, being related to a particular defence project, publication of this radically new concept has been withheld until the present time. The following synopsis, for which we are indebted to Professor Vizz, outlines the development history and, in simplified form, details the relevant design formula.

Following research into high efficiency radiating systems of the horn and dish variety, it was found that the dimensions of the aperture of the horn feeding the dish had a marked effect on the overall performance of the system. Mathematically it was proved that unless the aperture was resonant at the operating frequency, thus emulating a high Q loading for the waveguide, efficiency dropped to a very low level. Indeed, some of the earlier difficulties with this type of system are attributable to this phenomena.

Ideally the slot should be surrounded by an infinite area of metal, but in practice this is usually limited to 1λ. In the United Kingdom, B. Sykes, G2HCG, showed considerable initiative by conducting a series of experiments to determine to what extent the surrounding metal could be reduced without unduly upsetting the properties of the slot aerial. The results were particularly interesting. Sykes proved conclusively that two $\frac{1}{2}\lambda$ dipoles spaced $\frac{5\lambda}{8}$ with their ends connected behaved essentially as a slot aerial, but with the advantage of greater bandwidth. The feed point, mechanically the centre of the ends of the dipoles where they are bent downwards, had an impedance, Z_o, of 276 $\text{Log}\frac{W}{d}$ where W is the width of the system, itself dependent on frequency, and d the diameter of the elements.

Another aerial having similar characteristics to the slot is the reflex aerial. In this a standard dipole is positioned in front of a plane sheet reflector, but behind a special grid. Each opening in the grid is equal to about $2{\cdot}5\lambda$ long by $0{\cdot}6\lambda$ wide. With a series of grids amounting to a width of 2λ, oblique radiation from the system is negligible.

If slot and reflex aerials are combined, a number of special advantages accrue, not least of which is the ease with which it can be fed.

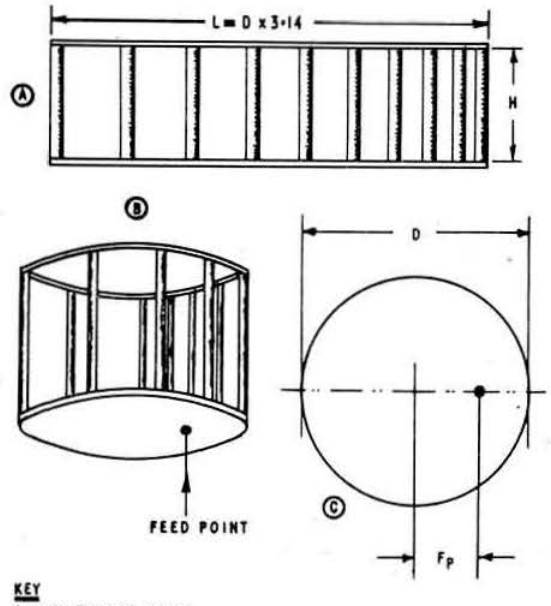
In this design the reflex grid system is formed into a cylinder which for horizontal polarization is mounted vertically, and for vertical polarization mounted horizontally. The grid itself is still in slot form, but the bars are positioned in a logarithmic order and not spaced equidistant, while the plane reflector takes the shape of a circular disc upon whose periphery the bars are mounted. A shorting strip connects the "free ends" of all the bars together.

In operation, the drive causes excitation of the bars whose spacing corresponds to a modified distance of $\frac{2250}{f}$ inches, f being the excitation frequency. The term modified distance indicates that the bars between the distance $\frac{2250}{f}$ in. do, by capacitive and negative inductance effects, substantially reduce this nominal figure. As the frequency decreases so the effect increases. It is for this reason that the bars are placed in a logarithmic order. Fig. 1 shows the construction and the formula for calculating the dimensions of the multi-slot. All calculations are based on the lowest frequency of operation.

The multi-slot is of diminutive dimensions compared with the normal slot aerial, and even as low as 1 Mc/s, capable of being easily carried by one man.

The method of feed is of particular interest. It consists of a single wire connected to an off-centre point of the circular plane base. For correct operation, this wire must be $\frac{1}{4}\lambda$ long, or a multiple of a $\frac{1}{4}\lambda$ long at the lowest operating frequency, and, in its travel to the multi-slot, kept as near to the vertical as possible.

Having a low angle of radiation, this aerial will give an outstanding performance over long haul routes, and being virtually non-frequency selective, although some preference is shown at $\frac{1}{4}\lambda$ multiples, is easily fed with either a simple series or parallel aerial tuning unit of the conventional type.



KEY
A – MULTISLOT GRID
B – GENERAL VIEW OF MULTISLOT HEAD
C – POSITION OF FEED POINT

$$H = \frac{\lambda \times 1{\cdot}094 \times 3}{100} \qquad F_p = \frac{300{,}000}{f} \times 3{\cdot}282 - (H \times 100)$$

$$D = H \times 100 - (\lambda \times 3{\cdot}282 + 1)$$

ALL CALCULATIONS TO 5 DECIMAL PLACES. RESULTANTS ARE IN Ft

Fig. 1. Construction of the multi-slot aerial devised by Prof. Vizz.

* C.O.D

A Transistorized Wheatstone Bridge

By E. CHICKEN, AMIERE, G3BIK*

FOR many years the writer has been using a mains powered Resistance Capacitance Bridge which, while being considered an indispensable part of the radio-shack's test equipment, has often proved difficult to bring quickly into service because of a prevailing shortage of mains outlet sockets.

It has always been felt that any piece of test equipment is appreciated to the full when it is instantly ready for use exactly when needed. With this in mind, a fully portable transistorized resistance-capacitance bridge was designed and constructed, and the small amount of effort and expense involved proved to be well worth while.

Because it is so simple to construct, uncritical in its layout, and so easily calibrated, there is no reason why any radio enthusiast should be without one.

Consider first the basic circuit of the Wheatstone Bridge shown in Fig. 1. This is shown as a four arm mesh using

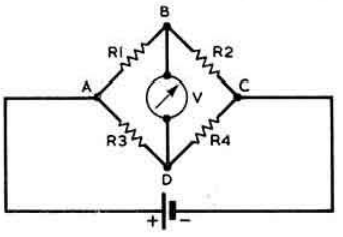


Fig. 1. Basic Wheatstone bridge.

resistors throughout, although, as will be explained later, these arms can be either capacitors or inductances if so desired. However, the simple basic bridge circuit shown uses a battery connected across the junctions *A* and *C*, and this battery will cause a current to flow round the circuit starting say at the positive terminal, into the bridge mesh junction at *A*, through the bridge and leaving at junction *C*, thence back to the negative terminal of the battery. Of course, this current must split into two components when reaching junction *A*, one flowing through the upper half of the circuit via *ABC*, the other through the lower half via *ADC*, recombining at the junction *C*.

According to Ohm's Law, any current flowing through a resistance causes a voltage drop across that resistance, hence a potential difference between the ends of the resistance. So, looking again at Fig. 1, it will be appreciated that the current flowing through R1 causes a certain voltage drop across the resistor, and another current through R3 causes a voltage drop across this resistor. If a voltmeter were to be connected across the bridge between junctions *B* and *D*, it would read the potential difference between these points. If, however, the voltage drop across R1 was identical with that across R3 then there would be no potential difference between the junctions *B* and *D* and the voltmeter would read zero.

Under these conditions, the bridge is said to be balanced, and we can say that:

R1 is to R2 as R3 is to R4.

This applies no matter what the value of the current flowing through either branch. All that is needed to bring the bridge to balance is that the voltage drop across R1 is made equal to the voltage drop across R3. In other words, the ratio of R1 to R2 is made identical to the ratio R3 to R4, no matter what the individual values of the resistances might be.

This is readily achieved by replacing the lower bridge arm *ADC* by a potentiometer, the slider of which is connected to the lower end of the voltmeter. When the slider is positioned such that the voltmeter reads zero volts, then the bridge is at balance, and from the relationship R1 : R2 as R3 : R4, it can be said that

$$\frac{R1}{R2} = \frac{R3}{R4}$$

therefore

$$R1 = R2 \times \frac{R3}{R4}$$

If the value of R1 is unknown, then provided the values of R2, R3 and R4 are known R1 can be easily calculated.

R2 is given a fixed known value, and because R3 and R4 form part of a potentiometer the numerical value of the ratio R3:R4 can be read directly off a calibrated dial irrespective of the actual resistance value of the potentiometer. In practice, because R2 is fixed, the scale can be calibrated to show the actual value of the unknown resistance.

Extending this principle further, if the battery is replaced by an a.c. source, then R1 and R2 could be replaced by capacitors, and as before, if the value of C2 was fixed and known, then the value of the unknown capacitor C1 could be derived from:

$$C1 = C2 \times \frac{R3}{R4}$$

and the dial (Fig. 2) calibrated directly in units of capacitance. Inductances could be similarly measured.

The range of measurable values can be extended by switching in different known values of C2 or R2 as the case may be.

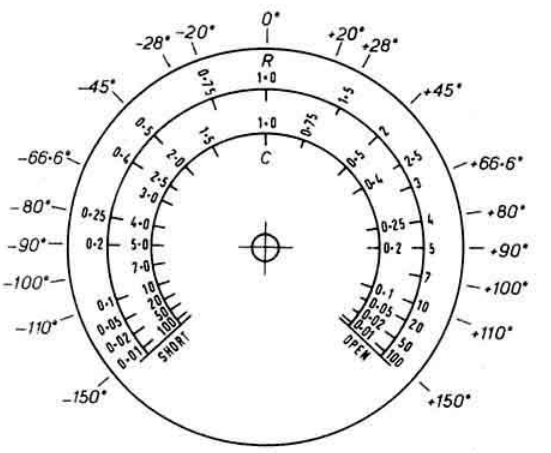


Fig. 2. Approximate appearance of the scale for the potentiometer.

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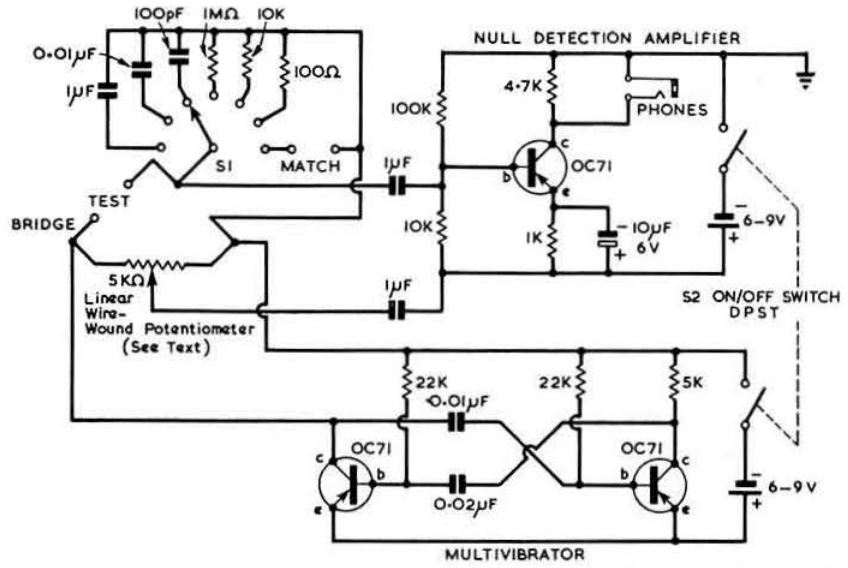


Fig. 3. The final circuit of the Wheatstone bridge, with its associated multivibrator and null deflection amplifier. Different or additional resistance and capacitance standards can be used to extend the range, as explained in the text.

In this instrument, the a.c. supply is provided by a transistorized multivibrator oscillating at a frequency of a few kilocycles per second, and as a further simplification, the bridge circuit is actually used as one of the collector loads, thereby automatically developing the oscillatory voltage across the bridge junctions *A* and *C*.

The next consideration is the balance null detection system. Obviously, the d.c. voltmeter used in the basic circuit shown in Fig. 1 is not suitable for the measurement of the small a.c. voltages involved. Headphones could be connected directly across junctions *B* and *D*, but the signal would be almost inaudible near the null point, so for maximum accuracy, the balancing signal is amplified by a separate single stage transistor amplifier before being fed to the (preferably, high impedance) headphones. This necessitates a separate battery supply for the null detecting amplifier, but because the current drain is so small, this does not add much to the overall cost.

The final circuit adopted is shown in Fig. 3.

All the switched standard resistors and capacitors (R2 and C2) should be good quality high stability types. The 100 ohm resistor should be wire wound, and the 100 kilohm and 1 Megohm silver tolerance carbon resistors—the wattage is unimportant. The 100 pF and 0·01 μF capacitors should be silver mica or ceramic, and the 1 μF a good quality paper dielectric type. The potentiometer should be a good quality linear law wire wound type, the larger the diameter the better, but a standard sized potentiometer worked very well on test. As the scale is calibrated in ratios, the resistance value of the potentiometer is not critical, any value between 1000 and 5000 ohms being suitable.

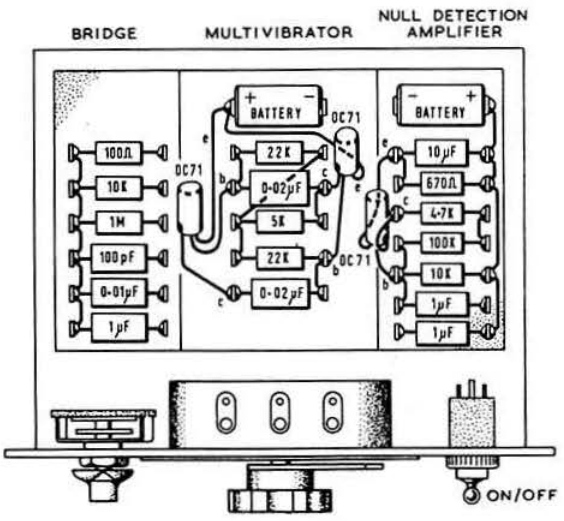
Any small audio frequency transistors such as the surplus green or white spot types, and any batteries between 3 and 9 volts, are suitable.

The component layout is not critical, but a suggested layout is given in Fig. 4.

Operation and Calibration

In operation, the component to be measured is connected to the TEST terminals, the range switch set to the appropriate range, the headphones are plugged in, and the instrument switched on. A high-pitched tone should be heard in the

(*Continued on page 235*)



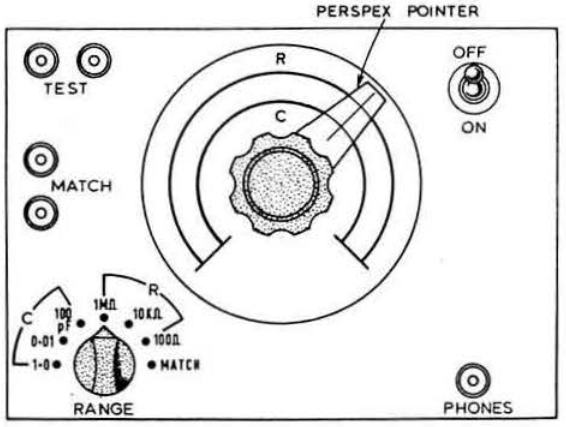
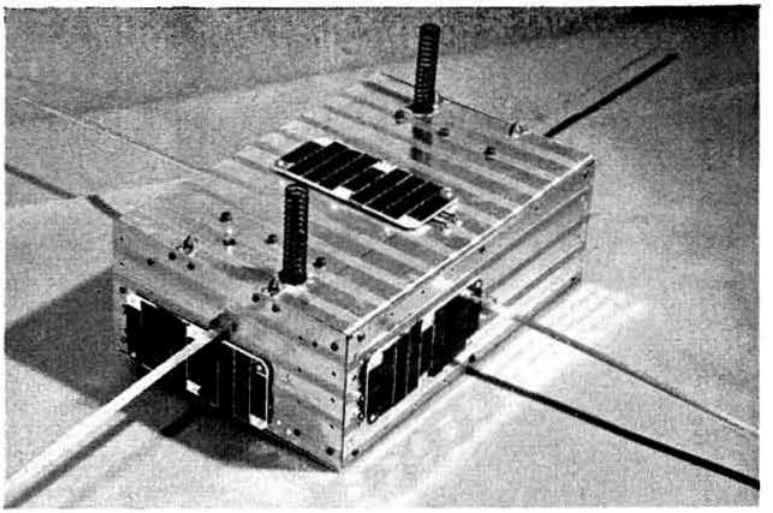


Fig. 4. A suitable chassis and component layout for the bridge.

THE OSCAR STORY

By W. H. ALLEN, M.B.E., G2UJ*



AFTER many months of anticipation, the 2m band translator satellite *OSCAR III* was successfully launched from Vandenberg, California, into a near circular orbit with an angle of inclination of 70° and at a height of 575 miles at 18.30 GMT on March 9.

Orbit No. 3 brought Oscar III to within about 26° east of the British Isles at 23.10 GMT on the day of launch and the telemetry beacon, radiating 25 milliwatts on 145·85 Mc/s, was well received at strengths up to S6. No translated signals were reported. The tracking beacon on 145·95 Mc/s was inoperative.

The orbital period was approximately 103·5 minutes which means that almost exactly 14 orbits were completed in 24 hours. Due to the rotation of the earth, successive orbits appeared to move just over 26° further west. The daily change between corresponding orbits on successive days was nine minutes later in time and 6° further west. An examp'e may make the foregoing easier to understand. Let us assume that a certain orbit, call it No. 20, passed directly over London at 22.00 GMT. The orbit prior to this (No. 19) would have passed approximately 26° to the east 103·5 minutes earlier, and the succeeding orbit (No. 21) would be 26° to the west of London 103·5 minutes later or at 23.43·5 GMT. Twenty-four hours later, *OSCAR III* would have completed another 14 orbits and the corresponding orbit to No. 20 would be No. 34, 6° west of London at 22.09 GMT.

All evening passes were from south to north and all daytime passes from north to south.

Two-way contacts through the satellite have proved more difficult than was expected, and although American signals have been heard in the United Kingdom and at least two Gs have been received in the States, no USA/UK contact had been reported up to the time these notes were compiled.

The distinction of making the first 2m transatlantic contact fell to W1BU and DL3YBA during orbit 61 on March 14.

Various theories have been advanced to account for the lack of contacts and why certain stations, notably DL3YBA and HB9RG, were heard repeatedly being " translated " while others which should equally well be " illuminating " it were ignored. There seems little doubt that the receiver in *OSCAR III* was not operating at full efficiency over its designed acceptance band of 144·075 to 144·125 Mc/s and frequencies between 144·10 and 144·115 Mc/s seemed to be favoured. The low frequency edge of this sector of the receiver passband was not too sharply defined, however, because G6AG was operating on 144·092 Mc/s when he was heard by K2MWA/2 at RST569 on March 13.

Fading was much in evidence on the telemetry and translated signals and indicated that *OSCAR III* tumbled over and over with the result that the plane of polarization of its aerials was subject to continual change. It is thought that the use of circular polarization for transmission and reception would have been a definite advantage. G3LTF (near Chelmsford) constructed a helical aerial for this purpose but we have not heard whether it proved more effective than his long Yagi with a gain of 13 db for those times when the satellite was at a distance and a dipole for the nearer passes. In that way the difference in aerial gain approximately made up for the attenuation introduced by the greater path length. G3LQR found that a four-element Yagi mounted vertically and tilted 40° to the horizontal was a good compromise. G2WS (Coventry) has a three-element Yagi capable of being turned right over in a vertical plane and found it quite satisfactory.

The time during which the satellite was within range varied according to the track and the position of the receiving station, but may be taken as a maximum of about 15 minutes. GM3SFH (Thurso), however, held the beacon signal for 24 minutes on orbit 45 when the satellite passed fairly close to the east.

As explained in previous articles, *OSCAR III* was fitted with an automatic gain system which ensures that the strongest signal received could not drive the transmitter beyond one watt output, so it was possible for a station using high effective radiated power virtually to monopolize the equipment by reducing the receiver gain in the satellite to the point where weaker signals were not translated. Such an effect was noticed by GM3SFH during orbit 45 when a very strong s.s.b. signal paralysed the equipment entirely.

Now for more detailed results.

On March 14 G3LTF worked SM7OSC and HB9RG (Zurich), and G6AG (Gerrards Cross) made contact with the latter station. G3LTF also received EA4AO (Madrid).

The first report of hearing an American station came from G6OX (Englefield Green, Sy.) who received K2IEJ at RST

(*Continued on page 235*)

* Project Oscar Co-ordinator, 24 Arundel Road, Tunbridge Wells, Kent.

Some Notes on Crystal Oscillators and Multipliers

By K. H. GREEN, A.M.I.E.R.E., BRS21334*

THE oscillator circuit shown in Fig. 1 has appeared many times in the BULLETIN. It is usually described as a modified, or simple, Colpitts circuit and values of about 10 pF to 50 pF are assigned to C1 and C2.

There is justification for regarding the circuit as a modified Colpitts oscillator but its simplicity is deceptive. Crystals do not oscillate in this circuit at the frequency normally stamped

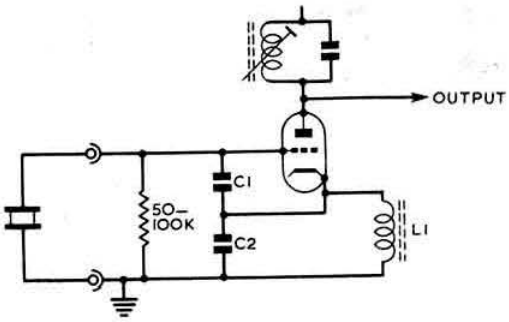


Fig. 1. Crystal oscillator circuit.

on them and examination of the output waveform may give some users a nasty surprise.

The circuit, described by Gouriet and also by Clapp, was developed as a stable low frequency drive oscillator and its operation is as follows. The choke L1 is a high impedance at the crystal frequency, its purpose being to provide a d.c. path for the valve current. When the crystal is removed the circuit is that of a valve amplifier having a capacitive cathode load (C2) with C1 shunting the grid/cathode capacitance.

Analysis of this arrangement shows that the input impedance consists of a capacitance in series with a negative resistance and oscillation will occur if an inductance is connected between grid and earth. A crystal presents an inductive reactance only in the small range of frequencies between its series and parallel resonances. Therefore the oscillation frequency, when the crystal is connected, is below that of the crystal parallel resonance which is stamped on its holder.

The value of the input negative resistance is proportional to the g_m of the valve and also to the reactances of C1 and C2. It has its greatest value when C1 and C2 are equal. If the capacitors are too small the crystal is overdriven. This may result in a change of frequency, poor stability, a very impure waveform and, possibly, rupture of the crystal. In general the capacitors are made not less than about 500 pF each although with surplus crystals it may be necessary to reduce this value to about 200 pF. An advantage of this large value is that valve capacitances are swamped giving an improvement in frequency stability.

The following practical example illustrates the degree of error involved in using standard crystals in this arrangement.

Crystals with a specific frequency near 7 Mc/s were ordered for an oscillator of this type. C1 and C2 were 100 pF each and the order specified that the crystals should work with a shunt capacitance of 50 pF.

On test, the output frequency was found to be 2·6 kc/s low. Increasing C1 and C2 to 200 pF each reduced the error to 1·1 kc/s. No further change of frequency could be produced although the circuit oscillated strongly with the values of C1 and C2 increased to 1000 pF each. The circuit was changed to one of the t.a.t.g. type and, with 50 pF connected across the crystal, the output frequency was correct.

It is preferable to tune the anode circuit to a harmonic of the crystal frequency as this reduces feedback into the crystal circuit. For the same reason, when a pentode is used, the suppressor grid and the screen decoupling capacitor should be returned to earth.

An alternative circuit in which it is easy to make crystals oscillate is the t.a.t.g. type shown in Fig. 2. The triode version (Fig. 2(a)) gives an output at the frequency of the crystal when the anode circuit is tuned to a slightly lower frequency. The pentode circuit of Fig. 2(b) has the following advantages:

(a) The output is at a harmonic of the crystal frequency.
(b) The output circuit is buffered from the oscillator circuit.
(c) Should oscillation fail, anode current is restricted by the action of the screen dropping resistor and a cathode bias resistor is unnecessary. The absence of bias improves starting.

The use of double triodes as multipliers is popular because

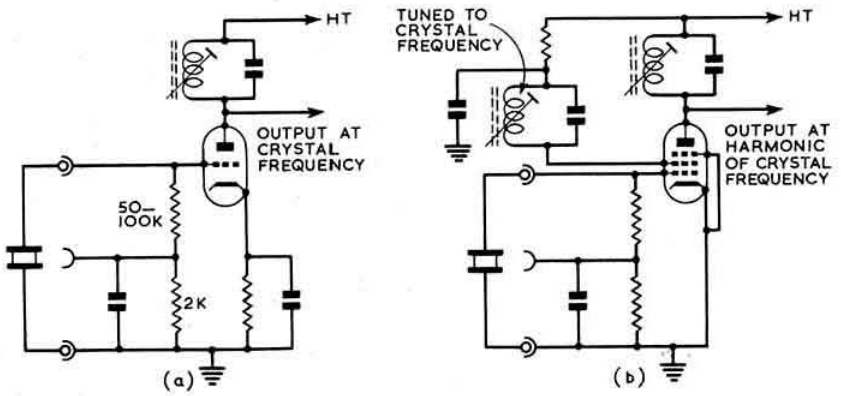


Fig. 2. T.A.T.G. type crystal oscillators.

*" Killick," Nicol End, Chalfont St Peter, Bucks.

of the saving in space and cost but there is a point worth bearing in mind. Multipliers are biased by the flow of grid current and, because of Miller effect, the input capacitance of a triode multiplier is dependent on the amplitude of the signal applied to its grid. Thus, if a multiplier is not driven very hard, the grid circuit (previous anode circuit) is detuned by any change of drive amplitude. When multipliers are connected in cascade it may be difficult to align them properly and the final output is likely to be unstable in amplitude. Miller effect in cascaded triode multipliers has been known to prevent the start of oscillation in a triode t.a.t.g. type oscillator driving them.

Alignment of oscillator and multiplier circuits is made easier by connecting resistors of about 2K ohms between chassis and the earthy end of each grid resistor and taking each junction to a feedthrough connector mounted through the chassis: see Fig. 2. Test points so formed enable the grid current of each valve to be measured, without unduly disturbing its operation, by connecting a microammeter between the appropriate test point and chassis. Each stage is tuned for maximum grid current in the next.

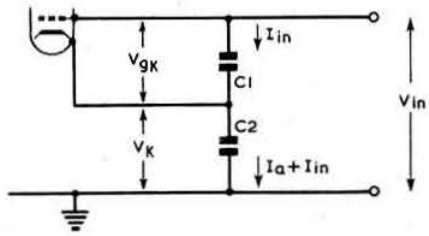


Fig. 3. Amplifier with capacitive cathode load.

APPENDIX

Input Impedance of an Amplifier with Capacitive Cathode Load

With reference to Fig. 3:

$V_{gk} = -jX_{C_1}.I_{in}$

$V_k = -jX_{C_2}.I_a$ (I_{in} is negligible compared with I_a)

Thus $V_{in} = V_{gk} + V_k = -jX_{C_1}.I_n + -jX_{C_2}.I_a$

But $I_a = g_m.V_{gk} = g_m.-jX_{C_1}.I_{in}$

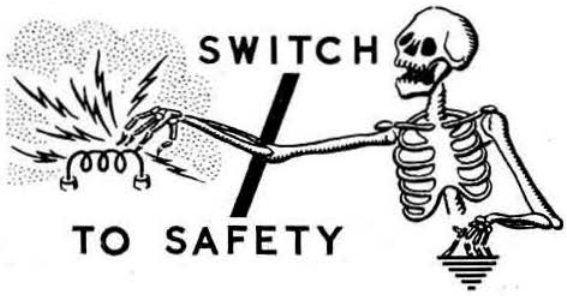
Therefore

$V_{in} = -jX_{C_1}.I_{in} + -jX_{C_2}.g_m.-jX_{C_1}.I_{in}$

and $Z_{in} = V_{in}/I_{in} = -jX_{C_1} - g_m.X_{C_1}.X_{C_2}$

The term $-g_m.X_{C_1}.X_{C_2}$ indicates a negative resistance: oscillation occurs when this equals the circuit losses.

The term $-jX_{C_1}$ indicates a capacitive reactance in series with the negative resistance.



Oscar Story

(continued from page 233)

569 during orbit 33 at 03.01 GMT on March 12. At the same time W1BU heard G3LTF.

During orbit 47 on March 13 K2MWA/2 heard G6AG and DL3YBA both at RST 569 and at 12.07 GMT on the same day (orbit 51). K2GUG was heard at various strengths by stations in London, Manchester and Thurso. On the following orbit G3SKT heard K2GQI and G3FZL heard K2GUG.

Orbit 59, also on March 13, produced HB9RG, SM7OSC and DL3YBA for GI3ONF in Portadown and on orbit 61, which was roughly along longitude 45° west at 03.17 GMT on March 14, G3RCY (Reigate) received signals from W1BU, K2IEJ, W4AOE, DJ3ENA and DL9GU.

It is also understood that a trans-Australian contact has been made, LU3DCA in Buenos Aires worked a W6 and that KH6 was contacted from the USA.

The estimated life for *OSCAR III* was about four weeks, determined by the battery capacity, but by March 22 the telemetry showed the voltage to have fallen from its initial 20 volts to 16·5 volts. Only 15·5 volts were registered on the 25th and this decline apparently continued for all translated signals ceased, in the UK, before orbit 245 on March 27. The telemetry beacon on 145·85 Mc/s was still radiating, however, after that date.

Further reports are invited by the writer for inclusion in next month's BULLETIN. Supplies of *OSCAR* Report Forms are available from Headquarters on receipt of an s.a.e.

Transistorized Wheatstone Bridge

(continued from page 232)

headphones, and the dial adjusted until the intensity of the tone is at a minimum.

The ratio reading on the dial is then multiplied by the range switch setting to give the required value of the unknown component. For example, if the dial reads 0·85 on the *C* scale, and the range switch is set at 0·01 μF, the value of the unknown capacitor is $0{\cdot}85 \times 0{\cdot}01 = 0{\cdot}0085$ μF.

If the dial reading is 5·75 on the *R* scale, with the range switch at 1 Megohm, the value of the unknown resistor is $5{\cdot}75 \times 1{\cdot}0 = 5{\cdot}75$ Megohms.

The calibration of the scale can be carried out either by using a selection of good quality capacitors and resistors and marking the scale at the positions of the null points so obtained, or by actually measuring the resistance of the potentiometer on either side of the slider for different angular positions of the dial, and noting the ratios of the measured values on the dial. This would entail temporarily disconnecting the end connections of the potentiometer.

Fig. 2 gives an idea of what the finished scale would look like, and can be used initially as a guide.

With a standard wire wound potentiometer (1½ in. diameter) the accuracy of measurement is about 10 per cent but with a 3 in. diameter potentiometer, the accuracy should be better than 5 per cent.

The lower limit of measurement depends on the potentiometer and the layout. Circuit stray capacities should be kept to a minimum but with normal wiring the prototype measures down to 22 pF; on resistance, a good null is obtained at 10 ohms.

Finally, an extra facility may be included if a seven position range switch is used. This allows either two capacitors or two resistors to be matched in value. One is connected to the TEST terminals, and the one with which it is to be matched connected to the MATCH terminals; if the null point occurs at the centre of the scale, the two components are identical.

NEWS . . .

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

Minister of Communication? There has been speculation whether the Postmaster General (the Rt. Hon. Anthony Wedgwood Benn, M.P.) forecasted a change of title when he spoke at the annual dinner of the Telecommunications Engineering and Manufacturing Association. He said " As Minister of Communication, which is what the PMG really is, my department is concerned with providing the most efficient communications system to the country as a whole."

Bit out of date is the radio dealer operating from an address in Lancashire who still displays on his letter headings a reproduction of an Approved Dealers' Badge issued to him by the Joint Committee of the Radio Society of Great Britain and the Wireless League *circa* 1930. The Joint Committee scheme ceased to function after December 1933!

Modular Construction. Forward-thinking electronic equipment designers are looking towards modular circuit construction as the next major development in electronics; radio and television are not excluded from their thoughts. Modular circuits are made already in a variety of forms, the most advanced being monolithic modules made in one piece by chemical processes, for such applications as computers and missiles, but modular construction has not yet been adopted in any but its simplest form in domestic equipments. The suggestion that modular construction may provide a future solution of the service problem was considered in *Wireless and Electrical Trader* dated February 20, 1965.

What's a Compreamp? " Want to make that kilowatt, a.m. or s.s.b. phone signal sound like two or more kilowatts or a few hundred watts sound like several hundreds?—then fit a compreamp." Wilfred Scherer, W2AEF, in his review of the Waters Model 359 (*CQ Magazine*, February 1965) explains that a Compreamp is a " solid state device which functions as a preamplifier and speech processor." Small in size it operates from a self-contained 9 volt battery. Now wait for the rush!

New R.F. Transistor Cuts I.F. Stages. Claimed to be an important contribution to the development of domestic radios, a new Mullard r.f. transistor, type BF115, makes possible a reduction in the number of i.f. stages. The device is for use at frequencies up to 100 Mc/s and gives high gain, low noise, good power efficiency and consistent performance at high temperature. The BF115 is a silicon epitaxial planar device having high forward gain, coupled with a low value of feed-back capacitance—the latter being not greater than 0·7 pF at a collector-to-emitter voltage of 10V. These features enable a high overall gain to be achieved and, in some applications, at least one stage of i.f. amplification can be dispensed with. The small size of the BF115—it is contained in a TO-8 encapsulation—enables it to be used with advantage in f.m. tuners and car radios. In the latter application its high maximum operating junction temperature of 175°C is an added advantage.

Listening for Satellite Signals is beginning to supplant other kinds of v.h.f. listening for many amateurs in the USA and, if the truth be known, in many other countries as well. American journals catering for the s.w.l. are devoting more and more space to the reception of satellite signals. How long will it be before a Satellite Listening Group is set-up in the UK?

Satelli'e Navigation. Ships of the US Navy are now using a satellite navigation system to determine their position at sea. The system consists of three orbiting satellites, each sending out radio signals which ships with the necessary receiving and computing equipment can pick-up and translate into written form. It operates automatically in all weathers and is said to be the most accurate and reliable means of obtaining navigational " fixes " yet developed. Using it, a ship near the Equator can check its position every 90 minutes, and those in higher latitudes at shorter intervals.

TV and F.M. Station Guide. Channel numbers and frequencies of all BBC and ITA television transmitters and f.m. radio transmitters, together with other related data, are given in *Trader* Service Sheet 1692/T276 published by Iliffe Electrical Publications Ltd., and included as a supplement to *Wireless and Electrical Trader* dated February 27, 1965. Information is also given about ITA Programme Contractors. Copies of this useful Service Sheet are available from *Wireless and Electrical Trader*, Dorset House, Stamford Street, London, S.E.1, price 1s.

Circular Waveguides for long distance communication and other purposes have been developed by Prof. H. M. Barlow of University College, London. Demonstrating his new system to members of the IEE on March 19, Prof. Barlow used a 280 ft. waveguide with a number of right-angle bends. This represents a major departure from the normal helix-type waveguide with its continuous in-built mode filters, which is very costly to manufacture. In an interview with *Electronics Weekly* Professor Barlow considered that microwave waveguide communication is of more immediate use than opto-electronic laser systems, though he recognizes that these may eventually be developed.

Cheap Electricity from the Atom. The United States and Canada have signed a co-operative agreement aimed at bringing closer the day of cheap and plentiful electricity from the atom. The pact provides for a two-way exchange of information between the two countries on specialized reactors that produce new fuel and at the same time furnish heat to generate electricity. The reactors—sometimes called " advanced converter " reactors—are the intermediate step to the ideal atomic power station; the " breeder " reactor which would produce more fuel than it consumes. The United States, Western Europe and Canada are aiming at 1975 as a goal for " breeder " reactors to furnish inexpensive and abundant amounts of electricity for homes and industry. Present atomic stations furnish only a small fraction of the electric power used today.

Radio Energy which originated in a distant galaxy more than 300 million light-years away was harnessed to unveil a plaque at a ceremony held recently in the United States to mark the inauguration of the world's most sensitive aerial system. Energy was picked up from the galaxy (Cygnus " A," one of the most powerful radio sources in the universe), translated into static noise and broadcast to a large audience over a p.a. system. The static noise triggered a relay circuit which in turn actuated a mechanism for drawing aside a curtain veiling the plaque. It is claimed that the aerial, known as the Haystack Radar Facility, is so sensitive that it can track an object the size of a needle orbiting 500 miles above the earth.

RECMF make a move. The Radio and Electronic Component Manufacturers' Federation has moved from 21 Tothill Street, London, S.W.1, to 6 Hanover Street, W.1 (Mayfair 2472).

Audio Fair. Tickets for the International Audio Fair to be held at the Hotel Russell, Russell Square, London, W.C.1, from April 22 to 25 can be obtained on application to the Editorial Office of *Wireless World*, Dorset House, Stamford Street, London, S.E.1, or *Hi-Fi News*, Link House, Dingwall Avenue, Croydon, Surrey. Requests should be accompanied by a stamped addressed envelope. Tickets will admit two.

Mullard Film Meeting. McIlroy's Restaurant, Swindon, will be the venue for the last of the current series of Mullard Film meetings. Date, April 28; time, 7.45 p.m.; films, Electromagnetic Waves, Part I, and Dual Vision. RSGB members will be welcome.

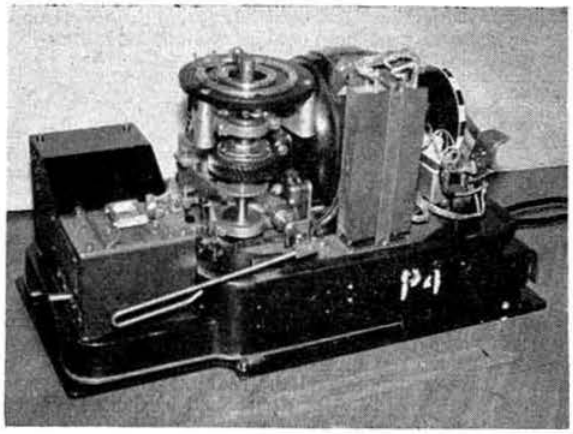
RTTY

By J. A. McELVENNEY, G3LLV *

FOR a number of years the main problem facing the RTTY'er has been the lack of suitable surplus equipment. The time when the owner of a 7B was king has fortunately passed, and each week seems to bring news of a release of RTTY gear of one sort or another. The latest is in the form of small quantities of American Teletype equipment: the rugged model 15 that has been jokingly described as " a mangle with keyboard," and the much sought after 14 transmitter-distributor. These machines, which the writer recently acquired, were labelled TG7B and TT52/FG respectively.

The photograph shows the 14 TD, which, when correctly adjusted, is capable of text book signals. Fortunately for us, the American forces seem to have an innate distrust of the voltage and frequency stability of the mains supply outside the US. Consequently, nearly all Teletype gear found in this country has governed motors. With correct adjustment of the governor, they can be made to operate on both the 45·5 and 50 baud speeds. The 87·6 v.p.s. stroboscope fork, used to adjust the speed to 45·5, can be seen in the foreground. A 96·19 v.p.s. fork is required for 50 baud operation, or alternatively, an accurate tachometer may be used.

The purpose of this article is not to describe the above equipment, as this has been adequately done elsewhere,† but to deal with one aspect of American RTTY gear which is both a problem and, at the same time, a blessing in disguise.



The Teletype 14 transmitter distributor (TT-52/FG) with its cover removed.

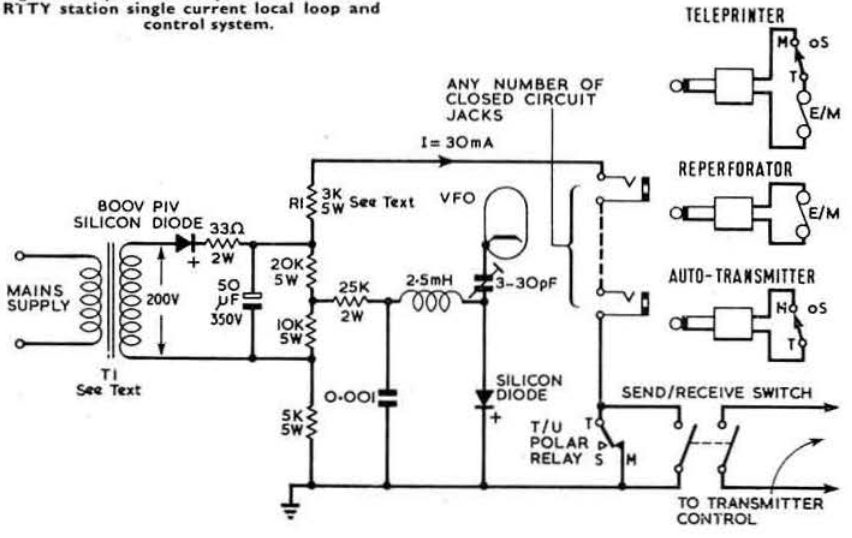
Single Current Operation

In the January 1963 issue of the BULLETIN, G2UK briefly discussed the differences between single (neutral) and double (polar) current operation. All American gear, unless equipped with an integral polar relay, is designed for 20 or 60 mA neutral working.

Where does the problem come in? Suppose, as is very likely, that a Creed 7B is already in use and a single current only American machine is acquired. It cannot have its magnet connected in series with the 7B's since, being non-polarized, it will hold in irrespective of the direction of the current through the coil. Add this to the fact that most neutral machines have a keyboard without a space contact and the problem unfolds. In actual fact, there is a way round it, but try at the same time to obtain local record from both keyboards, f.s.k. the v.f.o. from either machine and include a reperforator and autohead in the same circuit. The resulting pile of scrap paper will look more like an exercise in the family tree of Henry VIII than an RTTY control circuit.

The answer—convert the Creed equipment to single current and use a simple circuit of the type shown in Fig. 1. The conversion is simple and on some 7Bs is partly done already. Just in front of the electromagnet, parallel to the linkage between the electromagnet and the receiving cam is the single current bias spring. The left-hand end is removed from the peg and attached to the hole in the middle of the above linkage. The motor is switched on and with no current in the magnet, the armature is flicked fully to the left. The knurled adjusting nut is then gradually tightened until the machine runs open on space. The nut is given one more turn and that is it. With a loop current of 30 mA the electromagnet should move smartly over to the mark side and return just as smartly when the current is interrupted.

Fig. 1. Simple but complete circuit of an RTTY station single current local loop and control system.



* Honorary Secretary, BARTG, 5 Havelock Square, Broomhill, Sheffield 10.

† "The New RTTY Handbook," by Byron H. Kretzman, W2JTP, published by Cowan and obtainable from RSGB, price 30s. post paid.

If your machine does not have this spring do not despair, as rubber bands have been used successfully before now.

The Loop Circuit

Fig. 1 shows a complete station loop circuit; there are one or two minor additions that could be made but this will suffice. The circuit may be broken down into three components, which are the loop, f.s.k. and supply circuits.

The loop circuit could not be simpler. Everything, the printer, auto-head and reperforator is simply connected in series. Any practical number of jack sockets may be used, and the machines can be plugged in anywhere at random. In the mark condition a current of 30 mA flows in the loop and nothing on space. Any machine may be used independently of the others simply by switching on its motor and leaving the rest off. One minute the keyboard of the printer may be in use and the next the auto-head. One instant, local record on the printer and by the flick of the motor switch, tape from the reperforator. Whichever set of contacts is moving will control the current in the loop and the printer that has its motor on will provide copy.

The S/R switch may be mounted in any convenient place. The left-hand pair of contacts serves to short-circuit the polar relay and prevent it from controlling the loop during transmission, while the right-hand pair controls the transmitter in the usual way. If a spare pair of contacts is available on the existing station S/R switch, this may be used instead. The polar relay is the existing one in the terminal unit.

The f.s.k. circuit is interesting and deserves some comment. It is of a type developed by K8DKC and is widely used in the States. At first sight it may not appear much different to the usual keyer, but the trick is that the feed to it, from the supply, goes alternately negative on mark and positive on space. This results in the shift diode being switched cleanly in and out. In some of the so-called " dry keyers " there is a tendency for the shift to vary due to an alteration in the junction resistance with temperature, but with this circuit the diode is left in no doubt as to whether it is open or short-circuited. The particular version in Fig. 1 has a disadvantage in that once the shift has been set, the v.f.o. has to be opened up to alter it. This may be overcome by connecting a 1M ohm potentiometer in series with the 25K ohm resistor. The control may be used to alter the shift, although a little of the inherent stability may now be lost. The convention on the h.f. bands is to shift l.f. on space. For some transmitters, this will mean moving the v.f.o. h.f. and the circuit can be adapted to this by inverting the diode.

The supply is a simple half wave circuit giving about 250 volts across the capacitor. T1 may be any transformer giving between 150 and 250 volts at 50 mA. The value of R1 should be adjusted to give 30 mA in the loop. The 50μF capacitor is the type with an isolated can.

The argument for single current has been based upon the use of mixed machinery. It is obvious, though, that it can be used with any type of equipment to advantage. If you do not believe me, ask G6CW or G2HIO.

RTTY on the BBC

Alan Walmsley, G2HIO, perhaps the major exponent of DX RTTY in this country, was recently surprised by a visit by the BBC late in February, when he was interviewed for an early morning radio programme. After the questions a demonstration of live RTTY was given. It would seem that Murphy's law was not operating that day as a solid QSO with W3PYW ensued. Although the writer did not hear the result, it was apparently very good. Alan is to be congratulated on a difficult job well done.

BARTG DX Contest

At the time of writing the contest is still some three weeks away. A considerable amount of publicity has been given to it which we hope will make it an interesting event. Thanks are due to *RTTY* magazine for cancelling its contest, scheduled for February, so as to provide more support for ours.

That is it for this time. 73 de G3LLV.

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.

Enquiries Regarding Bulletin Articles

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

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW*

North Midlands Mobile Rally

Once again comprehensive talk-in arrangements have been made for this well supported annual event which is to be held this year on Sunday, April 11 at Trentham Gardens. On 144 Mc/s, G3MAR (145·3 Mc/s) will be control station at Trentham Gardens and will have outstations at Keele (G3SMD, 145·4 Mc/s) and Mow Cop (G3LLJ/P, 145·8 Mc/s).

On 1·8 Mc/s, G3GBU (1920 kc/s) at the rally site will have G4QD (1880 kc/s), G3HVI (1900 kc/s), G3STM (1940 kc/s) and G3COY/A (1960 kc/s) as outstations. These stations will be in operation from 10.00 until 14.30, and again at the close of the rally for " talk-out " purposes.

All contributions for " Mobile Column " and detailed information on forthcoming mobile rallies should be sent direct to E. A. Matthews, G3FZW. Only brief details of future events for inclusion in " Mobile Rallies 1965 " should be sent to Headquarters.

G3GBU will have a s.s.b. station available, and it is hoped to provide another s.s.b. talk-in station on 3·7 Mc/s.

The Royal Signals ARS will be exhibiting at the rally with the theme " Forty Years of Army Radio." In addition they will have a mobile workshop and battery charging equipment on site and will provide a repair service for any visiting mobiles whose equipment gives trouble during the day. This service will be " at owner's risk," but all personnel engaged on such duties will be fully qualified.

The RAF (Sealand) ARS display will be combined with a general Air Force stand, where it is intended to show the latest airborne s.s.b. transceiver in operation.

Other exhibits are to include the usual model aircraft flying display, perhaps a water ski-ing show, and all the usual trade stands.

Schoolboy visitors will doubtless be interested in the activities of members of 238 and 235 Sqns. Air Training Corps who will be operating a station in the ATC W/T Network, and also providing a standby talk-in station for 1·8 Mc/s under the call-sign G3JGE.

* 1 Shortbutts Lane, Lichfield, Staffs.

QUA Associates

conducted by "JIX"

YOUR letters about transistor circuits and experiments using them have all been interesting. The writer is glad to have this evidence of keen radio construction going on and wishes you success with your technical work in the field of amateur activity.

This month a circuit is introduced in which the transistors

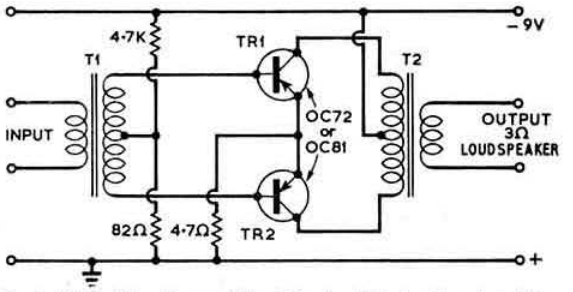
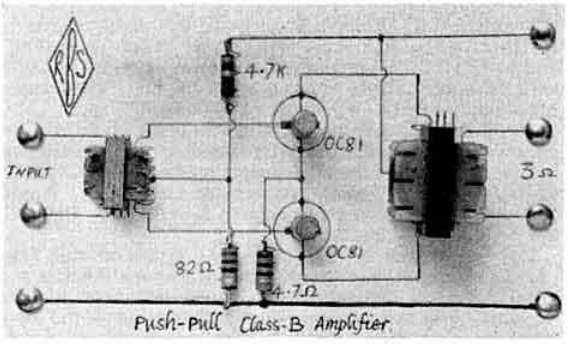


Fig. 1. A 500mW audio amplifier. The circuit is simple and straightforward. Notice the balanced effect push-pull arrangements give.

are arranged to develop power output, instead of just producing the greatest amplification, as in previous circuits. In the circuits discussed so far, the transistors were arranged to operate in what is known as the *small signal* condition. The signals never become so large that distortion sets in or transistors actually " turn off " at the extreme swings of the signal waveform. For power output, however, the transistors need large input signals to drive the output voltage and current over wide ranges, because, as many of you should recall, power in watts equals volts times amps. So with large changes in voltage and current, large output powers can be obtained, and it is power that is required to work loudspeakers, operate relays or modulate transmitters.

This new card circuit uses two small power transistors in push-pull. Transformers are used to couple and *match* the input and output and the two stage card amplifier described earlier can thus be used to drive it. About half a watt can be fed to a 3 ohm loudspeaker.



A recommended method of mounting the components of this audio power amplifier

Very little bias current is fed into the bases of the transistors, which means that they are nearly cut off, i.e., very little current is flowing in the collector circuits. If a signal is now applied, one transistor receives a large increase in base current and a large, amplified, current is produced in the collector circuit. The other transistor's base is driven right off during this time and no current flows at all in that half of the circuit. On the other half cycle of the alternating input signal, it is the first transistor that is driven right off and the other that comes on to deliver a large current in its collector circuit. Thus one half of the signal goes one way, the other half the other way, as it were. These two " halves " are added up in the centre tapped output transformer to reproduce the complete signal.

This method of running the transistors is known as operating them in *Class B* and is very economical on battery supplies because very little current is drawn until the signal appears. Quite large output powers are obtainable and the circuit is efficient.

The transformers are home made, although many commercial types are available for push-pull class B transistor

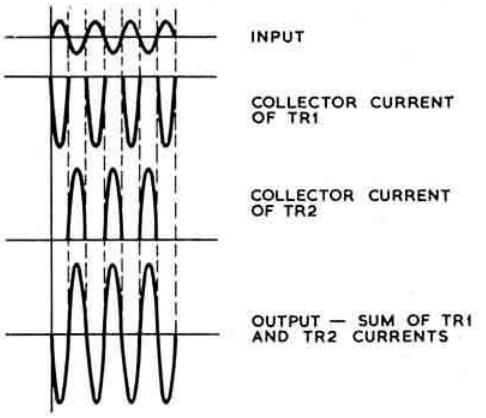


Fig. 2. The current pulses produced in each transistor are combined in the output transformer, T2. Much greater output is possible this way, although the average current with no signal is very small.

circuits such as this one. It is thought that readers might like to try winding them, considering the experimental nature of our circuits and their construction. At least, if you wind these, you will be able to say that you have had the experience!

The turns ratio of transformers used in circuits such as these has much to do with matching the *impedance* of the various inputs and outputs. When *matched*, the stages pass on the maximum power. The number of turns sets a value to the inductance offered by the transformer winding and this affects the quality or frequency response of the amplifier. If the quality was found to be tinny and high pitched, the transformer would probably be offering too little inductance.

If sets of laminations can be found that are roughly the same size as those in Fig. 3, then the number of turns for the

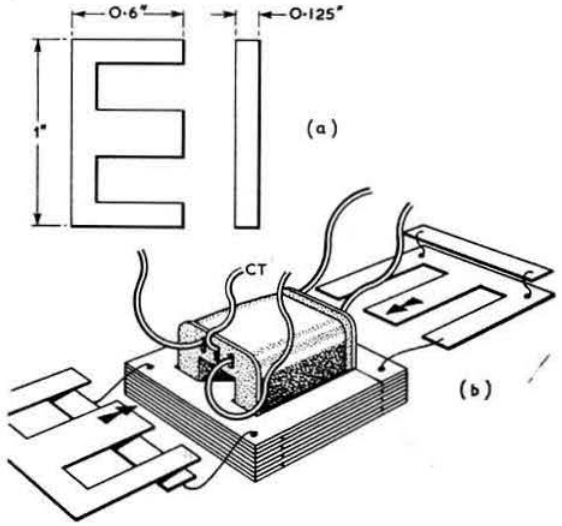


Fig. 3. (a) An example of the small laminations available. T1 primary, 825 turns; T1 secondary, 300 turns total, centre tapped; T2 primary, 370 turns total, centre tapped; T2 secondary, 40 turns of fairly thick wire. (b) The laminations are interleaved alternately in the bobbin.

appropriate primaries and secondaries should be wound on, making the centre taps at the appropriate points during the process. The laminations can be found in old hearing aid amplifiers and television chassis (a very small transformer is usually found in the frame timebase oscillator section). A good method of winding coils such as these is to put the former on to a piece of wood shaped to fit the hole, through which is passed a screw. The screw is gripped in the chuck of a hand drill, and the drill can be held in a vice with the handle on top. The wire is fed on to the former with the left hand, while the drill is turned with the right. Count the number of revolutions your right hand makes, and the number of turns is given by this number multiplied by the gear ratio (usually about 5 : 1) of the drill. A few thousand turns can be wound in a matter of minutes by this method when you become skilled at it. A spot of impact adhesive such as Evostick on the transformers fixes them, as well as the leads, to the card. Wire up as in the other circuits and obtain your half watt of audio output. This output stage and the earlier preamplifier makes a fairly satisfactory record player system. With a crystal pick-up, connect a 100K resistor in series with the input to the preamplifier.

News from Associates

M. Woollin, A4431, has a No. 19 set modified for Top Band listening, and also an R.F.24 converter for 20m. A4431 says that his physics teacher is an Amateur, and therefore does not come under the general description in G3RKK's letter. I expressed the hope that A4431 might be able to start an Amateur Radio Boys' Club with his teacher as leader, in Gomersal, Leeds.

Don Wilson, A4464, is a newcomer to RSGB, but hopes to be licensed later this year. Don complains about the interference suffered by GB2RS at his QTH, West Lothian, Scotland.

C. S. Kilburn, A4495, is a student at Scarborough, and finds a little difficulty in getting his equipment working. There may be one or two " A " Members who would like to correspond with A4495 about techniques of SWLing in general. His address is 74 Westborough Road, Scarborough, Yorks.

A. Frost, A4335, is lodging in Oxted at the moment. He has a listen on a 0-V-1 receiver (battery operated) while the AR88D is back at home. A4335 would like to contact any members in his area. His address is 66 Granville Road, Oxted, Surrey.

John Henderson, A4181, says he would like to hear from any other " A " Members who have used a Perdio " Town and Country " receiver. So drop John a line if you have any gen. His address is 8 Minerva Road, East Cowes, I-o-W.

Alan Baker, A4248, writes to say that he has an R107 with a Codar preselector. I suggested he contacts **Andrew Wheele, A4267,** also of Welwyn. Andrew, known to me as a Roding Boys' Society member, together with Alan and any other interested lads of the Welwyn and district area, might get together and start a boys' radio club there. Let *QUA* . . . know how things go. Alan's address is 10 Elmoor Avenue, Welwyn, Herts.

D. H. Foster, A3926, has an HRO receiver, but he complains about the QSL card situation. I fear that subject will come up at high frequency as long as SWLs listen! Another newcomer to RSGB Membership is **A. Henshaw, A4389**—welcome to the Society. A4389 uses a No. 19 set but finds his QTH rather noisy.

A Visit to the Science Museum

The writer has, with the members of the Roding Boys' Society, been co-operating with the Editors of *Practical Wireless* and *Practical Electronics* in an informal get-together for us and the young readers of those journals who are interested. This is a visit to the Science Museum, South Kensington, on Saturday, April 24, meeting at the South Kensington Underground Station at 10 o'clock in the morning. We hope to have a lecture on an electronics subject that day, and have a conducted tour round the radio exhibits. Drop me a line if you would like to join in.

* * *

73 to you all, and the best of luck if you are sitting the RAE this May. G3JIX.

Moonbounce

Edward P. Tilton, W1HDQ, V.H.F. Editor of *QST* and a world authority on v.h.f. and u.h.f. affairs from an Amateur Radio point of view, contributed to the November, 1964, issue of the *Telecommunication Journal* (official publication of the International Telecommunication Union) an illustrated account of how radio amateurs have, in recent years, attempted to use the Moon as a reflector of v.h.f. waves for long distance communication.

Mr. Tilton traced the work done by US amateurs back to 1946 when the first set of basic requirements for Moon reflection communication were established. He recalled the 144 Mc/s experiments carried out by W3GKP and W4AO in 1952 and gave an account of the first two-way EME communication accomplished by W1BU and W6HB on 1296 Mc/s in July, 1962, later extended by W1BU to KH6UK in September, 1962. Reference was made to the work done by K1HMU, whose 144 Mc/s signals were heard by W6DNG and by OH1NL, leading up to a contact on April 12, 1964, with the latter station, to bring about the first Transatlantic Moonbounce QSO—a distance of 10,000 km.

Mr. Tilton brought the record up-to-date with an account of how amateur interest in EME communication was aroused in June, 1964, when the experiments organized by KP4BPZ/W1OUN at the Arecibo Ionospheric Laboratory, Puerto Rico, resulted in two-way contacts with W1BU, HB9RG, W9GAB, G3LTF and others.

The publication of this important article in the *Telecommunication Journal* means that government officials and radio engineers throughout the world will have had an opportunity to learn more about another phase of the work being done by radio amateurs. The article was printed in English, French and Spanish.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS, G2BVN*

WITH the passing of the trough of sunspot Cycle 19 conditions on the h.f. bands are showing signs of improvement. Pacific area stations are again being heard in the mornings and judging by past trends we can look forward to a steady increase in activity during the months ahead. The table of definitive sunspot numbers issued by the Zurich Solar Observatory for 1964 will provide a guide to the sequence of solar events during the past year:

January	15	July	3
February	17	August	9
March	16	September	4
April	8	October	6
May	9	November	7
June	9	December	15

The first sunspot of the new cycle made its appearance on August 28, 1963, but until February 21, 1965, all the new spots have been observed on the northern hemisphere of the sun. However, on the latter date the first spot was observed on the southern hemisphere. Cycle 20 is therefore well and truly launched and may its peak be an all time high!

New Writer for MOTA

From next month *MOTA* will be guided by **G3HDA,** Mick Bazley, who has agreed to assume responsibility for the task. G3HDA is a dx'er of the first calibre and *MOTA* will benefit from his interest. It is hoped that all those listeners and transmitting amateurs who have supported this feature will redouble their efforts during the coming months, for it is impossible for one person, however keen, to be everywhere all the time and one of the cornerstones of *MOTA* must be the co-operation of its readers.

The writer would like to say thank you in the sincerest possible way to all those who have helped so much during the past five years; this co-operation has come not only from the UK but also from many overseas countries. G2BVN has not lost his interest in DX and will continue to help the cause along in all possible ways, but due to the time involved in other Society tasks, cannot now devote the necessary attention to *MOTA*.

News from Overseas

The Jamaica Radio Association advise that **6Y5RD** is being pirated and the legal operator is receiving many QSLs for contacts that he did not make. It is pointed out that since independence in August 1962 neither the Turks and Caicos Islands nor the Cayman Islands come under the jurisdiction of Jamaica. Noel Eaton, VE3CJ, mentions that the new prefix for the latter will be ZF1. An up to date list of licensed operators in Jamaica is now held by G2BVN.

The prefix of **ZD5** still seems to be causing some comment and it is again mentioned that this is now the definite prefix for **Swaziland. ZD5R** is active on s.s.b., but ZD5V has been transferred to ZS5 and **ZD5L** is now in Bechuanaland (ZS9) from where he will be active at least on a.m. but also on s.s.b. in due course. Ex-ZS6ARJ has been allotted the call **ZD5D** but is not yet on the air. **ZD5R** operates most evenings around 14,120 kc/s and will be pleased to QSO UK stations.

5N2AAF is on home leave until June 1 when he will return to Zaria. From July 1 to November 30 he will be in Thailand, but only as a s.w.l. due to the licensing position. 5N2AAF continued to listen on 28 Mc/s, which has yielded some odd results. A sked was arranged with K1YZW; a contact did not materialize but the US station instead worked ZS6JK, who later worked several W/K stations who were not heard in 5N2. An arrangement with G3PCI did not yield any signals but 9J2DT was hearing 9M4LP, with KV4 and KZ5 coming in around 18.00. During BERU 5N2AAF made 286 contacts in the Low Power section, including four QSOs with UK stations, one of whom, **G3FPQ**, made 221 QSOs claiming 2,645 points. All the overseas participants mention G3FPQ as having the outstanding signal from the UK. A very interesting newsletter is issued by 5N2AAF under the title *NARS News* being the present journal of the Nigerian Amateur Radio Society. During the absence of 5N2AAF on leave this will be produced by 5N2RJO.

Still on the subject of BERU, ZB1RM, ZB1HKO and ZB1J participated, the first named finding conditions alternately frustrating and reasonable. The contest period opened with 7 Mc/s yielding contacts, although most stations moved to 3·5 Mc/s after exhausting the possibilities of the former band. 14 Mc/s opened to the UK at about 06.00 and the rest of that day was spent on that band and

This photo of ZC4CZ and his equipment was taken by EP2DV who stayed there for a couple of days while en route to the USA (K8).

* Please send all reports and news items to RSGB Headquarters to arrive not later than **April 8** for the May issue and **May 12** for the June issue.

21 Mc/s and coercing operators to give 28 Mc/s a try, which produced success only with the African stations. **ZB1RM** echoes the complaint from other contestants that 7 and 3·5 Mc/s were almost unusable owing to the USSR contest taking place at the same time. This appears to have been an internal affair with no forewarning of the clash. On Sunday 21 Mc/s opened to the UK and many contacts were made whilst these conditions lasted, whilst the period ended with last desperate efforts on 7 and 3·5 Mc/s. ZB1RM reports ZB1A as active on s.s.b. with G3SJQ settling in and having applied for a licence.

A note from **ZS8G** via GI3CVH asks that operators should note that QSLs should go direct to **Box 379, Maseru,** and *not* to W2CTN. The latter stemmed from illegal use of the call and should be ignored. To clinch matters ZS8G forwarded a photocopy of his licence.

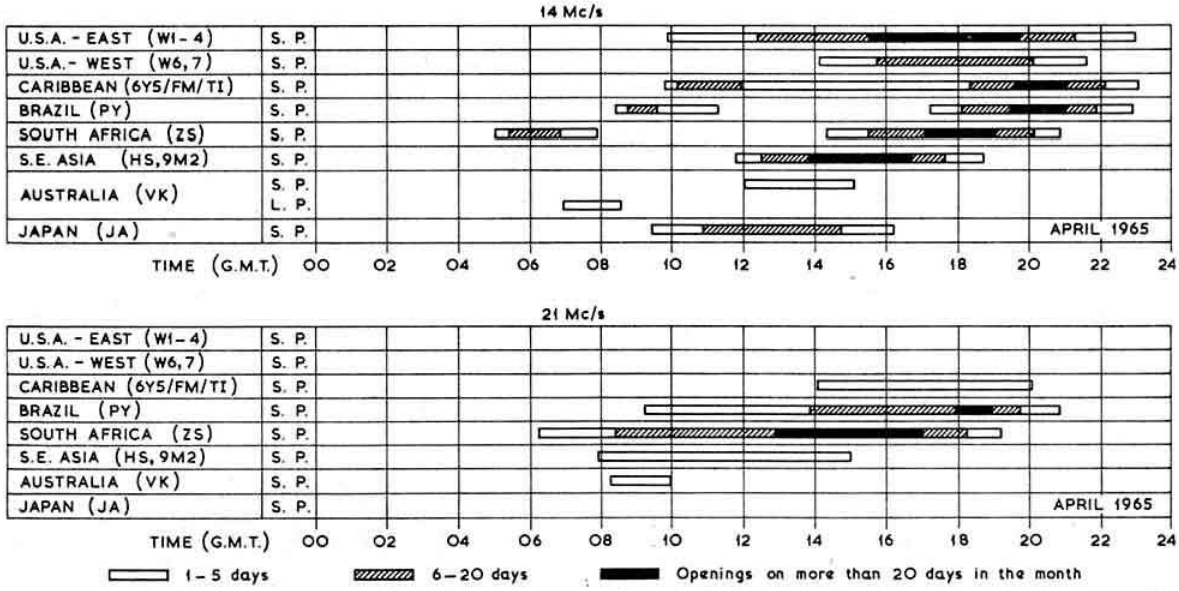
Readers interested in obtaining the latest DX news may do well to listen to the VERON HQ station **PA0AA** which transmits news bulletins in English on 3600 kc/s, 14·1 Mc/s and 145·14 Mc/s each Friday at 19.15 and 21.15. This station also transmits RTTY news bulletins (20.30) and Morse code exercises.

VK4FJ, via BRS20317, asks for the co-operation of European stations to enable him to qualify for his WAE1. VK4FJ calls on 3505 kc/s at 19.00 and on 7010 kc/s at 19.45 until 20.30. He is anxious to work all European countries on 3·5 Mc/s and there are a number of gaps on 7 Mc/s. The equipment is a KWM2 feeding an inverted-V hanging from a 50 ft. tower.

Activity from **Afghanistan** is at an all time high with the following calls heard on the bands: **YA1AG, YA1AW** and **YA1BW** all on c.w.; **YA1AN** (QSL DL3AR), **YA1YL** (QSL W2CTN), **YA3TNC** (QSL K0RZJ) and **YA4A** (QSL K4KMX) all active on s.s.b. The latter is to be heard on the SEANET which meets daily on 14,320 kc/s at 12.00, often with 9M4LX as M.C.

ZC4CZ in listing the odd noises that now inhabit 7 Mc/s, which, according to the *Geneva Radio Regulations 1959*, is, between 7000 and 7100 kc/s, allocated to the Amateur Service, points out the advantages of 7045-7050 kc/s, and often calls on 7005 kc/s listening for replies on the former frequencies. However it seems that rarely does the idea catch on. Here in the UK excellent s.s.b. QSOs are often possible in the early evening hours round this spot. All we want is Radio Peking to open up on yet another band of frequencies and our happiness will be complete.

PROPAGATION PREDICTIONS



Sunspot activity has increased a little recently, and the minimum has been passed. However, the increase will be slow at first, so that there will be no observable improvement in conditions on the h.f. bands in the coming months. 28 Mc/s will, therefore, be still of little use for DX working, though as with 21 Mc/s, sporadic E will give the band a certain amount of life for short skip contacts over distances of 500 to 1100 miles beginning in May. On 21 Mc/s North America and Japan will hardly ever be heard, and the time intervals for reliable contacts with Africa and South America will be relatively short. The lengthening days in April will mean that 14 Mc/s remains open longer in the evening. On this band during April, and especially in the coming summer months, traffic to Australia in the afternoons will be more difficult than during the winter, and not until September/October will there be any improvement in this respect. During June and July the most favourable time for traffic with Australia is usually in the early morning on 14 Mc/s. The favourable time for traffic with Japan will be displaced more and more from the morning to the afternoon, as summer approaches. In midsummer there will be an additional period in the early morning for traffic with Japan. On days with above average F2 m.u.f's, KH6 will be workable from about 16.30 to 21.00 GMT via the direct path and from 05.30 to 07.00 GMT via the long path. In general, on 14 Mc/s during April there will be relatively few occasions for working DX via the long path, but, however, the situation will improve somewhat in the mid-summer months. The shortening nights, and with them the higher night-time F2 m.u.f's will lead to an improvement on 7 Mc/s in traffic with North America, especially in the latter half of the night. Fade-outs will occur occasionally, particularly in the first half of the month. Traffic with South America and South Africa will likewise show an improvement over the winter months. The daytime F2 m.u.f's lie mostly below 7 Mc/s at the present time, so that local traffic on this band will frequently be interrupted during the day by the dead zone. During May there will be a certain improvement here brought about by short skip conditions, and these will continue during the summer. On 3·5 Mc/s DX contacts are basically possible when the whole of the transmission path lies in darkness. This stipulation is more severe here than on 7 Mc/s. The shorter nights, together with the increase in the atmospheric noise level, will result in this band opening much less frequently for DX than during the winter. Local traffic outside the ground wave will still be interrupted occasionally on 3·5 Mc/s by the dead zone, but less frequently than during the winter.

The provisional sunspot number for February 1965 was 14·3 with the period of least activity lying between the 17th and the 23rd of the month. Predicted figures for May, June and July are 17, 19 and 20 respectively.

The shack at VQ8AMR, Rodrigues. To the right is SWL Serge Savannah (Tino) who accompanied VQ8AMR on the trip.

The view from VQ8AMR's shack.

Top Band News

The most interesting piece of news this month is concerning the QSO between **G3FPQ** and **VK3BM** at 20.10 on March 6. This contact took place after a long period of pre-arranged skeds and checks were made before and after on 7 Mc/s s.s.b. Congratulations to both operators on this QSO which completed WAC on Top Band for G3FPQ.

W1BB asks that all stations who can possibly get on the band during the IQSY period should make every effort to do so and thus help to complete the jigsaw puzzle of propagation conditions on 1·8 Mc/s. Summer dx'ing on the band is to be encouraged and special schedules are to be arranged.

As usual the *160 Meter DX Bulletin* from W1BB carries the latest news of events on this band, including details of a first ever QSO between **ZB2AE** and **W1BB/1**. Due to restricted space the aerial at the Gibraltar QTH was much below standard. Signals were 229/339 at 06.30/06.35. Another recent "first" was the QSO between ZP9AY and W1BB/1. and the latter makes the interesting comparison between 1963 and 1964 having made QSOs with 123 different stations in 23 countries followed by 163 in 27 countries for the latter period. It is anticipated that conditions on the band will remain at about the same level for the next two or three years. W1BB feels that the proven existence of daylight DX is probably the most interesting result of the work on 160 and hopes that future contacts will shed some light on this occurrence.

A release from **W3AZR** announces the formation of the International-*One Sixty*-Society "designed to promote more enjoyment for the 160m amateur and to protect his interests." A bi-monthly newsletter is to be produced and the membership fee is $2. Correspondents from European countries are needed and those interested should get in touch with W3AZR. The following UK stations are reported by W3AZR as having outstanding signals on the band: G3PU (579), G3PQA (569), G3RPB (569), G3SED (589), GW3FSP (569) and G6BQ (579).

DXpeditions

The big news this month is undoubtedly the announcement of a trip to be made by W4QVJ and others to the **San Felix-San Ambrosio** group of islands which will be found at approximately 80°W 26°S. The operation is scheduled to commence on April 20 and to last for about seven days. C.w. and s.s.b. will be used and only two QSOs per band per mode should be made under the penalty of no QSL. QSLs should go to W4DQS (see *QTH Corner*) and it is essential that all cards should show GMT.

ZS6s BBB, LW and YQ plan to activate **ZS8** and **ZS9** between April 16 and 20, whilst **HB9ZT** hopes to operate from Liechtenstein during May 8-9. **VU2NRA** continues to operate on c.w. and s.s.b. from the Andaman Islands and QSLs should go to W4ANE. Contributions are solicited in order to make a trip to the Laccadive Islands a possibility.

G5GH will be operating from **Montgomery** between April 9 and 20, and will doubtless furnish many stations with a GW CHC QSO. It is rumoured that G5GH may be forsaking Antagonistic Modulation for s.s.b.

VQ8AM has furnished a sample QSL card from his Rodriguez operation together with a specimen signature to W1WPO of ARRL as VQ8AMR cards were in circulation before they had been printed in Mauritius!

A3485 (M. J. Fisher, 64 Caldene Avenue, Mytholmroyd, nr. Halifax) has a number of W9WNV/XU and K7LMU/3W8 cards for s.w.l.'s. If you are hoping for one of these cards please send a s.a.e. to the above address.

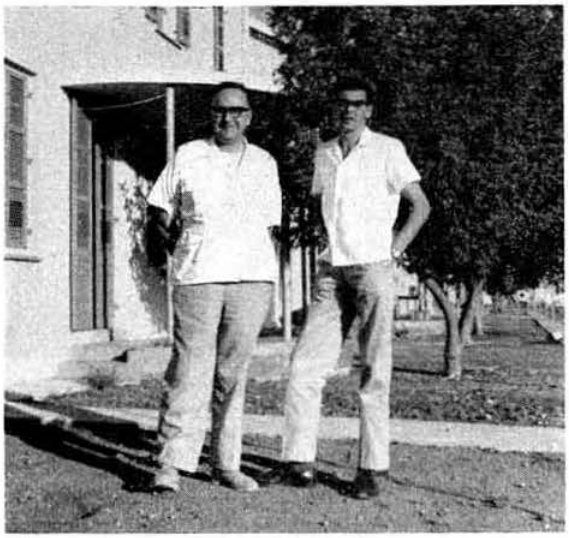
The rumour department produced news of XE1YJ going to Clipperton Is. during April, but nothing definite is known at this time.

QTH Corner

CE0XA	via W4DQS, 928 Trinidad Road, Cocoa Beach, Florida 32931, USA.
G3JPQ	ex VS1LU/9M4LU, M. G. Hutchins, Edgcumbe Cottage, Edgcumbe, Penryn, Cornwall.
KG6IG	via KG6 QSL Bureau, PO Box 445, Agana, Guam, Mariana Islands.
VP1TA	via W2CTN.
VP8IB	via RSGB Bureau.
VS9OSC	Amateur Radio Club, RAF, Salalah, BFPO 69, London.
XW8AZ	Box 402, Vientiane, Laos.
YA4A	via K4KMX, W. G. Ward, 101 Colonial Road, Warner Robins, Georgia, USA.
ZD3C	via K2IDF, A. R. Genola, 1025 Broad Street, Shrewsbury, New Jersey, USA.
ZD8HL	via W8LIM, H. R. Lund, 532, E. Birch Street, Ironwood, Michigan, USA.
ZD8LT	via K9YXX (not in latest CB).
ZS2MI	via ZS1CZ, H. B. Tronson, Land Survey Office, City Engineers Dept., City Hall, Cape Town, Rep. of S. Africa
5V8AB	PO Box 123, Lome, Togo, or via REF.
5Z4DW	G. H. Perrett, PO Box 660, Nakuru, Kenya.
6W8DJ	A. Pignier, B.P 2781, Dakar, Senegal.
7X2MD	D. Bendani, mm. Liszt, rue Claudel, Miramar-Oran, Algeria.
9L1HX	P. Dodd. Sierra Leone Development Co., Marampa Mibes, Box No. 7, Freetown, Sierra Leone.

* * *

RSGB QSL Bureau: G2MI, Bromley, Kent.



HZ1AMS/3 with ZC4CZ.

Contests

Due to editorial keying trouble news of the **CQ WW SSB Contest** on April 10-11 was not included last month. The contest rules are not materially different from those appearing on page 97 of the February 1964 issue of the BULLETIN. The date by which logs must be postmarked is April 30, 1965, and they should be sent to *CQ Magazine*, 14 Vanderventer Avenue, Port Washington, New York, 11050. Log forms and cover sheets are available by sending a foolscap size s.a.e. to **G2BVN** giving some idea of the number of contacts involved.

Rules for the **International SP DX Contest** have arrived but as these refer to the 1964 event no firm conclusion is possible. It is, however, believed that the Contest will take place between 15.00 on April 10 and 22.00 on April 11. The favoured mode is c.w. on all bands from 3·5 to 28 Mc/s. Results of the 1964 Contest show G3EYN (2730 points) and G3JFY (110) as the only UK entrants.

The official results of the **1964 YO Contest** are shown in a booklet which also gives the rules for the 1965 event due to take place during the first weekend in August. In this contest also the UK entry is small and booklets have been sent to all entrants.

The **14th OZ-CCA Contest** will take place between 12.00 May 1 and 24.00 May 2 on c.w. and at similar times on May 15-16 for phone. There have been no material changes in the Contest rules and all entries must be postmarked not later than June 15, 1965. If one IRC is sent with the log a complete list of the results will be sent to the contestant.

The **USSR DX Contest** will take place between 21.00 May 8 and 21.00 May 9 using c.w. on all bands between 3·5 and 28 Mc/s. An unusual feature of this Contest is that all contacts which may count in the score must be included in a 12 hour credit period. Each QSO counts one point and each different country on each band counts as one multiplier. A log must be submitted for the whole period of operation, but only an indicated 12 hour period can count towards the contestant's score. A complete summary of the rules cannot be given in the space available, but if there are any specific points on which clarification is desired G2BVN will be pleased to assist.

The **CHC/FHC/HTH Annual QSO Party** will take place between 23.00 June 4 and 06.00 June 7. This is an event in which operation is restricted to ± 10 kc/s of certain specified frequencies and full information is available in a leaflet obtainable from G2BVN.

During the **H-22 Contest** HB9ABU/P operated from the top of the Sphinx Jungfrau-Joch at an altitude of 12,000 ft., and in the Valais canton. A special QSL card will be available to confirm contacts.

AWARDS

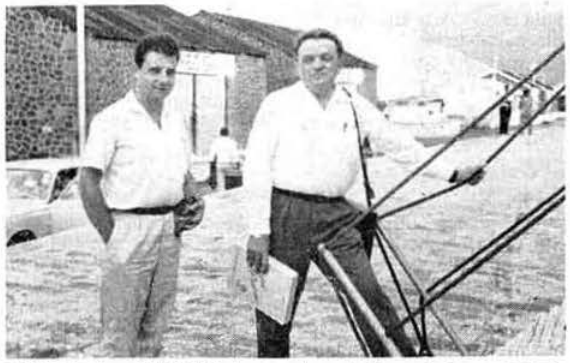
Information on current certificates and awards will be found in the *Directory of Certificates and Awards* which deals with between 600 and 700 awards, both for the transmitting amateur and the s.w.l. This volume is produced in loose leaf form, suitable for a three ring binder, by C. Evans, K6BX, and publication is quarterly from January 1 in each year. Each issue is self contained and amendments are not issued. Stocks of this book are not held to ensure that only current volumes are distributed, but orders for direct delivery from K6BX may be placed with **G2BVN**. The non-profit cost per issue is 18s. 6d. post paid, with a binder costing a further 7s. 6d. if required.

The following UK stations have received the *Worked All Pacific* award since December 1963: G6VQ (G11), G3HCT, G2BOZ and GI4RY (GI-1).

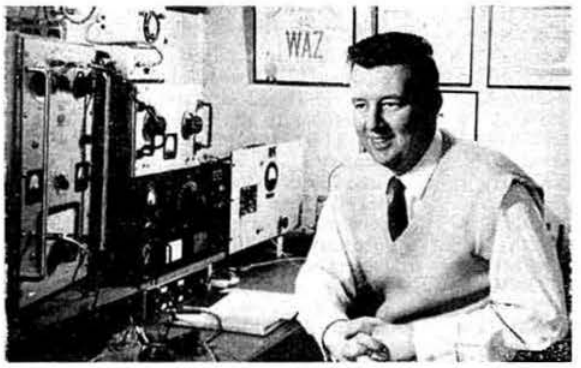
The **International Mobile Diploma** is sponsored by the District of North Rhine-Westphalia and may be claimed by transmitting stations and s.w.l.'s who can submit 100 QSL cards from /M, /MM or /AM stations, the effective date of all QSOs being after January 1, 1963. The fee for this Award is ten IRC and a GCR list is acceptable instead of QSL cards. Applications should be sent to DJ8OT, E. Warnecke, 562 Velbert, Postbox 1244, West Germany. Explanatory slips are available from G2BVN.

The Diplom DTA, the **French Austral Lands Award** is available to operators who have made contact since April 1, 1946 with three of the following stations: FB8WW (Crozet), FB8XX (Kerguelen), FB8YY (Adelie) and FB8ZZ (St. Paul and Amsterdam). A golden star is awarded for QSOs with four different stations. The fee for this Award is six IRC and applications should be sent to F3FA, A. Jacob, 33 avenue Victor Hugo, Pavillons-Sous-Bois, Seine, France. Photocopies of both sides of the QSLs are accepted in lieu of the actual cards.

The enquiry in *MOTA* last month in connection with the **Doctorate of Amateur Radio Award** has brought further information on UK amateurs coming in the categories mentioned. G3SOI and G3TTY are additions to the list and others are G2UK (probably the best known ham-doctor in the UK), G3DBM, G3EFB, G3EIL (the partner of G2HFD), G3EQM, G3GKD, GI3HXH and GM3INH. These calls



FB3ZZ (left) and FB8WW about to board ship on their way back to France after the VQ8AMR DXpedition.



G3LPS in his shack.

will be passed to WA6CRN for inclusion in the *Directory* and if there are further additions we shall be pleased to hear of them. Thanks to G3FBA for help on this matter.

Congratulations to **G3BID/M** on receiving the second DUF/4 Award issued for /M operation.

News has been received that K6BX, Clif Evans, publisher of the *Directory of Certificates and Awards* has been admitted to the US Naval Hospital in San Diego with a split retina in his eye. Latest reports are not hopeful but we offer K6BX best wishes for a speedy recovery.

Band Activities

Although no breath-taking DXpeditions have commenced during the past month there has certainly been an upsurge in activity on the bands. This is no doubt partly due to the advent of spring and longer hours of DX openings, and also to several major contests which have taken place during the period under review. Contests may be a mixed blessing, but there is no doubt that when a contest is under way a lot of DX shows up that would not otherwise be heard or worked.

Another interesting fact emerges from a study of the reports of the large number of associate members who are now reporting what they hear: that 95 per cent of their listening is to s.s.b. If they aspire to full membership of the amateur community they might be better advised to direct some of their endeavours to deciphering the call-signs of stations using c.w., the oldest and most reliable method of radio communications.

This is a bumper month for DX and our salaams go to the following 28 members from whose reports the following survey is compounded: DL2CT, G2FUU, G3AAE, G3FKM, G3HDA, G3KMQ, G3KSK, G3MWV, G3OAD, G3SML, G4MJ, G8JM, BRS20317, BRS25901, BRS26727, A2498, A3374, A3560, A3699, A3766, A3942, A4035, A4038, A4056, A4062, A4201, A4311 and A4420.

3·5 Mc/s C.W.: JA6AK (23.30), OH0NI (22.10), UJ8KAA (19.50), UL7SA (19.35), VP1TA (03.00), VS9MG (23.45), VS9PGM (02.50), ZL1HY, ZL3KN, ZL3OX, ZL4BO, ZL4GA, ZL4IE (all 07.15-07.45), 3A2DA (21.45), 4U1ITU (00.20), 5N2AAF (04.30), 5R8AN (21.45), 6Y5XG (02.40), 7X2RW (23.35), 9J2W (00.40-02.10) and 9M4LP (22.30).

3·5 Mc/s S.S.B.: HB0AFU Liechtenstein (19.30), LX1DE (22.10), OD5AX (00.50), ZL3OE (07.20), ZL4LM (07.15).

7 Mc/s C.W.: CE2DK (03.50), EL2AD (01.30), EP2RV (20.45), HK3RQ (03.50), HK7BE (23.45), JA4BJO (20.50), KV4DB (00.45), KZ5BO (01.50), KZ5WE (02.00), MP4TBO (23.00), OY7S (19.20), PY7BAL/0 (00.30), TL8SW (23.55), VK2AMB (17.05), VK2GW (08.30), VK2NS (08.15), VK2PV (07.15), VK2VN (07.15), VK3APN (08.40), VK3AXK (08.30), VK3RJ (08.00), VK3XB (07.40), VK3YD (08.35), VK3ZR (07.15), VK4TY (19.50), VK5KO (20.35), VP1PV (23.30), VP4VU (00.05), VP6BW (03.15), VP8HJ (22.15), VS9MG (19.00), VS9OSC (17.00), VS9PGM Perim Is. (00.25) ZE1BL (03.15), ZL1HY (07.20), ZL2GS (08.20), ZL4BO, (19.10-20.00), 5N2AAF (00.15), 6Y5XG (00.00), 9J2DT (05.12), 9J2VB (00.15), 9J2W (01.40), 9J2WP (18.00), 9K2AD (19.50) and 9M4LP (19.30).

7 Mc/s S.S.B.: VK2AKW (08.40), VK2AVA (07.45), VK3BM (07.55) and VS9MG (20.25).

14 Mc/s S.S.B.: BV1USG (08.10), BV1UST (10.00), CE3RC (21.10), CR9AI (15.05), CT2AM (20.05), DU1EH (12.55), DU9FB (14.00), EL6E (22.50), EL8B (08.50), ET3FW (08.25), ET3USA (08.50), FG7XL (19.40), FK8AU (09.55), FY7YL (11.05), HC8FN (13.00), HI8JAN (19.45), HI8XRM (12.40), HK0QA San Andreas Is. (12.55), HL9KG (11.00), HL9TR (08.20), HL9US (08.30), HM1AB (09.00), HM2BD (09.25), HP1AA (17.15), HP1JF (19.55), HR1MD (19.50), HR1SO (18.00), HS1HS (12.55), HS1X (13.00), HV1CN (13.40), KB6EPN (08.15), KC4USV (08.00), KG1BO (16.20), KG4AE (19.50), KG6IJ Iwo Jima (08.40), KG6SB Saipan (11.15), KH6BLX (19.25), KL7KQ (08.20), KL7EOJ (08.30), KL7FIM (08.30), KR6MB (09.40), KR6UL (09.40), KV4CF (11.00), KV4CX (13.40), KX6BQ (10.55), KX6DP (08.15), KX6DR (09.30), KW6CV (08.40), KW6EJ (07.55), MP4MAH (14.30), MP4TBO (15.50), OH0NI (15.50), PJ2MI (11.30), PZ1AR (21.00), TG9EL (09.50), TG9PM (13.15), TI2RFT (12.55), TJ1AC (09.20), TL8SW (17.15), DL9HF/TT (16.30), TU2AE (18.30), VE0MY (12.05), VK9DR Christmas Is. (14.55), VK9JK (12.55), VK0DS (17.40), VP1GFQ (14.55), VP2KM (14.55), VP2KR (16.35), VP2LS (10.55), VP3BF (20.55), VP3HAG (19.35), VP4VP (16.15), VP6WR (11.25), VP7CK (13.35), VP7DI (17.45), VQ8AM (17.40), VQ8AMR (16.55), VQ8BS (17.10), VQ9HB (17.10), VS9MB (17.45), VS9MC (17.05), VS9MG (14.05), VS9PCZ (17.15), VU2NRA (14.30), XE1AB (13.00), XE3MF (14.10), XW8AL (15.30), XW8AZ (15.15), YA3TNC (14.15), YA4A (12.10), YN1TP (13.00), YS1SRD (13.35), ZB2AK (14.40), ZD5AR (18.25), ZD5R (16.45), ZD5V (16.55), ZD8HL (18.20), ZD8JC (21.50), ZD8LT (20.10), ZD8SC (19.20), ZD8TV (18.40), ZL4JF (08.20), 4U1ITU (12.40), 4U1SU (15.15), 4W1A (18.45), 4W1G (11.20), 5T5AB (08.30), 5V8AB (18.40), 6O6BW (21.15), 6Y5MJ (12.30), 7Q7GN (19.30), 7Q7PBD (15.45), 9L1HX (07.55), 9L1JR (18.45), 9M2CP (10.40), 9M4MB (13.50), 9M4MF (14.25), 9M6AC (13.00), 9M8EB (13.00), and 9U5ID (20.40).

14 Mc/s A.M.: EA6BC (10.45), EL1H (21.40), ET3USA (17.05), HI4XAB (21.35), M1B (13.00), SV0WT/P Crete (14.40), VP6FO (10.50), and ZB2AE (17.10).

14 Mc/s C.W.: AC8H (13.00), AP2AR (12.20), CO2JB (16.15), CO6AH (20.40), CO8BO, CP1EA (18.30), CR4AE (16.30), CR4AG (08.30), CR4BB (20.35), CR6AI (19.50), DU9FB (14.00), DU0DM (12.30), ET3RN (17.30), ET3USA (16.00-19.45), FB8WW (17.00), FL8RA (17.20), FM7WP (19.00), FR7ZD (15.50), FR7ZI (15.20), FU8AG (07.10), HI8LC (18.00), HI8XAL (11.40), JT1KAA (10.55), KH6EPW (17.35), KL7AYV (21.00), KL7KQ (07.20), KS6BN (07.15), KW6EI (07.35), LA2QJ/P Jan Mayen Is. (14.50), LA5AJ/P (12.35), LU4ZA South Orkney Is. (19.30), PJ2ME (19.00), PZ1CL (19.35), TN8AF (15.20), VE0MK (12.35), K9LMG /VP4 (19.10), VP8HJ (21.45), VQ8BY (15.30), VR2DK (08.30), VS6FF (10.50), VS9MG (16.50), VS9OC (15.45), VS9PGM (08.30), VU2NRA Andaman Is. (14.50), XE1TQ (15.00), XE1PJ (13.00), ZB2A (19.10), ZD5M (18.30), ZP5EC (20.30), 5R8AB (17.45), 5U1SU (12.40), 5X5KD (18.25), 6Y5MJ (20.15), 6Y5XG (13.05), 9K2AD (14.00), 9M4LP (15.00).

21 Mc/s S.S.B.: HI8WSR (18.15), HR2ABC (17.20), KG4CI (18.25), KV4CX (13.25), LX1DC (15.35), OD5CN (12.05), VP4VP (15.45), VU2JM (11.20), XE1XXE (17.25), YA3TNC (12.30), ZD8HL (15.15), ZD8JC (11.30), 5H3JR (18.20), 9J2BB (14.30) and 9K2AU (11.35).

21 Mc/s A.M.: CP1LJ (15.30), CR4AJ (15.35), CR4AX (15.35), CO2FA (17.15), CO8SB (18.30), EL1H (21.40),

EL6BE (15.10), ET3USA (14.40), FR7ZD (14.50), KV4CX (14.10), MP4TBM (13.10), OD5CY (11.10), PZ1BE (19.00), TN8AA (11.20), VP8DQ (18.50), VP9FE (16.40), VQ8BZ (13.50), W7VEW (17.55), YA1AW (12.55), ZS8C (16.50), ZS8G (14.20), 9L1WN (12.00), 9X5AV (10.30), 9X5IB (15.35), and 9X5RZ (10.50).

21 Mc/s C.W.: CO2HU (17.55), CR4AE (12.10), HI8XAL (15.45), JA4BS (09.00), MP4DAK (11.25), OH0NH (09.45), TL8SW (12.20), VK6RU (08.30), VS6EY (09.10), VS9MG (08.35), VS9PGM (09.00), XE1OE (16.55), 4S7DA (12.40), 5H3JJ (12.10), 5R8CB (13.05), 6Y5XG (17.10), 7X3CT (14.45), and 9M4LP (08.35).

28 Mc/s C.W.: DM2 (10.45), SP6 (11.30), and ZS2OW (15.10).

28 Mc/s A.M.: CR4BB (18.10), CR7CZ (09.45), CX1AAX (17.30), CX1AO (16.50), CX2CN (17.30), LU3DCU (17.45), LU3DDV (17.40), LU6DAF (14.00), W3MEC (15.10), ZC4MO (10.25), ZE1AS (10.45), ZE1BP (10.35), ZE2JA (16.20), ZE8JX (10.15), ZE8JY (10.20), ZS2OM (09.30), ZS2OW (14.50), ZS6AMO (09.55), ZS6AVQ (09.45), 9J2DT (13.45), 9J2FH (10.30), 9J2WR (11.15) and 9L1HX (16.30).

28 Mc/s S.S.B.: 9J2WR (10.20).

Ten metres is not dead on the north/south path and obviously merits more attention. The next few months should see the advent of sporadic *E* propagation on this band.

Now that support for this feature has increased so greatly, and with it the task of compounding all the reports into one comprehensive survey, it is absolutely essential that contributors arrange their lists in alphabetical order, divided into bands and modes. In future all reports not so arranged may have to be ignored as the closing date for contributions is so close to the closing date for completion of the survey that time may not permit rewriting of reports not arranged in alphabetical order. Finally, please remember that the time used in DXing is always **GMT**. Your co-operation in complying with the above requests will be greatly appreciated.

Commonwealth Call Areas Table

	1·8	3·5	7	14	21	28 Mc/s	Total
G3KSH	—	17	20	46	25	—	108
G3DYY	—	9	24	32	13	1	79
G3AAE	—	—	7	40	22	—	69
G3LHJ	3	3	5	29	26	2	68
G8JM	—	—	—	57	5	—	62
5N2AAF	—	—	5	19	4	—	28
DL2CT	3	6	3	7	2	—	21
		*		*	*		
A2340	5	12	21	50	13	1	102
A2498	2	8	5	58	17	4	94
A4201	4	9	4	51	11	1	80
A4311	1	8	—	54	9	2	74
A4038	3	5	5	40	16	2	71
A4048	5	8	2	45	3	2	65
A4431	3	7	3	24	15	1	53
A3942	3	9	13	21	5	—	51
A3699	5	10	2	24	8	—	49
A3766	1	6	1	26	11	—	45
A4391	4	5	1	8	3	1	22

Stations for which logs are held by the Hammarlund DXpedition of the Month

F9RY/FC	July 2, 1963-July 19, 1963
F9UC/FC	July 2, 1963-July 19, 1963
I1RSB/IS1	June 24-30, 1964
HZ2AMS	October 21, 1963-August 31, 1964
K2JGG/JY	December 15-26, 1964
K5LYC/M	August 4-19, 1964
K8ITH/4 K8ITH/8	August 11, 1963-September 2, 1963
KG6SZ	September 14-20, 1964
MP4MAP/HZ	October 12, 1963-October 19, 1963
MP4MAP	Sept. 13-19, 22-24, Sept. 28-Oct. 2, 1963
MP4TAX	September 10-12, 25-27, 1963
OH2AH/0	Jan. 11-31, 1964 and Aug. 16-23, 1964
OH2YV/0	January 11-31, 1964
VK9BH	June 23, 1963-July 19, 1963
VR1N	May 14-June 21, 1963
VK9DR	September 9, 1963-December 23, 1964
VK9XI	December 16, 1963-December 12, 1964
VK9MD	December 5, 1963-April 19, 1964
VP7NY	April 1, 1964 to present
VP8HF/VP8	March 6-22, 1964
WA4MIV/4	August 8-16, 1964
WA4MIV/M	August 4-18, 1964
YV0AA/MM	Oct. 24-28 and Nov. 7, 8 and 11, 1963
YV0AA	November 8, 9 and 10, 1963
YV8AJ	May 14-21, 1964
YV9AA	October 24, 25, and November 28, 29, 1964
ZD6PBD	December 21, 1963 to July 21, 1964
ZD6I	July 4-5, 1964
6Y5LK/VP5	October 10-18, 1964
7G1L	August 5, 1964 to present
7Q7PBD	July 22, 1964 to present
7Q7DI	July 6-7, 1964
HZ2AMS/8Z4	April 18-21, 1964
HZ2AMS/8Z5	April 3 and April 22-26, 1964

DX Briefs

G3AM has for the past few months operated on 3·5 Mc/s with a transistor transmitter running only 700 milliwatts. Contacts have been made with many European countries and also two QSOs with VE1ZZ and one with 4X4DS. G3AM wonders if the QSO with VE1ZZ on January 4, 1965 was the first G/VE QSO using a transistor transmitter?

VP8IB is the present call of G3PWR now operating from Port Stanley. QSLs should be sent to the RSGB Bureau.

GC3KEE is active on s.s.b. from Guernsey and doing his best to cope with the demands but is not encouraged by the stations that continually break into a QSO. Some European operators also do not yet realize that 'CQ DX' does not include the caller's own continent!

The latest schedule of **VOA** Amateur Radio broadcasts introduced by W2SKE includes the following transmissions on Sundays aimed at the European audience: **07.30-07.45**, 3980 kc/s, 7200 kc/s, 7270 kc/s; **22.45-23.00**, 7205 kc/s and 9740 kc/s.

The **Lebanese** Government restored licences to amateurs on February 12 and since that time there have been a number of OD5 operators active on the h.f. bands.

VP3BF is the present call of 9G1BF and who may be heard regularly on the Ex-G Radio Club net on 14 Mc/s s.s.b. (GW3IEQ).

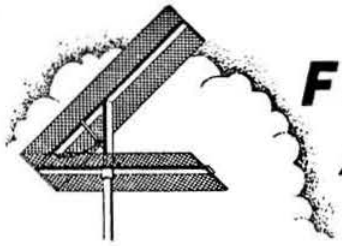
Hammarlund ask that applications for QSL cards addressed to Box 7388 should now include a self-addressed envelope; IRC or stamps are *not* required. This assistance will speed up the delivery of cards.

5V8AB is active on s.s.b. usually between 17.30 and 18.30 around 14,000/14,100 kc/s. If a direct QSL is desired this may be sent to Lome Airport, Box 123, Lome, enclosing also a card for completion by 5V8AB, as local cards are not yet available.

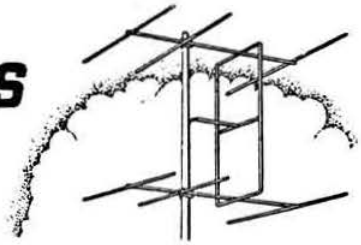
CR8AE is active from Portuguese Timor and formerly operated as CR7EJ. **ZD7IP** will probably be the call of George Barrett, G8IP, 5B4IP, etc., during his stay on St. Helena.

XW8AW/BY cards have been received from **W4ECI** but it is pointed out that these are not valid for DXCC credit. The card like many of its predecessors is attractively produced

(continued on page 256)



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW*

THE problem of TVI on Channel 5 television is worrying many 70 Mc/s operators. The latest comment is from **G2BRR** (Wootton Bassett, Swindon) who asks if there is no cure for this trouble which in his case is caused by a B44 Mark III which cuts out vision and sound and superimposes itself " loud and clear." This is by no means the only one we have heard of. Can anyone help? We have had similar troubles in the past on other bands, and almost always a satisfactory cure has eventually developed. There appears no reason why someone should not succeed on this band also, so please let us hear about it if you have, and alleviate the lot of the poor unfortunates!

G3PMJ (Manchester), referring to the TVI problem, says that from personal experience it is not always the final output frequency which causes the trouble. Frequencies from the multipliers can get on to the feeders and to the beam, even though they may be some 40 db down on the required frequency. To eliminate all sub-harmonics a change was made to new fifth overtone crystals. As they are expensive, only two were obtained, but these cleared up the TVI to BBC Channel 2 with the next door neighbour at his old QTH. The GPO were also pleased! So it appears that for those who live where BBC 1 is on Channel 5, this may be the answer!

G2BRR was only able to get into the First 70 Mc/s Contest on February 14 at 14.52 from a portable site at Clyffe Pypard, 5 miles south of Wootton Bassett, and 8 miles SSW of Swindon (721 ft. a.s.l.). By then, most of the fixed stations had closed down, and only five stations were worked. By April, much more time will be spent in operation, however, and better things are hoped for!

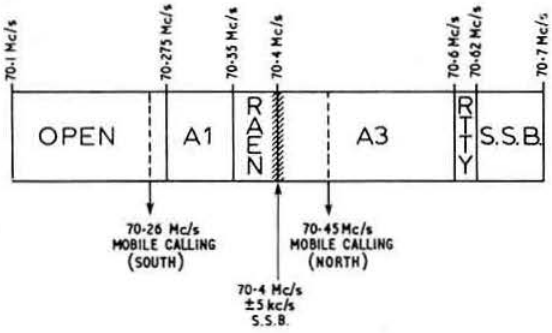
The five stations worked were G3PIA/P (15 miles), G3PPG (49), GW3RUF (55), G3JOT/M (8), and G4AP (5). G3OJE and G3BNL were heard between 14.52 and 16.30 (!) on February 14.

G3RMN (Selsdon, Surrey) is now active on 4m. The transmitter runs 50 watts to a QQV06/40 and is v.f.o. controlled (originally as a temporary measure) by multiplying the top band v.f.o. by 36! Reports, however, indicate that the drift is less than a kilocycle. The receiver is E88CC cascode, EC91 g.g. and a ½ 12AT7 mixer feeding into the main receiver. Owing to restrictions on use of outdoor aerials a loft dipole at 20 ft. is used. Fifty-eight stations were worked in the first Open Contest, the best DX being G3PIA/P (68 miles). No stations were heard at a greater distance, but other local stations were more successful, probably due to their superior aerial systems.

G3KXA (Solihull) went portable signing GW3RUF/P in the contest in order to make at least one GW audible in London. The weather was excellent until a freezing wind made itself felt in the afternoon. Sixty-nine stations were heard and worked at an average mileage of 85, the best being G3ORL (Essex 155 miles), G3JHM/A (Sussex 137), G3MEH and G3OWA (Surrey, 135). Twenty-eight stations were worked at over 100 miles distance, 11 were worked on c.w. and it was very pleasing to hear stations calling on c.w. when they realized that GW3RUF/P was having difficulty copying their a.m. Nothing was heard of GM, GI, EI, Norfolk or Cornwall, in spite of much searching. DX stations seemed to fade at sunset and, in fact, the last 2½ hours yielded only five QSOs. A commercial station in Amsterdam was copied all day! The A and B sections of the Contest seems an excellent idea says G3KXA, and why not do it for 2m also? A TW Communicator at 10 watts input and a four element Yagi at 30 ft. were in use. A large number of fluttery carriers with very little modulation was heard, and if these had been keyed it might have been possible to work into Durham or even Scotland!

Four Metre Band Plan

Following the failure of the suggested geographical band plan to " get off the ground," the V.H.F. Committee has been considering the comments which this first plan provoked. It appears that there is wide support for a band plan " à la mode," such as is operated on the h.f. bands, and in consultation with a representative selection of those using the band, the Committee has now formulated the following plan, which is considered to be a reasonable compromise for all.



The small s.s.b. sub-band centred on 70·4 Mc/s is included to cover that part of Scotland operating within the restricted band 70·3-70·5 Mc/s.

It is proposed that this plan be given a trial for a period of, say, six months, at the end of which time we should all be able to judge whether it has proved acceptable, and indeed workable by band users. *Even if you are unconvinced of the necessity for any plan, please try and conform for the next six months, in order to give this proposal a fair trial.*

* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the May issue to arrive by April 9, and for the June issue by May 7.

Two Metre News and Views

5N2AAF/G3JKO (Zaria, Nigeria) who will be home about now (see page 177, March issue) says that his visit to Northern Ireland as GI3JKO/P will be from May 3 to about the 11th, working from six counties.

During the Third 144 Mc/s Contest (Portable) on May 2 he will be operating from either Herefordshire or Westmorland. He also informs us that 9G1FI, 5N2AAC and 5N2RJO are seriously considering v.h.f. in West Africa. There is some difficulty at present about frequencies, but it is hoped that this will be cleared up soon.

G3OUF reports a very interesting reconnaissance visit to Alderney on February 20/21 to make arrangements for the GB2GC summer expedition. G3OUF, G3POI and G3SHZ formed the party and they took some 2m gear with them as a last minute arrangement. One suspects that they were very glad they did! The gear was loaned at short notice by G3HBW and comprised the Radio Society of Harrow Field Day equipment, less the modulator. The call-sign used was GC3SHZ/A operating from the Sea View Hotel with the beam "hand held" indoors at 30 ft., the sea being 15 yards from the "shack." After difficulties involving a forgotten 5U4 had been resolved, the station was finally on the air at 23.00 and G3SHK was contacted on sked at a best RST of 599 with 579 received by Alderney. Other stations worked on the 21st were G2JF, G3RIN, G8OU, G5NF, G3HBW, G6AG, G6NB and G3TNO. Most of these were S9. The weather on Alderney was cold and windy whilst G6NB reported snow falling at Brill. The reason for the trip was to assess the proposed QTH at Port Albert for the summer expedition; it appears to be superior to the 1964 QTH and some good results are hoped for. The operators for the summer trip will include G3HBW, G3OUF, G3POI, G3PSH, G3SHK, G3SHZ, G3SIT, and G3TUX, and the period will be August 17 to September 7. Gear for all bands from 4m to 23m will be taken. The group is keen to arrange skeds with continental, midland and northern UK stations. (See also March issue page 177).

G2JF says that **F8VN** has moved from Chartres to a location that is not so good, which is rather a pity because F8VN was usually the most outstanding signal from the Paris area.

G2PL (Wallington) who made his mark pre-war on the h.f. bands can now be heard putting out a signal on 2m with a 12 element Yagi.

We are informed that there are no less than 16 stations operating s.s.b. on a frequency of 145·41 Mc/s in Holland.

G3THN (Ticehurst) is now a regular signal on the band and appears to be doing exceptionally well. He runs 10 watts to a QQV03-10 and radiator at 32 ft. from a 4-over-4 which is at present fixed in one direction, but this problem will be overcome shortly.

G3FCY (Hull) in a contact on 2m reports that he is very actively engaged in "shaping up" 70cm equipment with which he hopes to create some u.h.f. interest.

G3TAS (near Stowmarket) has recently started up on 2m from what appears to be a very good location 180 ft. a.s.l. He is running 25 watts to a QQV03-20A from a dipole at 12 ft. His best contact with this small aerial was made with Kent.

GI5AJ (Bangor), on a frequency of 145·89 Mc/s, is at present running a nightly schedule with GI5SJ (Belfast) on 145·98 Mc/s. The signal from GI5AJ often percolates to the Home Counties when there is any sign of an uplift in conditions.

EI2W (Dublin) has not been heard locally for a number of weeks, whilst EI2A is a regular attender.

EI6AS (Dun Laoghaire) is fairly new to the band and when conditions are suitable he will be found on a frequency of 145·88 Mc/s. He is 400 ft. a.s.l. and has a fairly high gain aerial system of 13 elements. He is also active on 70 Mc/s and 70cm.

The 26 hour Second 144 Mc/s Contest (Open) on March 6 and 7 produced exceptionally good activity in southern England as well as plenty of cross-modulation and QRM. The Netherlands were also well represented, whereas French and Belgian stations were not so prolific this time. Conditions were good up to 200-250 miles, with few periods when signals were poor.

F9NJ (Lille) confirms propagation limits of 250 miles and mentions that good signals were received from GW3RUF/P but he was unable to raise the station. His total number of contacts was 165, made up as follows: 39 G, 46 PA, 20 ON, 44 F and 12 DL/DJ. He is having some difficulty in deciding the location of a number of G stations with whom he made contact, but this problem should disappear in forthcoming events when the QRA Locator system becomes established. The scale of the UBA map stocked at Headquarters, incidentally, is 25 km to the cm, or approximately 40 miles to the inch.

G2JF (Wye) made 175 contacts as follows: G 87, GW 4, GC 2, PA 47, F 18, ON 11 and DL/DJ 7, and agrees that there was plenty of band occupancy with lots of QRM when working stations in one's own zone, but that it was relatively clear when working into other zones, which, after all, is what one would expect.

G3SPS/MM (EI6AL) will be operating /MM on the 2m band for the next three months from MV "British Seafarer." Operation will be mainly from the North Sea, with the occasional trip to Scandinavia and Northern Europe. After six weeks operation from around the UK Coast, G3SPS thinks that most stations operate to and from north and south, with very little evidence of beams turning east. The fact that there is liable to be a Maritime Mobile station about should whet many appetites! Contacts so far have only really been local coastal QSOs, with some to the Midlands when conditions are good, but there is scope for much more. The

They are waiting to see your brain-child—
—at the Constructors' Exhibition at the Kingsley

You should have received long since a circular from Convention Secretary, Frank Green, G3GMY, informing you about the Constructors' Exhibition at the V.H.F. Convention on April 10.

If you have lost or mislaid the circular this note will remind you to bring along your latest piece of v.h.f. home built equipment next Saturday, April 10. Button-hole the first member of the V.H.F. Committee whom you see and tell him what you have brought. Write out a brief technical specification of your item for the guidance of the judges.

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

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3VHF	Wrotham, Kent	144·50 Mc/s	A1	North-West
GB3GEC	Hammersmith, London	431·5 Mc/s	A1	East

RSGB V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham, Kent, when measured by the BBC Frequency Checking Station, was as follows (nominal frequency 144·50 Mc/s):

Date	Time	Error
March 15	16.22 GMT	70 c/s high
March 16	08.50 GMT	180 c/s high

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

Saturday, April 10, 1965

Kingsley Hotel, Bloomsbury Way, London, W.C.1.

Programme:

Morning—Exhibition of commercial and amateur equipment

Afternoon—A programme of lectures

Evening—Dinner, and presentation of prizes

Last minute bookings should be telephoned to F. E. A. Green, G3GMY

Convention only 4/6

Convention and dinner 30/-

Underground Stations: Holborn (Kingsway) and Tottenham Court Road

Buses: 7, 8, 19, 22, 24, 25, 29, 32, 38, 73, 127, 134, 156, 176

Organized jointly by the RSGB V.H.F. Committee and the London U.H.F. Group

station runs 30 watts to a QQV03/20A and a 4 element Yagi 65 ft. above sea level. Calling and listening is usually between 18.00/20.00 GMT, and 22.00 GMT onwards each night when the vessel is at sea, which, due to its being a tanker, is most of the time. The frequency is usually 145·78 Mc/s.

G3EKP (near Blackburn) worked nothing spectacular during the contest on March 6, the furthest station heard to the south being in Birmingham. Three Irish stations were contacted, however, and G5YV was heard for the first time (the East is usually a very poor direction), but no QSO resulted.

G3TDR (Laleham) found above-normal conditions on the night of February 22. G3TGE (Dunstable) was given his first contact on 2m. G3KFT (Cheltenham), who was using only 3 watts into a QV04-7 (but situated 750 ft. a.s.l.) was worked 57/9 both ways, and G3DY (Whittlesey near Peterborough) and G3SCG (Coventry) were reached. On the 25th G3BA (Sutton Coldfield), using s.s.b., was worked. The G3TDR transmitter runs 70 watts, and an interesting feature is that the maximum peak modulation power is not more than 30 watts (two 6L6s in class AB). Full modulation is accomplished by modulation of the screen of the preceding QV04-7 amplifier driver as well as the anode and screen of the QQV06-40A p.a. The stations worked have reported favourably on this form of modulation, and it appears that in this case the system is worth another 10 watts of audio to G3TDR. He operates most evenings, looking for contacts from the north and west.

G3THC (Wolverton) is on 144·615 Mc/s with an 832 final and an EL91 modulator. The converter is an E88CC cascode working into a 4 to 6 Mc/s i.f. The aerial is a 6-over-6 slot at 28 ft., and beam direction is usually NW or SE. Skeds would be welcomed; normal operation is a.m. and c.w. at weekends.

G3JGJ (Moretonhampstead) went portable to a site over 1000 ft. a.s.l. 10 miles SW of Exeter, and very near his home QTH. This was on March 6, and G5ZT was worked at RS 59, giving RS58 to a 6J6 transmitter running 4 watts. The next morning the site was visited again and G3EGV (Weymouth) was worked, then G6GN (Bristol) and G3MPS. Conditions? There were several inches of snow round the car, with 11 degrees of frost! Other QSOs were with G3ICO (Yeovil) and G3MU (Exeter) with GC2FZC heard. GW8UH was heard at RS59, followed by G3IRA, and then GW3MFY (Bridgend) was worked at 14.30. Later QSOs were with GW4CG (Porthcawl), GW3FSP (Bridgend) and GW5BI (Cardiff), whilst G2BHW (Falmouth) was heard working G5ZT. Other stations were heard working GC2FZC but G3JGJ could not raise the Channel Islands. In spite of all this he thought conditions were poor.

Oscar III

For news of contacts and hearings via *OSCAR III* reference should be made to G2UJ's article on page 233 of this issue.

First 144 Mc/s Contest (C.W.)

The following are the best claimed scores for the contest held on January 30-31. They are, of course subject to checking.

High Power Section

1 G3EVV	1930 points	4 G3JEQ	1700 points
2 G3OXD/A	1840 points	5 G5JU	1320 points
3 G3EDD	1780 points		

Low Power Section

1 G3NOH/P	1870 points	4 G4CM	1340 points
2 G3NNG	1570 points	5 G3CHW	1290 points
3 G3SHK	1530 points		

Forthcoming Contests

The Contests Committee wish to draw members' special attention to the forthcoming v.h.f./u.h.f. programme, as follows:

(i) Third 144 Mc/s Contest (Portable) on May 2
(ii) Second 70 Mc/s Contest (Open) May 15/16
(iii) First 420 Mc/s Contest, May 29

In response to popular demand, a short contest will be held on 1296 Mc/s on May 30. The rules appear on page 255 of this issue.

A frequency measuring test, based on the Society's Beacon Station GB3VHF (144·5 Mc/s) at Wrotham, Kent, will be held probably on May 23.

DXpeditions

G2CUZ advises us that the Ainsdale Radio Club is sponsoring a Westmorland expedition, which will take place on Easter Sunday, April 18. Both 2m and 4m will be used, with the call-sign G2DQX/P on 4m and G2CUZ/P on 2m. Operation time should be from about 09.30 to 19.00. G2AMV has also asked G2CUZ to help in organizing a Region 1 (RSGB) 2m and 4m contest for the same day from 10.00 to 18.00, both bands, combining scores provided operation is not simultaneous! This will be open to all RSGB members in Region 1. The scores are 1 point per mile and the full rules are available from G2AMV. All clubs in the region should receive a copy, and G2AMV has kindly offered to provide a prize for the winner(s).

G3KXA and G3MRZ will be going to Snowdon again on May 1 and 2, using the club call-sign as last year, but this time they hope to operate on 4m during Saturday, May 1. On the Sunday they will operate from the summit itself during the 144 Mc/s Portable Contest, this time on 2m of course. Outside the contest period they would appreciate skeds for 4m and 2m. Activity will be from 13.00 GMT on May 1 until 09.00 GMT on May 3. Please write to G3KXA for skeds.

European V.H.F./U.H.F. Beacon Stations

During the summer, there will be a beacon on 2m and 70cm from QRA Locator KK16A (South Poland) with the call SP0UHF. Operation at other times will be from Warsaw. More details are promised later.

In Eastern Germany there is a beacon on 145·9 Mc/s signing DM2AUI transmitting from a position north of Erfurt on the Roter Berg (*VERON V.H.F. Newsletter*).

Seventy Centimetres

G8AGD (West Hartlepool) is about to commence operation, and is looking for contacts with local 70cm enthusiasts. If there are any nets in the north-east, will they please report for mention in this column.

We are asked by **G3BYY** (Wraysbury) to request that those "selfish individuals" who transmit TV on about 433·3 Mc/s leave the phone section of the band clear. This does not present a good image to the "phone only" users of the band, and should cease. The IARU agreements place sound between 432 and 434 Mc/s and vision between 434 and 440.

G3OBD (Poole) tells us that activity in the Portsmouth/Bournemouth area has increased greatly lately and that the local call-signs include G6XM, G3ABH, G3OBD, G8ADH, G8ACI, G8ACL G8AFG, G6AAH/T and G8AAY. G3OBD has completed a new aerial: a 32 extended element array from the handbook of W6AJF. This is a vast improvement on the standard 16 element stack. GB3GEC is now audible under most conditions: GW3ATM (Chepstow) was worked on March 9 and G3OYM/T (also Chepstow) heard.

Seventy centimetres also seems to be on the increase in the "u.h.f. wilderness" north of Manchester, says G3EKP (Belthorn, near Blackburn). A new station worked is G3FNQ (Southport), whilst attempts to capture G3BJD (Westmorland) have failed so far. Another new station will be GW3KYT who has been heard in the Isle of Man whilst testing, and schedules (once weekly) are being maintained with G8AFJ (Poulton-le-Flyde) who is ex-G3LJO/T.

GB3GEC is temporarily off the air for essential maintenance. Transmissions will be resumed as soon as possible.

Twenty-three Centimetres

Spurred by the announcement of the RSGB 1296 Mc/s Tests (July 17/18), REF will be running a similar exercise at the same time, in an effort to encourage greater activity on the band, and also to lead to international QSOs. Please remember that French stations will also be on.

Positively Last Reminder!

No v.h.f. *aficionado* needs telling by now that his big day of the year is Saturday, April 10—the day of the International V.H.F./U.H.F. Convention at the Kingsley Hotel in London. This, the eleventh of the series, is now embedded in the consciousness of every metre-man as something which must not be missed on any account.

By the time you read this the event will be almost upon us, and any last minute bookings will have to be made to Frank Green, G3GMY, by telephone. For the 30s. fee you get a 12 hour entertainment session starting with the exhibition as from 11.00 a.m., then the lecture session, followed by the slap-up but informal dinner in the evening.

If you can only make the morning and afternoon, the cost is but 4s. 6d. If you do come to the dinner please don't delay your decision until the last moment, for seating space may get tight.

The lecture session is a true cross-section of the ramification of the v.h.f. art, and good though previous years' lecture sessions have been, the 1965 line-up will be hard to beat.

There will be the talk on air traffic control by v.h.f., complete with slides and tape recordings, put over by Council Member G3TR. One of the latest Mullard tech-films will be screened by G3BPT. For those anxious to make a "quickstart" on 1250 Mc/s there will be a practical session by that 23cm pundit Ron Dabbs, G2RD, and fourthly, two other famous v.h.f. men, pundits in another popular sphere of activity, G3BA and G4LU, will be giving you the inside low down on v.h.f. expeditions.

See you there, Saturday!

Reports and comments for the Four Metres and Down column should be sent direct to G2AIW at 21 Bridge Way, Whitton, Twickenham, Middlesex.

Queries or requests for information on v.h.f. matters and awards, or on Society policy, should be sent to RSGB Headquarters for the attention of the V.H.F. Committee.

News from Headquarters

ITU Centenary

The centenary of the International Telecommunications Union will take place on May 17, 1965. To mark the occasion, the Society will be operating a special station under the call-sign GB2ITU.

Further details will be published in the May issue of the BULLETIN.

GB3ITU active next Month

To mark the Centenary of the International Telecommunication Union on May 17, 1965, and to recognize the official link which exists between the International Amateur Radio Union and the ITU the call-sign GB3ITU will be used during the month of May by the Secretary of IARU Region I Division instead of his normal call G6CL. Special QSL cards are being prepared to confirm contacts with GB3ITU which will operate in the 3·5 Mc/s, 7 Mc/s, 14 Mc/s, 21 Mc/s bands and possibly the 28 Mc/s band. It is also hoped to put GB3ITU in operation during the period of " The '65 Show " (Earls Court, August 25-September 4, 1965) and again during September when the ITU Plenipotentiary Conference is in session at Montreux, Switzerland.

A KW2000 transceiver will be used.

New GPO Engineer-in-Chief

Mr D. A. Barron, C.B.E., has succeeded Sir Albert Mumford, K.B.E., as Engineer-in-Chief of the Post Office.

The retiring Engineer-in-Chief is well known to many radio amateurs, having first lectured to the Society in pre-war days. At that time he was at Dollis Hill Research Station where he provided facilities on several occasions for groups of members to visit the station. He was deputy leader of the British Delegation to the Atlantic City Radio Conference in 1947 (Col. Sir Stanley Angwin was leader) and he played an important part in helping to " save " Top Band for UK and other Region I amateurs. He attended all the immediate post-war Amateur Radio Exhibitions held at the Royal Hotel, London, and in 1962 he opened the Radio Communications Exhibition at the Seymour Hall. Sir Albert was President of the Institution of Electrical Engineers last year and he is to be guest of honour at the Seventh Reunion of the Radio Amateur Old Timers' Association next month. We wish him well in his retirement.

His successor (Mr Barron) entered the Post Office in 1927 and has been closely associated with the Telephone Branch since 1940. In recent years he has made a major contribution to the development of electronic telephone exchanges.

The new Deputy Engineer-in-Chief, Mr J. H. H. Merriman, O.B.E., like Sir Albert Mumford, is a radio man of distinction. Recently he has been associated with the development of radio links, broadband micro-wave radio relay systems and satellite communication systems. He was deputy leader (under Capt. Charles Booth) of the UK delegation at the 1963 Conference in Geneva on Space Communication.

Mr F. J. M. Laver, an expert on radio planning questions, is to be a new Assistant Engineer-in-Chief.

Congratulations are offered to Mr Barron, Mr Merriman and Mr Laver on their appointments.

J. C.

Headquarters Fund—List No. 25

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

W. F. Blanchard, G3JKV, H. E. Perkins, G3NMH, D. J. Goacher, G3LLZ, P. W. C. Green, BRS3753, L. P. Maguire, BRS25249, W. Heyes, E. Early, F8ZF, P. Sjostedt, J. R. Gazeley, BRS20533, Rev. A. W. Shepperd, G3NGF, W. A. Whitehouse, G3SKB. Total amount contributed to date: £1730 8s. 0d.

Amateur Licences

At the end of February, 1965, the total number of amateur licences in force in the UK was 11,410 (11,063 A Licences, 181 B Licences and 166 Amateur Television Licences). Of this number 1770 held Mobile Licences.

Corrections

The call-sign of the late Mr A. Parker, of Warsop, near Mansfield, Notts., who was included under the heading " Silent Keys " on page 188 of the March, 1965 RSGB BULLETIN, was G3IHA, and not G3IAA as shown.

In the " correction " on page 185 of the March BULLETIN, G3ENY's name should have appeared as Mr G. N. Roberts.

Membership Badges

New style membership badges are now available from Headquarters, price 2s. each including postage. The badges are available in either stud or pin fitting.

Tie clips incorporating the new ½ in. badge are also available, price 5s. each post paid.

Morse Instruction Courses

The Society is now able to accept orders for the effective " Rhythm " method Morse instruction records produced by G3HSC. The complete course consists of instruction books and three records: a beginner's 12 in. l.p., an advanced student's 12 in. l.p. and a 7 in. test e.p., all of which are intended for playing at three speeds. The overall cost, including postage in the UK, is £4 4s. The beginner's l.p. and e.p. only together form a beginner's course suitable for the GPO Morse Test, costing £3 0s. 6d. All three records are available separately, however, price 50s. for each l.p., and 11s. 6d. for the e.p.

REGION I OFFICIAL REGIONAL MEETING

The Imperial Hotel, North Promenade, Blackpool

SUNDAY, MAY 16, 1965

12.15 p.m.	Assemble
1.15 p.m.	Luncheon
2.30 p.m.	Business Meeting
5.15 p.m.	Buffet Tea

The hotel is fully licensed. There is ample parking space, and a talk-in station will be in operation.

Admission will be by ticket only, available, price 25s. each, from:

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

H. G. Newland, G5ND, 161 Penrose Avenue, Marton, Blackpool.

Obituaries

E. Rayner, G6IO

South London in particular has suffered a great loss with the sudden death of Eric Rayner, G6IO.

He was unique throughout his 36 years of Amateur Radio, when he always used his call-sign G6 Isaac Oliver, no handle. He had a long record of local activities, and was secretary of the pre-war South London & District Radio Transmitters Society, known as the "Sliders."

Owing to illness he had been off the air for several years, and had only recently returned to Top Band.

Six amateurs representing the RSGB, The Clifton Club and the first "Ham" to work 'IO attended the funeral at Honor Oak Cemetery on March 5 to bid "Isaac Oliver" farewell. G2VB

Frank Hooson, G3YF

Amateurs in East London mourn the loss of a man famous among us for his contribution to the true spirit of Amateur Radio.

Frank Hooson, G3YF, passed away at the age of 64 years on March 1, after a long illness bravely borne.

Frank made friends the world over. He was one of the pre-eminent operators on the h.f. bands, although 14 Mc/s c.w. was his greatest love, and there his skill at unravelling the weakest DX signal through the maze of QRM aroused the admiration of all who knew him. His call is still to be found high in the Honour Roll. For many years his skill caused him to be singled out whenever a superb operator was needed for a special event. He was awarded the Rotab Trophy in 1963.

Frank will be remembered by all in East London as one of the staunchest supporters of the East London Group; his voice was always to be heard restraining the impetuous and advocating the true principles of the Amateur Radio Spirit. One of the loyalest supporters of the Society, his modesty alone prevented him from accepting nomination to any office, although he would undoubtedly have risen to the highest level.

It is, however, among the local RSGB group that his loss will be felt the keenest. He was the man to whom we could all turn for advice on any problem whether connected with Amateur Radio or not, and we knew that we should receive wise counsel and an unlimited amount of his time. In local affairs one of his greatest contributions took place each year in NFD, when his scrupulous honesty in adhering to the rules and spirit of the event was an inspiration to both the youngest and the oldest participants.

To his widow and family, we extend our deepest sympathy. G4GA
G8JM

Silent Keys

We record with sorrow the passing of the following:

A. Roberts, G4OF, of Gainsborough, Lincs.
H. T. Roberts, GW5UO, of Llandudno, Caerns.
J. L. Cathie, K2PMD, of Genesee County, New York
N. Brandon, BRS3712, of Crickley Hill, Glouc.
G. Cashman, BRS22870, of Cwmbran, Mon.
A. T. Inker, BRS24924, of Hoddesdon, Herts.

Webb's Radio

The well-known radio component dealers and Eddystone agents Webb's Radio, 14 Soho Street, Oxford Street, London, W.1, closed down on March 26, 1965. The firm will not be re-opening.

US Reciprocal Operating Rules

Following the passing last year of the US Reciprocal Operating Bill which authorizes the Federal Communications Commission to permit foreign amateurs to operate in the US, provided a reciprocal arrangement is in force, the Commission has, with effect from March 27, 1965, adopted rules to carry into effect the "reciprocal operating" provisions now included in the US Communications Act.

A permit will be issued only to those who hold a valid amateur transmitting licence issued by their Government and then only when there is a bilateral agreement between the US and that Government for reciprocal operation.

Visitors will sign their home calls in the English language, followed by the appropriate US prefix giving the actual location once during each contact. Applications must be made 60 days in advance on a Form (610A) available from FCC offices and some US offices abroad. Copies of the home licence must be submitted with the application. A US address must be given and if mobile operation is intended, a rough itinerary. Permits will be issued for a maximum of one year at a time from the Washington FCC office. J.C.

Lectures on Communication by Light

Club organizers may be interested to know that G. Turner, G3DGN, 88 Ram Gorse, Harlow, Essex, is willing to give lectures on communication by light to groups within a reasonable travelling distance of his home. As he is professionally engaged in this field, he is equipped to illustrate the talks with a working demonstration of a gas laser.

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.

RSGB Approved for Purposes of Section 16 Finance Act, 1958

Members may like to be reminded that the Commissioners of Inland Revenue have approved the Society for the purposes of Section 16, Finance Act, 1958.

The circumstances and manner in which members may make claims to income tax relief are as follows:

A member who is assessable to income tax under Schedule E in respect of the emoluments of an office or employment is entitled to a deduction from those emoluments of the whole of the annual subscription which is due and payable by him to the Society in the income tax year provided that:

(a) *the subscription is defrayed out of the emoluments of the office or employment, and,*

(b) *the activities of the society so far as they are directed to all or any of the following objects:*

(i) *the advancement or spreading of knowledge (whether generally or among persons belonging to the same or similar professions or occupying the same or similar professions).*

(ii) *the maintenance or improvement of standards of conduct and competence among the members of any profession.*

(iii) *the indemnification or protection of members of any profession against claims in respect of liabilities incurred by them in the exercise of their profession;*

are relevant to the office or employment, that is to say, the performance of the duties of the office or employment is directly affected by the knowledge concerned or involves the exercise of the profession concerned.

A member of the Society who is entitled to the relief should apply to his tax office for Form P.358 on which to make a claim for adjustment of his PAYE coding.

Society Affairs

Brief Report on the February, 1965 meeting of the Council

THE February meeting of the Council was held on February 6, 1965, at 10.30 a.m. and was attended by Messrs E. W. Yeomanson (President), N. Caws, J. C. Foster, J. C. Graham, R. C. Hills, E. G. Ingram, R. H. James, L. E. Newnham, A. D. Patterson, J. F. Shepherd, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton (Members of the Council) and John A. Rouse (General Manager and Secretary).

Apologies for Absence were tabled on behalf of Messrs H. A. Bartlett, A. O. Milne and F. K. Parker.

Northern Ireland Mobile Rally

The Council accepted a recommendation of the Mobile Committee that the Society should be formally associated wi h the Mobile Rally organized by the Belfast and District RSGB Group planned to be held at Nutts Corner Airfield on May 30.

Membership and Affiliation

The Council approved 125 applications for membership (90 Corporate and 35 Associate). In addition, 12 applications for transfer from Associate to Corporate grade were accepted.

Affiliation was granted to:
Bedford and District Amateur Radio Club
Gosport and District Amateur Radio Club
Jamaica Amateur Radio
Saltash and District Amateur Club.

Aerial Mast Appeal

Consideration was given to a letter received from Wing Commander I. E. Hill, G6HL, who submitted a report on his successful appeal against refusal of planning permission for a 55 ft. mast.

(The result of the appeal was reported on page 188 of the March issue of the RSGB BULLETIN.)

Book Advertising

It was agreed to run a further series of advertisements for RSGB publications in *Practical Wireless*.

April Council Meeting

The date of the April meeting of the Council was changed to April 9. (The dates of other Council meetings during the year were given on page 189 of the March issue of the BULLETIN—EDITOR.)

Technical Publications

Preliminary consideration was given to suggestions for new technical publications.

Society Ties

It was agreed to place an order for a new design of Society ties with a single motif. The new tie will be available in blue or wine.

New Headquarters

It was reported that yet another building had been considered as a possible new Headquarters. After an adverse report from the Society's surveyor it had been decided not to make an offer.

Reports of Committees

The Council received reports on the meetings of the following Committees: Education and Training (11.11.64, 2.1.65), RAEN (5.12.64), Exhibition (4.12.64), H.F. Contests (10.12.64), V.H.F. Contests (10.12.64), Scientific Studies (4.1.65), Mobile (7.1.65), V.H.F. (11.1.65), Membership and Representation (14.1.65), IARU Working Group (16.1.65).

The meeting ended at 4.45 p.m.

Delivery of the RSGB Bulletin

From time to time complaints are received from members that their copy of the RSGB BULLETIN has arrived late.

The BULLETIN is now published on the first Wednesday in each month, posting of copies to all members taking place on the previous day and copies should be delivered to addresses in the United Kingdom within 48 hours. Members whose copies regularly arrive late are asked to mark the wrapper with the date and time of delivery and return it to Headquarters so that the matter may be taken up with the Post Office.

RSGB NORTHERN IRELAND MOBILE RALLY

Nutts Corner Airport, Belfast
MAY 30

A full and entertaining programme has been planned, and among the principal events will be driving tests, Police demonstrations, TA Signals demonstrations, a Civil Defence display, St. John's Ambulance and British Red Cross, and displays by the Ulster Flying Club and the Ulster Gliding Club. Refreshments will be available.

Organized by the Belfast and District RSGB Group

Receipts

Receipts for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested.

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

144 Mc/s C.W. Contest (Open) 1965

This annual event, the seventh since the inauguration in 1959, received very poor support from the contest-minded exponents of the art. This may, of course, be due to sub-normal propagation conditions but on the other hand there may be some other reason which the Contests Committee is at a loss to understand. Suffice it to say that that there is approximately a 30 per cent reduction in entries for this event, which is disappointing.

The leading position in the High Power section is filled by G3EVV (near Gravesend) with 86 contacts whilst second position goes to the Albright and Wilson Amateur Radio Club G3OXD/A, operating from near Dud'ey, Staffs., with 75 contacts, and third position to G3EDD, Cambridge, with 67 contacts.

In the Low Power section G3NOH/P, operating from Wolverhampton, Staffs., heads the list with 78 contacts followed by G3NNG, Harwell, Berks., with 60 contacts and in third position G3SHK, Ruislip, Middlesex with 61 contacts. Congratulations to all award winners.

Comments

And now to general comments raised by a few entrants. G3EDD is still not pleased with the scoring system, and favours calculations of score on a mileage basis; he quotes as his best contact G3XC in Cornwall. G3NOH/P also prefers a mileage scoring system, otherwise he has no adverse comment to make. G3NNG confirms that poor conditions prevailed and states that he is not altogether in favour of the scoring system although, like many more contestants, he likes the simplicity of calculations. GW3MFY dropped to eighth position in the High Power section and as a result blames conditions which affected the remote station perhaps more so than those stations in the home counties. He would like to see a second c.w. contest in the calendar. G3JEQ, Gt. Bookham, disapproves of any distance calculations, whilst G3TR, Crawley, in his first 2m contest, thinks it just a bit too long. He does, however, leave the impression that he enjoyed the event and should be there next time. G3CHW has some pleasant things to say about the conduct of contestants in general and in particular the pleasure of meeting old friends, if only for a few moments. Of special interest is the entry from G3PYC, who, in the Low Power section with input to the transistorized p.a. stage of 50mW, managed two contacts. The other low power entry was from G3KPT/P who was running an input of 200mW to a 2G110 transistor from which he had 23 contacts. Congratulations are deserved by both stations.

In conclusion, the Contests Committee wishes to state that it holds the opinion that the quality of signals from a number of stations was definitely not T9 and yet there is no evidence of these degraded signals in signal reports. One station in particular caused a lot of annoyance to other entrants over a wide area with key clicks. It is not proposed to take any action on this occasion and it is hoped that anyone who has any doubt about the quality of the signal that he radiates will take steps to put matters right.

Check Logs

Check logs for the V.H.F./U.H.F. Listeners' Championship were gratefully received from A3962, A2110 and A1170.

RESULTS

Low Power Section

Position	Call-sign	Aerial	Power (watts)	Points
1	G3NOH/P ..	4/4	18	1870
2	G3NNG ..	6/6	12	1570
3	G3SHK ..	10 ele	28	1490
4	G4CM ..	6/6	12	1340
5	G3CHW ..	6/6	30	1290
6	GW3KXA/P ..	5 ele	7	1230
7	G5UM ..	6/6	25	1080
8	G8KL ..	6/6	30	810
9*	G3POI ..	8 ele	10	790
10	G3FD ..	6/6	29	770
	G3SIG/A ..	2 × 4/4	10	770
12	G3RQZ ..	5 ele	26	730
13	G2BLA ..	6/6	26	700
14	G3FNM ..	5/5	30	610
15	G6TS ..	6/6	14	580
16	G3KPT/P ..	5 ele	0·200	560
17	G3FIJ ..	2/2/2/2	25	550
18*	G3OJE ..	6/6	20	520
19	G3BGP ..	5/5	10	440
20	G3ATZ ..	8/8	18	430
21	GM3LAV/P ..	4/4	20	290
22	G2DHV ..	6 ele	20	110
23	G3PYC ..	5 ele	0·050	60

High Power Section

Position	Call-sign	Aerial	Power (watts)	Points
1	G3EVV ..	8/8	130	1930
2	G3OXD/A ..	6/6	80	1840
3	G3EDD ..	4 × 6 Yagi	120	1780
4	G3JEQ ..	6/6	90	1700
5	G5JU ..	4/4	70	1320
6	G3SHZ ..	10 ele	130	1250
7	G2XV ..	3/3/3	100	1190
8	GW3MFY ..	6/6/6/6	90	1150
9	G3TR ..	10 ele	90	1070
10	GW5BI ..	4/4	90	1020
11	G2AXI ..	4/4	100	930
12	G3INU ..	4/4	75	830
13	G3HRH ..	8/8/8/8	150	790
14	G2BHN ..	3 ele	45	700
15	G2WS ..	4/4	70	660
	G3LLE ..	4/4/4/4	150	660
17	G3NJF ..	6/6	80	610
18	G3AGN ..	6/6	60	570
19	G3SMJ ..	5 ele	12	450

* Member of V.H.F. Contests Committee.

70 Mc/s C.W. Contest 1964

The 70 Mc/s C.W. Contest, held on December 13 from 10.00 to 22.00 GMT, was introduced in 1963, but the great increase in phone activity on this band since that time has not been reflected in the number of entrants for this contest. Only 20 stations are listed in the results table.

At the top of the list is the multi-operator station of G8PD and G3HBW which used an aerial 125 ft. above ground on a site 600 ft. above sea-level. Both G8PD/A and G3SKR had 13 contacts at distances over 100 miles, and high in the Welsh mountains, GW3RUF/P, operated by G3KXA, made 16 such contacts, although the longest distance was between G3SKR and G3BJD/P at 227 miles. The total points of the five leading stations account for one-half of the total points of all stations.

Certificates of merit will be awarded to G3SKR and GW3RUF. No check logs were received from non-trans-

mitting members but perhaps the Listeners' Championship will encourage some activity in this direction.

Equipment

The most common receiver r.f. stage was the single 6CW4, although a few stations used pentodes. No transistor converters were used. The four-element Yagi was used by two-thirds of the contestants, among the exceptions being G5CP with a bi-square and G3JKY with a sterba.

Comments

Conditions seem to have been uniformly poor throughout the contest and many entrants stated that they had worked all they could hear. No Scottish stations were worked by entrants, while GI3ALT appeared to have worked at least four stations. In the south-west, one entrant contacted G5ZT and two contacted G3EHY. With these exceptions and GW3RUF/P no contacts were established west of a line from Birkenhead to the Isle of Wight. It has been suggested that the hours of the contest be shifted to encourage some activity from those parts of the country troubled by television interference, though this may necessitate a somewhat early start.

All comments received will be considered when the rules for 1965 are made. Check logs are gratefully acknowledged from G3VW/M, G2DHV and G3HRH.

RESULTS

Position	Call-sign	Points	Contacts	Location
*	G8PD/A	3834	57	Oxfordshire
1	G3SKR	2947	53	Middlesex
2	GW3RUF/P	2934	29	Brecon
3	G3OXD/A	2769	40	Staffordshire
4	G3BJD/P	2210	26	Cumberland
5	G3PLX	1881	28	Liverpool
6	G5JU	1457	24	Birmingham
7	G3OHH	1379	28	Cheshire
8	G3JQI	1162	10	Norfolk
9	G3JEQ	1126	37	Surrey
10	G5CP	1048	17	Derby
11	G3PHG	973	26	Surrey
12	G2AXI	934	23	Hampshire
13	G5UM	911	26	Hertfordshire
14	G3OJE	888	30	London
15	G3FD	725	25	London
16	G3CCM	640	22	Middlesex
17	G3JKY	595	29	Kent
18	G3BJY	505	10	Staffordshire
19	G2WS	326	7	Coventry
20	G3THH	258	9	Cheshire

* Multi-operator station

1296 Mc/s Contest 1965

This highly experimental event coincides with the last six hours of the IARU U.H.F. Contest and the RSGB First 420 Mc/s (Open) Contest. It is hoped that entrants to the 420 Mc/s contest will be in a position to provide crossband contacts, which are permitted, and score "half-points." Comments on this contest are solicited from all interested members whether or not they are able to enter the contest.

1. **When:** 12.00 GMT to 18.00 GMT on Sunday, May 30, 1965.
2. **Eligible entrants:** All fully paid up RSGB members resident in Europe. Multiple operator entries will be accepted provided only one call-sign is used.
3. **Contacts** may be made on any mode or with any power permitted in the entrant's licence.
4. **Scoring:** Contacts between stations in the 1296 Mc/s band will score 10 points per mile. Cross-band contacts with stations in the 432 Mc/s band will score 5 points per mile.
5. **Contest exchanges:** RST or RS reports followed by the contact number and location. This location must be identifiable on the 10 mile to 1 inch Ordnance Survey Map.

It is the responsibility of the receiving operator to obtain the information he requires to calculate distances correctly (entrants may find it convenient to exchange NGRs). Serial numbers may run in the same series as in the 432 Mc/s contest or start at 001 at the discretion of the entrant.

6. **Logs** must 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 as received," "Distance," "Points claimed." Crossband contacts should be so marked.
7. The cover sheet must be made out in accordance with RSGB Contests Rule 4 and the declaration signed. Operators of multi-operator stations must be listed. The NGR full six figure reference must also be recorded. Stations outside the area covered by the National Grid should show latitude and longitude.
8. **Entries** must be postmarked not later than Monday, June 14, 1965.
9. **Award:** at the discretion of Council a certificate of merit will be awarded to the winner.

Frequency Measuring Test

A 144 Mc/s frequency measuring test will be held on Sunday, May 23, 1965. Full details will be published in the May issue of the BULLETIN.

NATIONAL FIELD DAY 1965
FINAL DATE FOR ENTRY—MAY 5

Members responsible for stations participating in this year's NFD, to be held on June 12-13, are reminded that details of call-signs and frequencies to be used, together with the name of the group, club or affiliated society concerned, must reach the Contests Committee at RSGB Headquarters not later than Wednesday, May 5, 1965. The information should be set out as shown in Rule 6 on page 119 of the February 1965 issue of the RSGB BULLETIN.

CONTESTS DIARY

April 10-11	- CQ WW S.S.B. Contest.
April 10-11	- International SP DX Contest (C.W.).
April 24-25	- PACC Contest (C.W. and Phone).
April 25	- Rugby D/F Qualifying Event (see page 191, March, 1965).
May 2	- Third 144 Mc/s Contest. (Portable) (see page 256).
May 8-9	- USSR DX (C.W.) Contest.
May 9	- High Wycombe D/F Qualifying Event (see page 256).
May 15-16	- Second 70 Mc/s Contest (Open).
May 22-24	- Alexander Volta RTTY DX Contest.
May 23	- South Manchester D/F Qualifying Event.
May 29-30	- First 432 Mc/s Contest.
May 30	- 1296 Mc/s Contest (see this page).
June 4-7	— CHC/FHC/HTH QSO Party.
June 12-13	— National Field Day (see page 119, February, 1965).
June 27	— D/F Qualifying Event.
July 4	— Fourth 144 Mc/s Contest (Portable).
July 17-18	— 1296 Mc/s Tests.
July 18	— Oxford D/F Qualifying Event.
July 25	— Third 70 Mc/s Contest (Portable).
August 14-15	— WAE Contest (C.W.).
September 4-5	— Region 1 IARU V.H.F. Contest.
September 4-5	— V.H.F. National Field Day.
September 11-12	— WAE Contest (Phone).
September 12	— 80m Field Day.
September 19	— D/F National Final.
September 25-26	— 21/28 Mc/s Telephony/Receiving Contest.
October 2-3	— WADM Contest (C.W.)
October 9-10	— Raynet Rally.
October 16-17	— 7 Mc/s DX Contest (Phone).
October 24-25	— CQ World Wide Contest (Phone).
October 30-31	— Second 432 Mc/s Contest.
November 6-7	— 7 Mc/s DX Contest (C.W.).
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.).

First 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. This contest coincides with the Region I IARU U.H.F. Contest.

1. When: 18.00 GMT on Saturday, May 29, to 18.00 GMT on Sunday, May 30, 1965.
2. Station Locations: Stations may be operated from more than one site but the National Grid Full Six Figure reference must be recorded in the log for each location in the case of entries from G, GD, GM and GW. In all other cases, entrants must show latitude and longitude.
3. The General Rules relating to RSGB Contests, as published in the January, 1964 issue of the RSGB BULLETIN, will apply except as superseded by the rules of this Contest.
4. Eligible Entrants: All fully-paid up members of the RSGB resident in Europe. Multiple-operator entries will be accepted povided only one call-sign is used. /T stations are not eligible to take part.
5. Contacts: May be made on either A1, A3, A3A, A3H, A3J, or F3.
6. Scoring: Points will be scored on the basis of one point per mile.
7. Contest Exchanges. RST (RS) reports followed by the contact number and location (e.g. RST559001 5NE Wigan). This location must be identifiable on the 10 mile to the inch Ordnance Survey Map.
8. Logs: (a) Must be tabulated in columns headed (in this order) " Date/Time (GMT)," " Call-sign of station contacted," " My report on his signals and serial number sent," " His report on my signals and serial number received," " Location of station contacted as received," " Points claimed."

Logs must show clearly when station locations are changed.

(b) The cover sheet must be made out in accordance with RSGB Contests Rule 4 as published in the January, 1965 BULLETIN, and the declaration signed. The locations of the station as transmitted must be given on the cover sheet.

(c) Entries must be postmarked not later than **Sunday, June 13, 1965.**
9. Awards: At the discretion of the Council, a **miniature cup** will be awarded to the winner and **certificates of merit** to the runner-up, the leading portable station and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee. Listeners' logs submitted will qualify for the Listeners' Championships.

Third 144 Mc/s Contest (Portable) 1965

RSGB members throughout Europe are again invited to take part in this contest, details of which are as shown below. Contestants are strongly recommended to operate in accordance with the British Isles Two Metre Band Plan.

1. **When:** 10.00 GMT to 19.00 GMT, on Sunday, May 2, 1965.
2. The General Rules relating to 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 fully paid-up members of the RSGB resident in Europe. Multi-operator entries will be accepted provided only one call-sign is used.
4. **Power Supplies:** Power for any part of the station shall not be derived from supply mains, and the input must not exceed 25 watts in any stage in the transmitter.
5. **Contacts:** May be made on either A1, A3, A3a, A3h, A3j or F3, in the 144-146 Mc/s band.
6. **Scoring:** Points will be scored on a basis of one point per mile for contacts with fixed stations and two points per mile for contacts with other portables or mobiles.
7. **Contest Exchanges:** RST or RS reports followed by the contact number and location (e.g. RST559001, 5NE Luton). This location must be identifiable on the 10 mile to the inch Ordnance Survey Map. Five figure QRA locator details may be exchanged with continental stations. It is the responsibility of the receiving operator to obtain the information he requires to calculate distances correctly.
8. **Logs:** (a) Must 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 contacted as received," " Distance in miles," " Points claimed."

(b) The cover sheet must be made out in accordance with RSGB Contests Rule 4 and the declaration signed. Multi-operator entries must be marked on the cover sheet. The QTH as sent and National Grid Reference (full six figure grid reference) must be recorded on the cover sheet for entries from G, GD, GM and GW. In all other cases, entrants must show latitude and longitude.

(c) Entries must be postmarked not later than **Tuesday, May 18, 1965.**
9. **Awards:** At the discretion of the Council, a **miniature cup** will be awarded to the winner 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.

D/F Qualifying Events

Details of the High Wycombe Qualifying Event are as follows:

Sunday, May 9, 1965
Organizer: G. T. Peck, Dell Cottage, Horsleys Green, Stokenchurch, Bucks.
Map: Ordnance Survey, Sheet 159, " The Chilterns."
Assembly: 13.00 BST for first transmission at 13.20 BST.
Location: NGR 803930, " The Bricklayers Arms," Wheeler End Common, 3½ miles West of High Wycombe.
Entries and Tea: Intending competitors should notify the organizer as soon as possible stating the number in their party requiring tea.
High Wycombe Cup: The winner of this qualifying event will be awarded the High Wycombe Cup for the year 1965/66.
Rules Revision: Competitors should note that under the revised rules, the 1965 events will commence at 13.20 BST, i.e., 10 minutes earlier than in previous years, and that the frequencies and call-signs will be announced at the start.

Area Representatives Badges

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

The Month on the Air (continued from page 245)

and deserves a better fate.

The Radio Amateurs of Hereford are taking part in the Hobbies Exhibition promoted by the Rotary Club of Ross-on-Wye and will be active on all bands on a.m., c.w. and s.s.b. using the call **GB3RRC**. The exhibition takes place on April 15, 16 and 17. (G3ESY).

From **ZS1CZ** via G8JM comes the news that two new operators have taken over **ZS2MI** on Marion Island, but that s.s.b. will continue to be used. ZS1CZ will still act as QSL manager and asks for s.a.e. and IRC if a direct reply is desired. ZS1CZ has changed QTH recently and only the latest Call Books are correct. The up-to-date address will be found in *QTH Corner*.

Correspondents are thanked for their support and acknowledgment is made to the West Gulf DX Club *Bulletin* (W5IGJ), *DX'press* (PA0FX), *The Dx'er* (N. Californian DX Club), the Long Island DX Association *Bulletin* (WB2HXD), and the Florida DX Report. Please send all reports to RSGB Headquarters to arrive not later than **April 8** for the May issue and **May 12** for the June issue.

ZB2AE (G3MRE), Peter Holmes, made the first ever 160m QSO between Gibraltar and the USA when he contacted W1BB/1 on February 1, 1965. The equipment shown was modified for these special IQSY tests.

CLUBROOM

A Monthly Survey of Group and Club Activities

At the end of the news from each club will be found a call-sign in brackets, from which, via a Call Book, *a name and address can be determined. For any information on membership or activities of a particular club, please apply to the person indicated by this call-sign.*

Ainsdale Radio Club held its first social event late in February at the Morris Dancers Hotel, Scarisbrick, nr Southport. Attendance was excellent, the long distance award going to G4PF and his XYL who journeyed from Shrewsbury. Other guests came from Preston, Wirral and Liverpool. Such are the attractions of congenial company and a Hot Pot Supper. Earlier in the month, a visit by members of the Preston ARS was made especially interesting when G3RTX and G3RUW gave a talk on transistorized mobile gear, and showed a Top Band rig the size of a cigarette packet. (*G2CUZ*)

The **AERE Amateur Radio Club** Newsletter, *QAV*, takes a long hard look at the scores which they made in the last two V.H.F. Field Days. Equipment, the site, propagation conditions, logging, experience of operators, planning and preparation, all came under the same microscopic examination. This well written and logical survey concludes that given reasonable equipment, it is the experience of the operators *in relation to the frequencies in use* which largely determines the overall performance. In other words, a Top Band operator, no matter how good he may be, is not at home on, and cannot get the best out of, say 70 Mc/s or any other v.h.f. band. Perhaps your conductor may be permitted to express the opinion that such a survey might prove well worthwhile for other clubs taking part in any Field event. (*G2HIF*)

Members of **ATC Squadrons 235 and 238** will be assisting the operators manning an 80m s.s.b. station at Trentham Gardens during the North Midlands Mobile Rally on Sunday, April 11. (*G3COY*)

Barnsley and District Amateur Radio Club will be holding meetings on April 9 and 23. At the first, G6LZ will talk on "Aerial Tuning Units," while at the second, G5KM will lecture on " Single Sideband working." (*G4JJ*)

Basingstoke Amateur Radio Club is holding a meeting on April 10 at Immanuel Hall, Basingstoke at which a number of films will be shown, including one of the 1964 NFD. Visitors will be very welcome.

Bedford (B & DARC) is on the move, though not until September. Its present HQ is at the Harpur School in the centre of the town, and when this changes its location, the club hopes to go along too. There should then be more space for its activities.

The **Blackpool and Fylde** Radio Club held its AGM in February. They would be pleased to hear from any non-member radio amateur in the district who is assured of a most cordial welcome to club meetings. (*G3OCX*)

During the Derby Radio Society's 1965 Annual Dinner, Mr F. C. Ward, G2CVV, was presented with a silver bowl for his service to the society by Mr A. T. Lee, ex-2DJ.

A full programme for April has been arranged by the **Bradford Radio Society.** On the 13th members are taking their problems to the computer at the Bradford Institute of Technology. Another meeting has been arranged for the 27th, and on the 29th they are visiting the Spen Valley ARS for a talk on "Manned Space Flight."

The **Bristol Amateur Radio Club** will be the envy of many. They seem to have the whole house to themselves! Their new HQ is at 43 Ducie Road, and members have been sampling the delights of "do-it-yourself" decorating. In their new premises, the Bristol club should go from strength to strength. With a lecture room, workshop, operating room and that almost unheard of luxury, a separate Committee room, it can be justifiably proud of the facilities which it can offer to its members. (*G3TAD*)

Bury and Rossendale RS had the unusual experience of having part of its February meeting open to the public. Late diners at the Hotel were initiated into the jargon of Amateur Radio. Eventually the meeting got under way and G3JAG gave a fine talk on receivers for s.s.b. Of special interest is the Junk Sale which is to take place on April 13. (*G3JAG*)

Burslem AR Club will be on the air looking for contacts, and renewing old acquaintances, with mobilers coming into the district en route to the Midlands Mobile Rally at Trentham on April 11. Tape recordings of these contacts will be made, and played back at the Club's stand at Trentham. (*G3SAJ*)

Cambridge and District ARC clubroom was filled to capacity on February 5 for a Junk Sale. Guest auctioneer G3PTB, Arnold Tomalin, showed how such sales should be conducted. On the 19th Jerry Walker, G5JU gave an excellent demonstration and talk on the latest Eddystone receivers. Attention is currently being given to modifying the club's HQ to meet the need for additional accommodation.

Chester and District RS has a very full programme for April with meetings on the 6th, 13th, 20th and 27th. Meetings take place every Tuesday at 8 p.m. in the YMCA, Chester. If you are one of the Clubless Brigade, why not go along one evening and find out why so many " belong " ?

Short, sharp and sweet was the report from the **Clifton ARS** (London S.E.14). For particulars of membership write to J. Rose, G3OGE, 63 Broomfield Road, Beckenham, Kent.

The **Cornish Radio Club**'s magazine, *Cornish Link*, is a mine of information. The club intends to run another mobile rally at Newquay, and is sending messages to the clerk of the weather for his support. On Friday, April 23, the Annual Dinner is being held at the Red Lion, Truro. A first class example of how a club can help its members is given by the idea that they are investigating the possibility of running a coach up to London for the next Radio Communications Exhibition. With an eye on creature comforts, the v.h.f. group is considering obtaining a caravan for use on Field Days. (*G3AET*)

Crawley AR Club is holding its main April meeting on the 28th when a lecture will be given by G3IDF on the Shell Communications System. Winners of the club's annual constructional contests, judged by members of the Reigate and Thames Valley Clubs, were G3TIR for his 160/80m transmitter, and H. Church, A4260, for his transistorized receiver. (*G3FRV*)

Coventry ARS meets on Mondays at 8 p.m. at Westerfield House, Radford Road, Coventry, when visitors and potential members are always welcome. Of particular interest to all local amateur transmitter operators will be the meeting to be held on April 26 when Mr E. R. Robson of the GPO Radio Interference Investigation Staff will lecture on " TVI." No one in the district should miss this. (*G3POQ*)

The **Cray Valley RS** seem to have a strong contingent on 70 Mc/s and their March Bulletin, *QUA*, contained some very interesting notes by G3HRC on a simple way of getting going on

that band. The society is already giving detailed thought to the next NFD, with plans afoot to construct a transmitter specifically for the occasion. The aim is to achieve 100 per cent efficiency in both equipment and personnel. Slick operation is needed to get well up the results table. (*G3KYV*)

Crystal Palace and District RC held its AGM on Saturday, February 20. The *Newsletter* under review traces the history of the Club, and shows how, from a humble but enthusiastic start, the club has grown through the years. (*G3FZL*)

The **Dudley AR Club**'s publication *Local Oscillator* shows that meetings are planned for April 9 and 23 at the Art Gallery, Dudley, the subjects of which should have wide appeal. For the V.H.F. Field Day it is proposed to travel further afield than usual and set up shop on the top of a minor mountain. New members and visitors are assured of a hearty welcome at the club's meetings.

East London Group. Taking over at short notice, after it was discovered that the scheduled speaker had been detained in Australia, R. S. Roberts, G6NR, gave a most informative talk on " Colour Television." As soon as the European standards have been decided, G6NR has been invited to give the second instalment which will cover receivers.

Echelford AR Society. The March meeting of the Society was devoted to receivers, and in the preceding *Newsletter*, members were asked to give a short talk on the particular breed which they operated at this meeting. Thus, within a short space of time, it was hoped to glean a few first-hand impressions of how various types worked out in practice. During April the AGM is to be held, and as the secretary comments, all too often, members seem, somehow, to be inclined to give such a purely business meeting a miss. In fact, of course, the AGM is probably more important than all the others put together since, in the election of the Officers is the pattern of the next twelve months set.

The **Isle of Wight RS** is running an examination course every Monday evening, and this is very well attended. If you are budding then go along to Unity Hall, Wooton Bridge, nr Ryde one Friday evening and find out all about it. The programme of events for meetings includes lectures, film shows, and a course on construction practice. New members are always very welcome.

Lichfield AR Society has elected its officers for the current year. Recent meetings have covered such subjects as v.h.f. techniques, D/F sensing and lasers. Even though a thriving society, new members are particularly welcome.

At a recent meeting of the **Lothians Radio Society,** GM3NZI described experiments which he had been carrying out in conjunction with GM3RVL on the 3cm band. By ingeniously interconnecting various items of ex-WD gear they had arrived at the necessary plumbed electronics. The professional approach to similar frequencies was covered at a meeting held on March 23 when Mr A. Gavin of Ferranti Ltd. gave a talk on " Microwave Links."

Loughton and District RS is mounting its first full scale Mobile Rally on Saturday, June 26 at Loughton Hall, Epping Forest, some 12 miles NE of London. Many attractions, both indoors and outdoors, are planned. These are not limited to the interests of licensed operators alone, but rather are directed to their families. Sales, swindles, displays of equipment, demonstrations of Judo, Fencing and Archery plus a film show are on the itinery. To round off what promises to be a very good show, you will have a chance to trip the light fantastic at an Old Time Dance. All the necessary facilities will be available, not the least of which are Refreshment Rooms, and a Licensed Bar for a slug of reviver. Don't miss this one. (*G3JBS*)

The **Medway AR and Transmitting Society**'s *Newsletter* is always good for a laugh. February contained the best yet. A TVI sufferer was advised by an amateur operator to polish his aerial with Brasso. He did. The result? Better TVI. On a more serious note the editor of the magazine has invited constructive criticisms of the whole field of the society's activities, and especially relating to the subject matter of meetings. This is a bold and good idea, and a sure sign of healthy direction. On April 12, a film show is planned. (*G3OHP*)

Midland AR Society. Recently a lively discussion took place between the Buildits and the Buvits. The debate, ably led by G5PP, G3BA, G3PJT and G8ABE, was a rip-roaring success, and, in the end, the home constructors led by a short head. The don't knows had a wonderful time, for they apparently voted for both. Such is our democratic way of life! During the Affiliated Societies' contest, a total of 111 stations were worked on G5PP's slick station, the operating team being G5PP, G3AVE, G3PJT with G3SCG logging. (*G3JDJ*)

North Kent RS is already giving thought to the stand at the Erith Bank Holiday Show held in the Recreation Ground, Erith. Apparently the society has always managed to engineer their stand so that it is plumb next door to the beauty contest stand. At each club meeting, G2FNT holds Morse classes from 7 p.m. to 8 p.m. April meetings will be held on the 8th and 22nd. (*G2FNT*)

Northern Heights AR Society's recent activities have included a film show, a visit to a telephone exchange and Mrs Mary Shaw, G3OMM, repeating her talk on the history of radio portrayed on stamps. On April 14 the AGM takes place, while on the 28th there is to be a discussion on plans for NFD. (*G3MDW*)

Oxford and District AR Society meets on the 2nd and 4th Wednesdays of each month. On April 28, G3NNG will be giving a talk and demonstration of v.h.f. transistor equipment up to 23cm. This should be particularly interesting. On July 11, the Oxford University Rally takes place, and all mobilers will be welcome. (*G3PMI*)

Peterborough AR Society. The April meeting will take place on the 9th, when the G2DAF transmitter and receiver will be demonstrated. (*G3KPO*)

The **Plymouth Radio Club** are becoming increasingly concerned about pirates, the more so as some of their members have had their call-signs used. As if this was not enough, there have been signs of deliberate attempts to maliciously interfere with their Sunday morning Net. It is high time that every conscientious and responsible amateur ceased treating these " persons " as a joke. Grumbling and righteous indignation are not enough. The cure is in our own hands. On a more pleasant subject, the club had a most successful Annual Dinner, and hopes that some of the non-members who attended will join the happy band. (*G3SGV*)

The **Preston AR Society** is making plans for NFD and hopes to have a club transmitter on the air by the end of April. New members, old members and visitors are very welcome at the Society's meetings which are held on the second and fourth Tuesday in each month at St Paul's School.

The **Radio Amateur Invalid and Bedfast Club**'s publication *Radial* describes in attractively lurid detail a " Paris Venture " penned by G3OFU. March saw the eleventh birthday of the club. To all members of this club we say, with all the sincerity at our command, A Very Happy Birthday and may all your QSO's be 5-9, all your QSLs 100 per cent and all your DX calls be answered. (*G3LWY*)

Reading Amateur Radio Club has cleared the hurdle of the AGM and is getting down to work. The next meeting of the club is on April 27 when a Junk Sale is to be held, after which it is proposed to hold a discussion on improving reception. (*G3TOQ*)

The **Reigate AT Society** entertained 40 members and friends at the Annual Dinner in February. Progressive as always, the Society will be operating the club station G3REI/A on 160 and 80m from the Redhill Rotary Club Exhibition " Get Pleasure from Leisure " on April 9-10. Normal meetings are being held on April 4 and 24. Commenting on being placed ninth in the 1964 NFD results, the secretary observes that the extra effort which brought them up 13 places seems to have paid off. A hearty " welcome back " has been extended to G3MO who, after a 17 year break, is active once again. (*G3NKT*)

The **Roding Boys' Society** is busily engaged on rebuilding communication receivers to bring them up to scratch. A CR100 is the latest to get the full treatment. Slowly but surely, the club's test bay is being equipped with those items which are so essential for serious work. (*G3JIX*)

Salop AR Society are holding informal meetings during April. New members are welcome. (*G3RRN*)

We notice from the **Saltash and District AR Club's** magazine *Tamar Pegasus* that it is fortunate enough to list amongst its members the father of that well known technical writer, Alec D. Vance. Holder of the call G9BO—even his best friends wouldn't tell him—he describes a neat method of getting rid of unwanted cars while at the same time achieving an efficient earth. On April 9 a " Movie Night " is to be held, while on the 23rd it will be a members' meeting. The club is busy with the arrangements for the SADARC Mobile Rally to be held on June 7 at Calstock. (*G2DFH*)

Shefford and District RS has now moved to new HQ where there are ample car parking facilities. The club provided the talk-in stations for the RSGB Rally at Texas Instruments, Bedford.

The **Sheffield AR Club** is holding its AGM on April 9, and hopes for a 100 per cent attendance. During Easter week, the club

will be demonstrating amateur radio at St. Mary's Community Centre. A special station, GB3RCM, will be active on 80, 20, and 15m s.s.b. (*G8AEI*)

The **Skegness and District Group** will be holding a Junk Sale on April 9 commencing at 7 p.m. Venue: The Bull Hotel, Spilsby, where one can purchase the courage to take one's treasures home. Further details from either *G3OTD* or *G2ABK*.

Southgate AR Group is also holding a Junk Sale on April 8, so if any members have white elephants or something which they are sick of the sight of, lug it along and add it to the collection. The Southgate Morse Net held on Top Band at 7.30 p.m. on Friday nights is increasingly popular. Maximum speed is 12 w.p.m. which should suit everybody. (*G3TXA*)

Southampton ARC has been concentrating on furnishing the new clubroom. The new console for housing the club's transmitter and receiver has been completed, as has the test bench. Facilities are being provided for Morse instruction. It is hoped to have the clubroom open twice weekly with at least one licensed amateur in attendance on each evening. New members and visitors are assured of a hearty welcome. (*G3NIM*)

Surrey Radio Contact Club. On March 9 a very successful sale of members' surplus equipment was held. Over 60 members attended, and Ken Drummond once again demonstrated his mastery of the art of auctioneering. The AGM is to be held on April 13, and the committee look for a 100 per cent attendance. (*G3FWR*)

South Dorset Radio Society. At the March meeting, a talk was given on meteorology and its effects on propagation. On March 23, six members of the society visited the Mullard transistor plant at Southampton. (*G2TZ*)

South Manchester. The club is now active on all l.f. bands with a KW Vanguard, AR88 and a 132 ft. aerial. More members are needed. (*G3RTU*)

Spalding (Lincs). There is talk of forming a new club in this district. If you are interested will you write to D. Hault, Chespool House, Gosberton Risegate, Spalding, Lincs.

Torbay AR Society. A warm welcome home has been extended to G3TAN on his return from Singapore. Members are believed still to be recovering from the pleasant effects of the Annual Dinner.

University of Keele. While we shudder to use the word, G3SMD/M assisted by seven ladies of renowned beauty, "manned" a "pirate" radio station "Radio Potteries" during the U of K rag procession. The rag raised over £2000 for local charities. A very good effort indeed.

Uxbridge Radio Society. Work is progressing with the club's transmitter which they hope to give an airing soon. Had someone donated a filter, s.s.b. would have been given a whirl. As it is, they are stuck with Ancient Modulation. Shame. Apathy has struck again, and the committee has considered all manner of ideas—including gunpowder—to jolly up absent members. Probably it's due to the annual hibernation, and the idiot's lantern. There is no doubt but that the winter months really sort out the men from the boys—and if this doesn't make the absentees feel guilty, nothing will.

Verulam AR Club have formed a TVI study group. All members of this active club are looking forward to the lecture by Vic Hartop of J-Beam Aerials on April 21. New members and visitors are always welcome. (*G3PAC*)

Welwyn Garden City. Mrs G2BLA and Mrs G5UM undertook catering for 60 at the W.G.C. Group's Ham-fest (ham the main dish!) on March 11, organized to coincide with the Annual Constructors' Contest.

President Eric Yeomanson, G3IIR, presented the "G3EPK Trophies," senior and junior, to G3HRH and Associate T. Baker respectively, and Mrs Yeomanson drew the tickets in the giant raffle. Immediate Past President Geoff Stone, G3FZL, was also in the President's party. (*G5UM*)

The **Wickford Radio Club** is making ground, but would be very pleased to see more new membership applications. A club transmitter is well on the way, and there are plans afoot for a Mullard Film show shortly.

Wimbledon and District RS meets on the second Friday in each month, and is keen to increase the membership. It is hoped to have an active transmitting station on the air during the Wimbledon Exhibition on May 21 and 22. (*G3RZN*)

Wolverhampton AR Society. The current *Bulletin* under review contains a very interesting, and forthright, article by G6GR on "Linear Amplifiers." Under the heading of "Outdoor Events" G3CAQ seeks to find out how much support can be secured for NFD and practice runs out in the fresh air. Once again we see how a well run club tries to evaluate the opinions of its members, and so, eventually, organize events for all tastes. (*G3NOW*)

Wolverton District AR Club were initiated into the secrets of RTTY by G8WV at a recent meeting. G8WV put on an excellent show and went to great lengths to put over a clear exposition of what makes RTTY "tick." Not satisfied with this alone, he gave a practical demonstration with Creed equipment. Plans are in hand for the '65 NFD, and in April it is hoped to arrange a lecture by G3GWL on 23cm equipment. (*G3LCS*)

Worcester and District AR Club. On April 24, the club will be holding its constructional contest with entries judged by a committee from the East Worcestershire Radio Group. For full details contact the Honorary Secretary. (*G3NUE*)

York AR Society is another club with its AGM over and getting down to a programme for the coming year. (*G3JFO*)

Yeovil AR Club has acquired a Drake 2B receiver and a KW Viceroy Mk. 2 transmitter, both of which should make for some pretty spectacular contacts. (*G3NOF*)

* * *

It is absolutely essential that notes from clubs reach us by the deadline date. With the best will in the world, they cannot otherwise be included. Many reports are mere statements of fact having little interest value. Please do give us as much information as possible, rather too much than too little should be the rule. In many ways this feature can be good publicity for your club and encourage membership. Bear this in mind when compiling your report and in addition to notes on meetings which have taken place, give us as much information as you can on future events. To assist would-be members and visitors to your club, please include the call-sign of a member to whom application can be made. Via a *Call Book*, addresses can then be quickly found.

HELP US TO HELP YOU

* * *

Deadline for the **May** issue is: **April 9.**
Deadline for the **June** issue will be: **May 7.**

SECOND LONDON S.S.B. DINNER

Waldorf Hotel, Aldwych, W.C.2

SATURDAY, MAY 29, 1965

There will be a comprehensive trade show by British and American manufacturers in the afternoon, and cabaret and dancing after the dinner. It is anticipated that several amateurs from America and other countries will be present.

Tickets, price 3 guineas per person, are available from Mr N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.

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).—April 14, 28, May 12, 8 p.m., 77 Clifton Road, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B & FARS).—Mondays (Morse tuition from 7.30 p.m.), 8 p.m., Pontins Holiday Camp, Squires Gate.
Bury (BRS).—April 13 (Sale of surplus gear), 8 p.m., Old Boar's Head, Crompton Street (private room).
Chester.—Tuesdays, except first in month, 8 p.m., YMCA.
Crewe & District.—May 3, 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.—April 13, 27, The George Hotel, Jordongate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.
(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.
Morecambe.—April 7, May 5, 125 Regent Road.
Preston.—April 13 (Open discussion on receivers), April 27 (Night on the air), (All meetings start with a 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.—April 7, 21, May 5, The Blossoms Hotel, Buxton Road, Stockport.
Wirral.—April 7 ("Receivers," by W. Evans), April 21 ("Transistors," by K. Birch, G2FOS), April 28 (NFD plans), May 5 (Sale of surplus gear), 7.45 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley.—April 9 ("Aerial Tuning Units," by Mr. W. Lee, G6LZ), April 23 ("S.S.B. Transmitters and Receivers," by Mr. H. H. Eyre, G5KM), King George Hotel, Peel Street.
Bradford.—April 13 (Visit to Bradford Institute of Technology Computer), April 27, April 29 ("Manned Space Flight;" Visit to Spen Valley ARS).
Durham (CARS).—Alternate Thursdays, 8 p.m., Bridge Hotel, North Road.
Northern Heights (NHARS).—April 14 (AGM), April 28 (Discussion on NFD), 7.30 p.m., Sportsman Inn, Ogden.

LOOKING AHEAD

April 10.—International V.H.F. U.H.F. Convention.
May 16.—UBA AGM.
May 18-21.—RECMF Exhibition, Olympia, London.
July 11.—Sixth South Shields Mobile Rally.
July 11.—Torbay ARS Mobile Rally, Newton Abbot.
August 25-September 4.—Radio Show, Earls Court, London.
August 30.—Peterborough Mobile Rally.
September 12.—RSGB National Mobile Rally, Woburn Abbey.
September 26.—Harlow and District RS Mobile Rally, Magdalen Laver.
October 2.—N.W. V.H.F. Convention.
October 10.—Manchester Amateur Radio Convention, Belle Vue.
October 16-17.—Eighth Jamboree-on-the-Air.

Details of Mobile Rallies are given on page 224

Scarborough.—Thursdays, 7.30 p.m., rear of 3 Trinity Road.
Spen Valley.—April 15 ("Commercial Equipment," by C. R. Green of Green & Davis Ltd.), April 29 ("Manned Spaceflights," by M. A. Browne, F.R.A.S., Cheadle), Grammar School, Heckmondwike.
Sheffield.—April 9 (AGM), April 16 (Ordinary Meeting), April 23 (Club Exhibiting at St. Mary's Community Centre), April 30 (Ordinary Meeting), 8 p.m., 8 Sandbeck Place.

REGION 3

Birmingham (South).—April 15, 7.30 p.m., Friends Meeting House, Moseley Road, Birmingham.
Coventry (CARS).—Mondays, 8 p.m., Westfield House, Radford Road, Coventry.
Dudley (DARC).—April 9 (Lecture "Eddystone EA12 and EC10"), April 23 ("Mobile," by G5PP), 8 p.m., Art Gallery, Dudley.
Lichfield (LARS).—April 20 (Talks on D/F by members of Slade RS), first Monday and third Tuesday in each month, 7.30 p.m., Room 13, The Swan Hotel, Lichfield.
Salop (SARS).—April 8 ("10 Minute Talks" and Construction Competition), 7.30 p.m., Morris Hall, Bellstone, Shrewsbury.
Stratford-upon-Avon (S-u-AARS).—April 9 (NFD Preparations on Site), April 16 (Club Night). April 23 (Social Evening), April 30 ("D/F receivers"), 7.30 p.m., Masons Arms, Sanctus Road, Stratford-upon-Avon.
Wolverhampton (WARS).—April 26 (Home Built Gear Competition), 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Burton-on-Trent (B-o-TARS).—April 8 (Discussion on Direction Finding), 7.30 p.m., Club Rooms, Stapenhill Institute, Burton-on-Trent.
Derby (D & DARS).—April 7 (Surplus Sale), April 14 ("Interference and the Amateur," by F. C. Ward, G2CVV), April 21 (D/F Practice, Social Evening), April 28 (Preparation for 144 Mc/s Contest), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Heanor (H & DARS).—April 9-26 (Closed), meetings at 7.30 p.m., Room 14, Heanor Technical College, Ilkeston Road, Heanor, Derbyshire.
Leicester (LRS).—Mondays, 7.30 p.m., Sundays, 10.30 a.m., Club Room, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (ARC).—First Wednesday in each month, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.
Mansfield (ARS).—Fridays, 7.30 p.m., The New Inn, Westgate, Mansfield.
Melton Mowbray (ARS).—April 29 (Film Evening and Ragchew), 7.30 p.m., St. John's Ambulance Hall, Asfordby Hill, Melton Mowbray.
Nottingham (ARCN).—Tuesdays, Thursdays, Room 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood.
Northampton (NSWC).—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.
Peterborough (ARS).—Fridays at 8 p.m., in Old Windmill behind the Peacock Inn, London Road, Peterborough. April 9 (Lecture on "S.S.B."), 7.15 p.m., Electronics Block, Peterborough Technical College.
Worksop (NNARS).—Tuesdays (RAE Classes), Thursdays (Lectures), 7.30 p.m., Club Rooms, 13 Gateford Road, Worksop, Notts.

REGION 5

Bedford (B & DARC).—Meeting on the second Tuesday and fourth Thursday in each month, Harpur Secondary Modern School, Horne Lane, Bedford.
Cambridge (C & DARC).—April 9 (Activity Evening), April 16 (No Meeting—Good Friday), April 23 (Organization of NFD), April 30 (General Station overhaul), 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road.
Cambridge University (CUWS).—Tuesdays during term, 8.15 p.m., Psychology Department, Downing Site.
Haverhill (HARC).—Mondays, 7.30 p.m., 41a High Street, Haverhill, Suffolk.
Luton (L & DARS).—April 6 ("Amateur Life in Antarctica," illustrated talk by G3OHW), April 13 ("A £30 S.S.B. Package," by G3HVA), April 27 (Tape Lecture by W1BB), May 4 (Green & Davis Demonstration Evening), 8 p.m., ATC Headquarters, Crescent Road, Luton, Beds.
March (M & DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, High Street, March, Cambs.
Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Herts.
Shefford (S & DARS).—Thursdays (Morse Classes 7.45-8 p.m.), 7.45 p.m., Town Recreation Centre, Hitchin Road, Shefford, Beds.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street, Cheltenham.
Oxford (O & DARS).—Second and fourth Wednesdays in each month, 7.30 p.m., Cherwell Hotel, Water Eaton Road, N. Oxford.

REGION 7

Acton, Brentford & Chiswick (ABCRC).—April 13 ("160m DX Working," tape by W1BB), 7.30 p.m., AEU Club, 66 High Road, Chiswick.
Ashford (Middx.) Echelford (ARS).—April 28 (AGM), 7.30 p.m., Links Hotel, Ashford.
Bexley Heath (NKRS).—April 8, 22, 7.30 p.m., Congregational Hall, Chapel Road, Bexley Heath.
Barnet (BRC).—April 20, 8 p.m., Red Lion Hotel, Barnet.
Chingford (Group).—April 16, Contact the Hon. Secretary, Loughton 2397.
(SRC).—Fridays (except first), 8 p.m., Friday Hill House, Simmons Lane.
Croydon (SRCC).—April 13 (AGM), 7.30 p.m., Blacksmiths Arms, South End, Croydon.
Dorking (D & DRS).—April 13, 8 p.m., Wheatsheaf, Dorking.
East Ham.—Tuesdays fortnightly, 7.30 p.m., 12 Leigh High Road, East Ham.
East London District.—April 25 ("Crystal Filters"), 2.30 p.m., Lambourne Rooms, Ilford Town Hall.
East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.
Edgware and Hendon (EARDS).—April 12, 26, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Enfield.—April 22, 8 p.m., George Spicer School, Southbury Road, Enfield.
Gravesend (GRS).—April 21, 7.30 p.m., RAFTA Club, 17 Overcliffe, Gravesend.
Guildford (G & DRS).—April 12, 26, 8 p.m., Guildford Model Engineering Society, in Stoke Park.
Harlow (DRS).—Tuesdays, 7.30 p.m., rear of 11 High Street (QTH of G3ERN).
Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harrow.
Holloway (GRS).—Mondays and Wednesdays (7 p.m., RAE and Morse), Fridays (7.30 p.m., club), Montem School, London, N.7.
Hounslow (HADRS).—April 19, Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (Nr. Seven Kings Station).
Kingston.—April 15 (Mystery Night), April 30 (Sausage and Mash Supper), 8 p.m., YMCA, Eden Street, Kingston. Fridays (Weekly Morse classes), 2 Sunray Avenue, Tolworth.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the White Hall Hotel, Bloomsbury Square, London, W.C.1 **at 12.30 p.m. on Fridays, April 23, and May 21 1965.**

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

Leyton & Walthamstow.—April 20, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E.10.

London Members' Luncheon Club.—Third Friday every month, 12.30 p.m. (see separate box).

Loughton.—April 8, 7.30 p.m., Loughton Hall (Nr. Debden Station).

Mitcham (M & DRS).—April 9, 7 p.m., "The Cannons," Madeira Road, Mitcham.

New Cross (CARS).—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, London, S.E.14.

Norwood & South London (CP & DRS).—April 17, CD Training Centre, Catford, London, S.E.6.

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

Purley (P & DRC).—April 16, 8 p.m., Railwaymen's Hall (Side Entrance), Whytecliffe Road, Purley.

Reigate (RATS).—April 24 (lecture by D. N. Licence of Enthoven Solders), 7.30 p.m., George & Dragon, Cromwell Road, Redhill.

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

Scout ARS.—March 18, 7.15 p.m., Baden Powell House, Queens Gate, South Kensington.

Science Museum (CSRS).—April 20 (Informal Meeting), May 4 ("River Police and Radio," by Inspector T. Rogers), 6.30 p.m., Science Museum, South Kensington.

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

Southgate & District.—April 8 (Junk Sale), 7.30 p.m., Atlasta Lodge, Tottenhall Road, Palmers Green, London, N.13.

St. Albans (Verulam ARC).—April 21 (J. Beam Lecture), 8 p.m., Hedley Road.

Sutton & Cheam (SCRS).—April 20, 8 p.m., The Harrow Inn, High Street, Cheam.

Uxbridge.—April 15, 8 p.m., Railway Arms, Vine Street.

Welwyn Garden City.—April 15 (Visit to Decca at Puckeridge), assemble at QTH of G5UM at 7 p.m.

Wimbledon (W & DRS).—April 9, 8 p.m., Community Centre, St. George's Road, Wimbledon, London, SW.19.

REGION 8

Crawley (CARC).—April 14 (Informal, for details contact G3FRV), April 28 ("The Shell Communications Network," by A. Dyer, G3IDF), 8 p.m., Trinity Congregational Church, Ifield.

REGION 9

Bath.—April 30, 7.30 p.m., Room 247, Fourth Floor, Main Building, Bath Technical College.

Bristol.—April 23, 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 Street, 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).—April 9 (Movie Night), April 23 (Members' Evening, Five minute talks), 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).—Last Saturday in each month, 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.—April 12 (Technical talk), 7.30 p.m., Territorial Army Centre, Park Street, Cardiff.

REGION 13

Edinburgh (LRS).—April 8 ("Transistors," by Ed Murray, GM3SBC), April 22 (Junk Sale), 7.30 p.m., YMCA, South St. Andrew Street, Edinburgh.

REGION 16

Basildon (BDARS).—April 22, details from G3IJB. May 4 (Social evening at the Bullseye).

Chelmsford (CARS).—May 4, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford. Details from G3LTF.

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.

Norwich (NARC).—Mondays, 7.30 p.m., the Club Centre, 140 Oak Street, Norwich. Details from G3TLC.

Southend (SDARS).—Meetings in the Executives' Canteen, E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Details from G3NPF.

Wickford (WRC).—Fridays, 7.30 p.m., Beauchamps County Secondary School, Hill Avenue, Wickford. Details from G3SLP.

REGION 17

Harwell (AERE ARC).—Third Thursday in each month, 7.30 p.m., AERE Social Club.

Southampton.—April 10 (Local group debate), 7 p.m., Engineering Lecture Theatre, Lanchester Building, Southampton University.

Letter to the Editor

10 watt Top Band Transistor Transmitter

DEAR SIR,—I wonder if you would care to publish some further notes on the transistor transmitter described in the March BULLETIN.

The transmitter has been in use for some 2 years now, and has given performance equal to any Top Band transmitter used by G3DXO in the past 20 years. Such is the speed of present progress in transistor development, however, that it is almost impossible for publications to keep up to date. In fact, while I am trying to remember the name of a new transistor and what it will do, new, higher power, higher frequency, cheaper devices are being put on the market! A far cry from the days of PX4s and 6L6s!!

Having now made up several of these transmitters a few more notes may be an advantage. Starting with practicalities, the best auto-bias diodes found so far, in the MR1 and MR2 positions in the circuit diagram, are Mullard OA86s. These seem to be in fact the civilian version of the CV448s originally used. The important point to bear in mind, of course, is that the diode must be capable of working at 2 Mc/s. as it has to rectify part of the drive power from the previous stage to correct for the negative bias that would otherwise be built up due to base current.

To avoid thermal runaway of TR1 in the event of the crystal being removed with the supply on, the collector of this stage should be decoupled with a 470 ohm resistor, and bypassed with a 0·05μF capacitor. The 2S712 is quite capable of blowing a 1 amp fuse before damaging itself, but it is kinder to decouple it.

The turns on L1, quoted as about one hundred, should be increased rather than decreased if the crystal oscillator does not function first time. 150 turns were found to be necessary to make a difficult crystal oscillate. The crystal frequency was however 1734 kc/s, which of course is outside the present amateur band.

Due to one solitary case of TVI with the original transmitter (this was about half a mile away), the output circuit was changed to include a low pass filter; about 5 turns of 22 s.w.g. enamelled wire wound tightly over the centre of the output coil L4 makes a fair match into a 72 ohms low pass filter or aerial tuning unit.

Several people have asked if the circuit will work on a lower voltage. The circuit will work without modification down to about 15 volts but G3DXO is at present working on a new design for 12 volt mobile work.

Yours sincerely,

R. J. LEWIS, G3DXO

Heybridge Basin, near Maldon, Essex.

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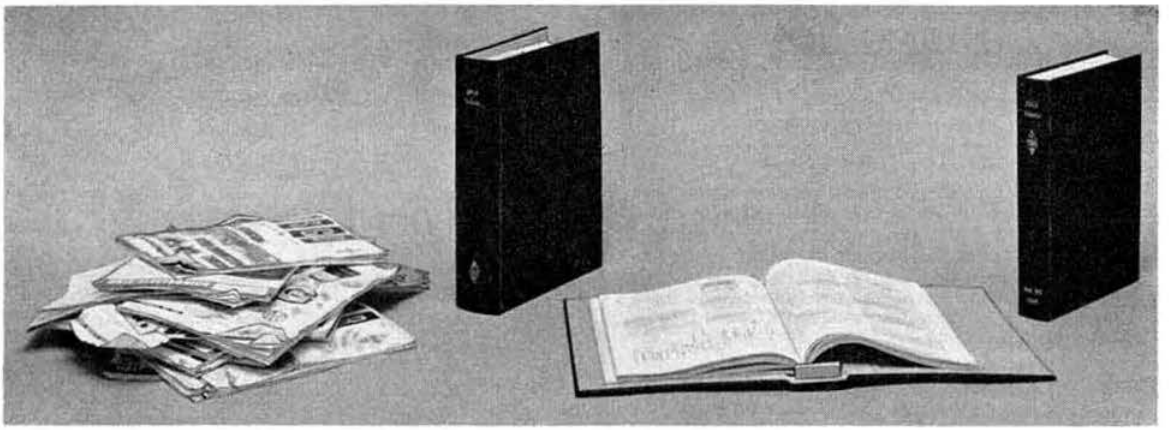

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ROBT. T. HUTCHESON,
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