RSGB

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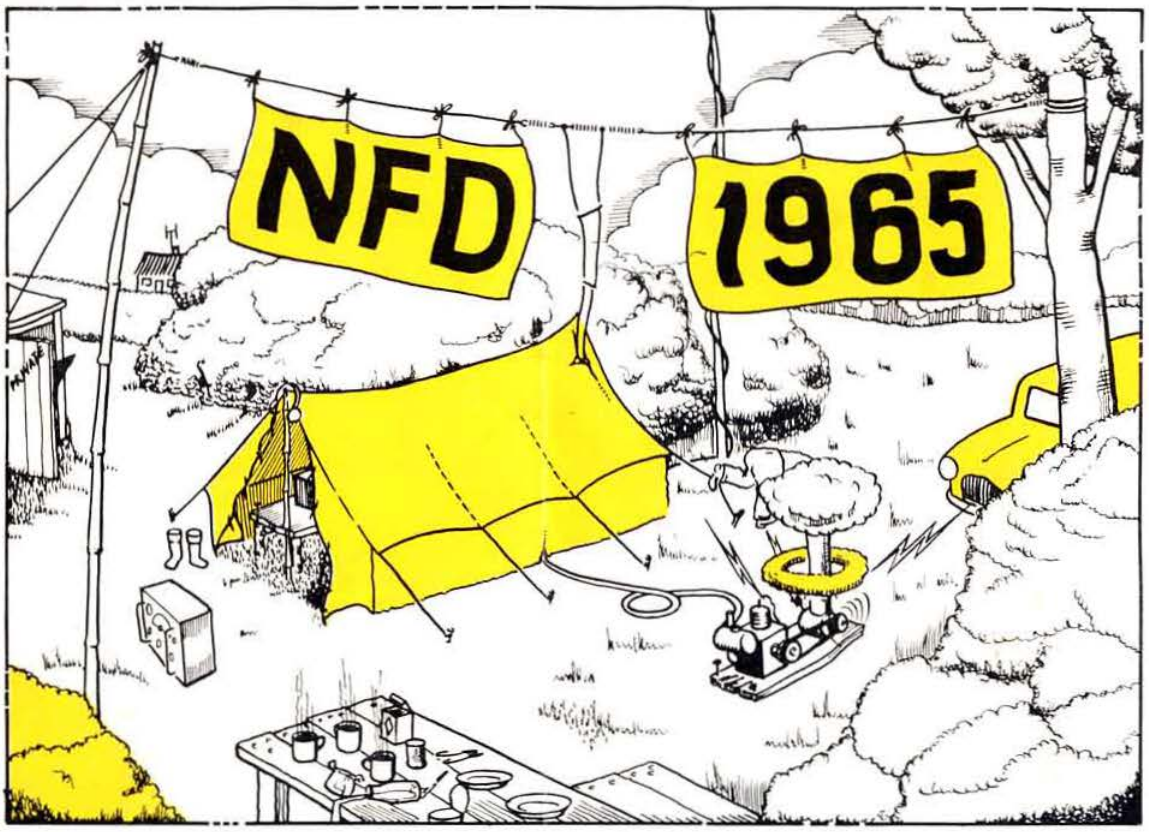

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RSGB BULLETIN

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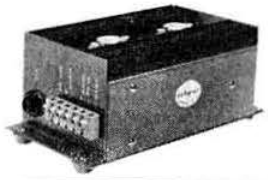

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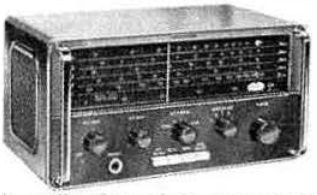

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SUBSCRIPTIONS

MEMBERS are well aware of the effect on their personal finances of recent increases in the cost of services and goods, and the Society has been no less affected.

Since 1957, with the great help provided by the surplus on the sales of publications, the Society has succeeded in balancing its accounts. This year, however, many items are rising in cost for reasons entirely outside our control, e.g. Postage, Rates, National Insurance, Rent, Printing, Wages and Paper are only a few of the basic items affected.

During past months there has been an extensive search for a new Headquarters, so far without success, and on the expiry of our old lease new terms were offered to us by the Ministry of Public Building and Works which is now the Society's landlord. Under the new lease there is a rise for rent and services from £550 to £1,320 p.a., and, following the national trend, the Society's annual general rate has risen from £220 to £287.

Postage charges are a major burden. Most services of the Society will be affected considerably by the increases which came into effect on May 17: general correspondence and publications, the QSL Bureau and the BULLETIN. The increase in the cost of postage on the BULLETIN in a full year is no less than £700.

Printing is the major item in the Society's budget. At the present time the Industry is faced with increases in cost which could well put up the Society's bill for printing by as much as 18 per cent. in the next few months, in addition to the 5 per cent. rise last January. The next increase is expected to apply to all work after June 1, 1965. The results of the negotiations now going on cannot be foretold but it is considered that the figures quoted below are realistic.

The rises in costs we have mentioned are completely outside the control of the Society but other expenses will also continue to rise; for example, Headquarters correspondence. Salaries and wages must also increase if we are to maintain a capable staff.

The figures below give an estimate of the increased costs with which the Society will be faced during the coming year and are based either on known facts or on a realistic estimate provided by our Printers and Accountants.

		£
Rent and services		770
Rates		67
Electricity and gas		10
Cleaning		108
Salaries, wages, pensions, cost of living increases, merit rises and possible additional staff		1,250
Telephone		50
General postages		250
QSL Bureau postages		60
General printing and stationery		100
Audit fees (as agreed at the AGM)		20
BULLETIN:		
Printing, paper, blocks and drawings	3,088	
Copyright fees	200	
Postage	700	
		£3,988
TOTAL ESTIMATED INCREASES		£6,673

It is our carefully considered opinion, that, in the light of the above figures, the annual subscription for Corporate Members should be raised to 50/-, and that for Associate Members to 25/-. The Council of the Society has accepted this advice and the new subscription rates will come into effect on July 1, 1965.

The membership subscriptions fall due evenly throughout the year and therefore in the first year only half the increased revenue will be received. Therefore, for a Corporate membership of 12,000 the increased revenue will be £9,000 in a full year but only £4,500 for the year ending June 30, 1966. Looking ahead two years, and assuming no further increases in costs in the printing industry and no more increases in Rates, Postages and similar expenses, the deficiency for two years would be £13,346. In this period the increases in subscriptions will total £13,500. The surplus in the 1964 accounts of about £1,000 must be kept as a reserve.

It is intended that with the solvency of the Society assured for the time being, full services to Members will be maintained and the BULLETIN will continue to be improved in content and presentation.

NORMAN CAWS, F.C.A., *Honorary Treasurer*
ROY STEVENS, *Executive Vice-President*

News from Headquarters

Mobile Operation

Many enquiries have been received from members regarding the implications of a proposal by the Ministry of Transport to amend the Motor Vehicles (Construction and Use) Regulations to forbid the driver of a motor vehicle to " speak into any radio transmitting equipment."

As soon as the Minister's proposal was made known the Society took the matter up at the highest possible level. As a result, representatives of the Society will be attending a meeting with Ministry officials shortly.

Headquarters Fund—List No. 26

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

S. J. Coe, G3FCT; C. J. W. Thomson, G3PEM; H. Parker, VS9PJV; E. Shackleton, G6SN; D. A. Jones, ZL1AOJ; E. A. Lomax, BRS1579; J. Barton, A2737; A. J. Mathews, G6QM; F. J. Biggerstaff, BRS22277; R. H. Roling, GW6WM; Dr. A. Liftig, K1IXG; Mitcham and District Radio Society.

Total amount collected to date: **£2,049 17s. 4d.**

DL2 QSL Bureau

The DL2 section of the RSGB QSL Bureau had been taken over by Cpl. C. Thomas, DL2CT, Box 125A, RAF Butzweilerhof, BFPO 19. Mr. G. D. Griffith, DL2OX/G3POX, who has been responsible for the Bureau for the last three years, is returning to the UK.

RSGB QSL Bureau

The address of Mr P. R. Cox, G3RYV, QSL Bureau Sub-Manager for call-signs in the series G3UAA-G3UZZ, is now 38 Ridgway Crescent, Tonbridge, Kent.

The new postage rates are 4d for up to 2 oz, and 2d for each additional 2 oz.

" Home Brew "

The accent of the special feature on the stage of the Seymour Hall, London, at the 1965 RSGB International Radio Communications Exhibition is to be " Home Brew."

In previous years it has proved difficult to do justice to the many outstanding examples of Home Built Equipment entered for the various contests, due to lack of space. This year, however, with the accent on " Home Brew " the many pieces of equipment are to be given the place of honour on the stage where they will be seen to the best advantage.

In order to provide a first class display it is essential that there be a large entry of high standard for the various contests. Some of the awards are as follows: *Horace Freeman Trophy*, *Exhibition Organiser's Plaque*, *" Other Regions Awards,"* *Special Award for " Amateur " Amateurs*, *Junior Constructors Award*. Details of these contests will be given in a later issue of the BULLETIN, but now is the time to start building that new piece of equipment, or finish off the one you already have on the stocks.

Your Exhibition Committee asks you for a maximum effort in making this special feature a great success, and to show the world that the British Amateur is in the forefront when it comes to home-constructed equipment.

Make a start now—it may bring you a valuable prize, but it will certainly bring you that special satisfaction which pertains to a " Home-Brew " effort.

Prof. Martin Ryle, G3CY, Honoured

Professor Martin Ryle, Director of the Mullard Radio Astronomy Observatory at Cambridge, has been awarded the Henry Draper Medal of the United States National Academy of Sciences for outstanding achievement in astronomical physics. The award was made on April 26 in Washington, D.C., during the 102nd Annual Meeting of the Academy.

Professor Ryle was an early investigator of the discrete sources of radio emission in the sky, the existence of which was just becoming established in the period immediately following World War II.

It was to a crowded meeting of RSGB members held at the Institution of Electrical Engineers in 1948 that Martin Ryle gave one of the first public lectures in the British Isles on the then new science of Radio Astronomy. Since that time Professor Ryle has become world-famous for his researches at Cambridge. Members who attended the RSGB National Convention at Cambridge during 1960 will remember that Professor Ryle, who has held the call G3CY since 1938, personally conducted the several parties of visitors who toured the Mullard Radio Astronomy Observatory on that occasion.

Professor Ryle is a Fellow of the Royal Society, winning the Hughes Medal of the Society in 1954. He is also a Fellow of the Royal Astronomical Society and won the Gold Medal of that Society last year.

The Henry Draper Medal, established in honour of an eminent American astronomer and Academy member by his widow in 1883, was last awarded in 1962. Professor Ryle became the 350th recipient.

RAE Course

A course for the Radio Amateurs' Examination will begin in September at the Evening Institute, Farlingaye School, Woodbridge, Suffolk. Further information may be obtained from the Head of the Institute, Mr. A. R. Spicer.

Staff Vacancy at Headquarters

There is a vacancy for an enthusiastic radio amateur with a good command of English to join Headquarters staff. The work will be concerned principally with the RSGB BULLETIN but there will be ample opportunity to gain experience in the production of the Society's many other publications for the amateur.

Applications, giving details of education and previous experience (if any), should be addressed to the

General Manager,
Radio Society of Great Britain,
28 Little Russell Street,
London, W.C.1.

TRANSEQUATORIAL RADIO PROPAGATION DURING THE YEARS OF THE QUIET SUN

An Amateur IQSY Project

By R. C. CRACKNELL, ZE2JV, and R. A. WHITING, ZC4WR

A GROUP of amateurs located at various points between Dundee in the North and Capetown in the South have been actively engaged in transmitting and recording signals across the Equator on frequencies between 29 and 50 Mc/s. Observations, which started in September 1963 and were planned to continue through the current minimum of sunspot activity through which we are now passing, have been centered around two beacon transmitters. The first was operated by ZC4WR from his home in Limassol, Cyprus with a power of 25 watts into a vertical aerial on a frequency of 29,008 kc/s, and the other operated under a special licence, ZE1AZC on 50,046 kc/s, is situated on a magnificent 1,000 ft. hilltop some 23 miles north of Salisbury, Rhodesia.

ZC4WR's beacon transmission, which was regrettably closed down by Cyprus Government order in September, 1964, was propagated into Southern Africa with a regularity that surprises the experts, and over the period it was operated was continually monitored at Salisbury (ZE2JV), Bulawayo (ZE1AN), Sasolburg, Orange Free State (ZS4SA) and Worcester, Cape Province (ZS1LA).

Perhaps nobody other than ZC4WR and ZE2JV, who since 1958 have together specialized in transequatorial v.h.f. propagation [1, 2] would have dreamed of trying long distance 50 Mc/s tests during sunspot minimum, and neither of them expected more than an occasional opening of the much favoured Cyprus–Rhodesia path [3], over which as late as 1962, propagation at 72 and 84 Mc/s had been recorded [4]. However, since ZE1AZC went into continuous operation in April, 1964, many reports have been received from BRS26325 in Dundee over the period June-September 1964, from W4JQB and WA4AGF on June 30/July 1, and DE-A-00544 in Bad Godesburg, Germany on September 9, 1964. These exceeded the most optimistic expectations and indicate that the transequatorial mode (t.e.p.) has still not been fully appreciated.

The T.E.P. Mode

Most of us know from our own operating experience and from elementary *Handbook* theory [5] that the upper layers of the ionosphere (*F* region) tend to be denser over the Equator than over the Poles. It should be expected that minimum ionization would occur over the magnetic poles and maximum along the line of zero magnetic dip (which we call, not strictly accurately perhaps, the Geomagnetic Equator). In fact, however, this is an over-simplification, and instead of the maximum we find a bite-out in ionization over the G.M. Equator, and the rolling back of the maxima into two high density zones in the regions lying 10°-15° to the north and south of the G.M. Equator.

Since these high density regions typically develop electron densities three to four times greater than experienced elsewhere, stations so situated to take advantage of them can employ frequencies nearly twice as high as could stations elsewhere. And this is not the full story. If stations are situated so that they are symmetrically positioned with respect to these h.d. regions, signals can bounce like a billiard ball off each in turn without intermediate ground reflection. In this case the wave requires less refraction and hence an even higher frequency is usable and attenuation lower than for normal multi-hop *F* layer propagation. The morphology of the h.d. regions after dark is even more fascinating, as these regions split up into blobs or columns of extra high density ionizations, disappearing after midnight to re-appear in the early morning hours as high altitude layers of ionizations capable of channelling signals along the lines of the earth's magnetic field in a similar manner to v.l.f. dawn chorus whistlers [6].

These phenomena make a particularly interesting study, as position of the vertical sun, sunspot cycle and diurnal variations in the morphology of the tropical ionosphere affect the symmetry, and relative densities of the h.d. regions, and have fully occupied the Amateur activities of the writers, and many of their Amateur friends, since the two first ran schedules as VQ4RAW and G2AHU respectively.

Historical Note

Early exploitation of this mode on 50 Mc/s was well recorded in the BULLETIN and the achievements of G6DH's historic QSOs with the late ZS1T and ZS1P are well worth recalling, as were many reports from G5KW operating as MD5KW from the Suez Canal zone during the 1947/48 sunspot maximum. The following extract from the log of VQ2PL (now ZE7JX) is typical of what t.e.p. can provide: " 18.11.47. 50 Mc/s. MD5KW. 5-7/5-7. We started at 19.00 and carried on until midnight. . . . "

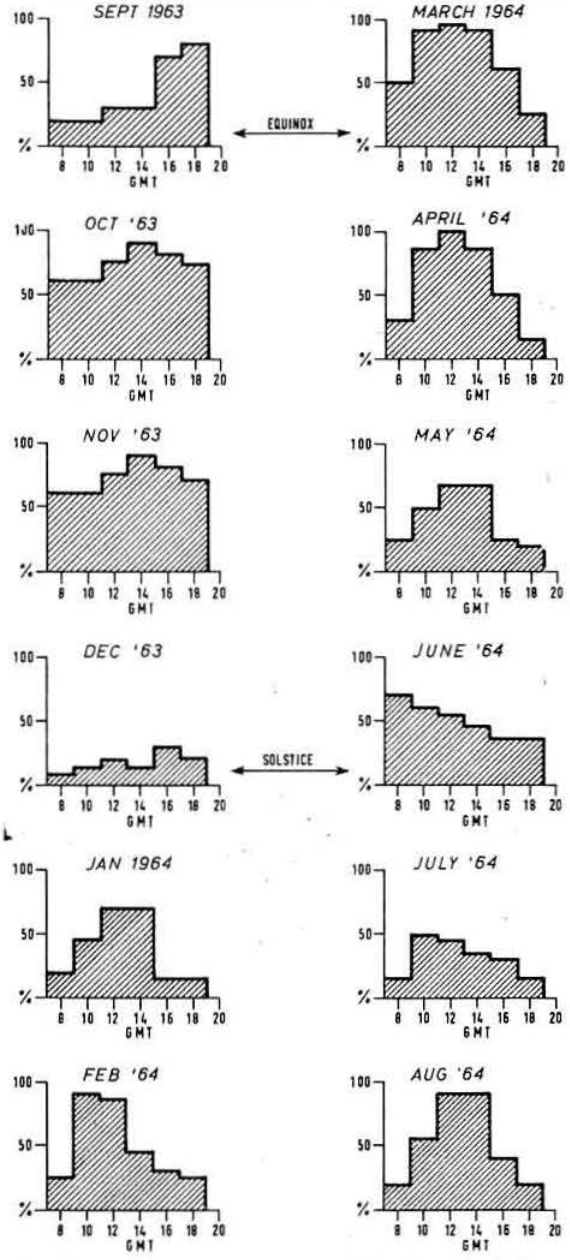
Ironically, Southern Rhodesian stations were not licensed to use 50 Mc/s until 1949—more or less at the same time that British stations lost the band—but ZE2JV well remembers the 1948 BERU contest, when it was possible to work Gs on 28 Mc/s right through the contest all night and all day as well. The night time signals had that peculiar flutter-fade-auroral-type sound that later became so familiar on t.e.p. signals.

The 50 Mc/s DX was then forgotten; dismissed by all observers as a freak occurrence of the years of the highest sunspot count up until that time. However, soaring sunspot numbers in 1957 prompted many of the same gang to dig transmitters out of the garden sheds and search for the forgotten ubiquitous RF26s. The stories of yet higher sunspots than ever recorded before and world wide 50 Mc/s DX are too well published to bear repetition here [3] and the ARRL Propagation Research Project was a commendable international effort in which amateurs in many countries, including Britain, co-operated.

Across the Equator signals on unbelievably high frequencies were observed at ZE2JV, 87 Mc/s f.m. from Israel, and 70 Mc/s police signals from Cyprus. Up turned a school friend G8IP as ZC4IP, and of course ZC4WR, and the 28/50 Mc/s game was on. Night after night, sometimes nearly all night: " 50 Mc/s Rhodesia–Cyprus more regular than a telephone line, elephants can't knock it down," we quipped. Signals were analyzed photographically, timed [7] and the long QSOs gave way to automatically keyed transmissions that continued through the IGY and after. At least three modes of transmission paths were identified, each with its characteristic time delay and fading pattern, and it was shown that at times these took place simultaneously giving signals difficult to decipher.

The Reliability of the Limassol/Salisbury T.E. Circuit on 29·008 Mc/s

Histograms showing percentage of operational days' signals received in Salisbury, Southern Rhodesia, from Limassol, Cyprus, on a monthly basis.



During 1957/60 50 Mc/s QSOs with all parts of North America were commonplace from Rhodesia, and many reports on the automatic transmissions arrived from the Northern hemisphere from California in the West to near Japan in the East, and especially from F9BG and G4LX (Newcastle). However, transmissions only took place on restricted schedules and some of the oddities of propagation shown up by ZE1AZC in 1964 were never suspected at the time. Perhaps of even greater significance in pointing to the reliability of t.e.p. was that ZC4WR's 28/29 Mc/s transmissions almost every evening from 1958 to 1962 showed an over-all reliability of nearly 99 per cent, mostly on phone, and his transmitter ran 15 watts to a long wire aerial.

This was the background which prompted us to take a look at what the t.e.p. circuit could do when sunspot counts were low.

Results: September 1963–September 1964

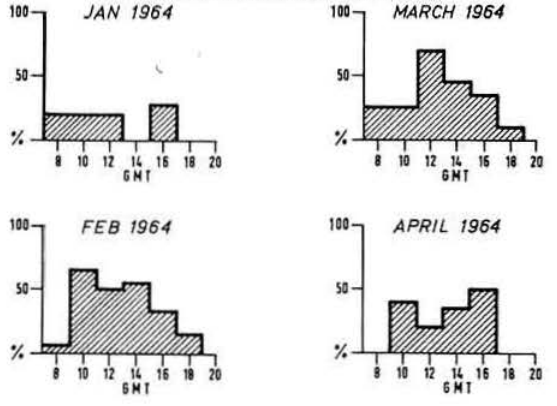
Although observations of the signals radiated by the 29 Mc/s beacon transmitter were made at several places in Southern Africa, the principal path considered is the one to Salisbury. At ZE2JV's QTH automatic recording equipment was installed to record signal levels and such recordings were continuous throughout the observational period from September 1963. The operating times of the beacon were 07.00-19.30 GMT at weekends, and 14.30-19.30 GMT on weekdays. These times were chosen to fit in with amateur operating practice and to provide further data on the previously noted anomalous behaviour of the t.e. circuit after sunset. In view of the early morning propagation anomalies revealed by ZE1AZC's 24-hour operation on 50 Mc/s, the beacon, reactivated as ZC4WR, now operates continuously. In interpreting the results presented here the original operating times of the beacon should be borne in mind.

The reliability of the Limassol/Salisbury and other paths exceeded all expectations in view of the lack of solar activity. To give some idea of the distances involved the Limassol/Salisbury path is 3,400 miles long and would be a normal $2F^2$ circuit. The reliability of this path is well illustrated by the series of histograms (Fig. 1) covering nearly a year's observations and far exceeds that predicted by conventional methods of calculating the m.u.f. In fact, as can be seen, 10m contacts were possible throughout the year between the two locations and except for one month were possible never less than five days out of ten during operational hours.

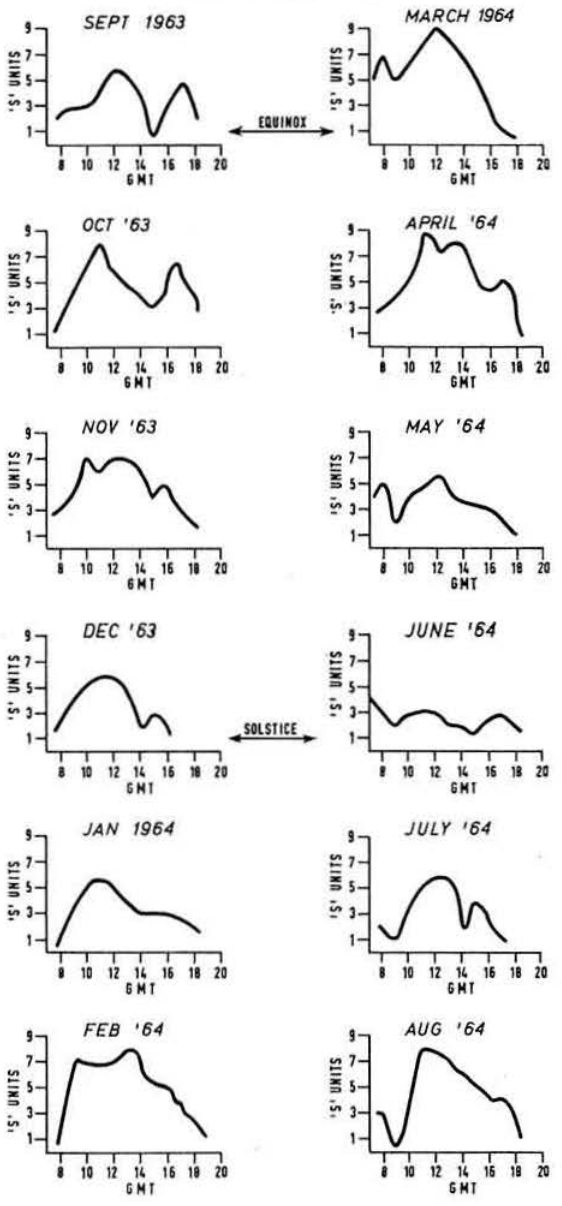
The histograms show too the seasonal variation in circuit behaviour, influenced by the sun's position relative to equatorial regions. The circuit was most reliable at the equinoxes and least reliable at the solstices. This seasonal pattern was observed on all paths and has been observed in preceding years on the higher frequencies as well. In particular, it is interesting to note that circuit reliability was highest just after the September equinox and slightly before the March equinox, i.e., when the sub-solar point is south

The Reliability of the Sasolburg/Limassol T.E. Circuit on 29·008 Mc/s

Histograms showing percentage of operational days' signals received in Sasolburg from Limassol on a monthly basis.



Average Diurnal Signal Level for the Limassol/Salisbury T.E. Circuit on 29·008 Mc/s



of the Equator. The circuit was least reliable during the December solstice. The June solstice brought indications of anomalous early morning propagation as can be seen from the histogram for this month. Also during this month there were reports of early morning reception of ZE1AZC (Salisbury) on 50 Mc/s in Dundee, Scotland. The post-sunset openings, which were a feature of the t.e. path when the sunspots were more frequent have gradually declined. The histograms show that during September, October and November, 1963, the circuit was open for not less than seven days out of ten at 18.00 hours GMT, but this anomalous behaviour after sunset did not manifest itself to any great extent in 1964 and at present it would seem that this phenomenon is a function of sunspot number.

The path to Bulawayo (ZE1AN), 200 miles south of Salisbury, followed the same general pattern of reliability. However, except for the equinoctial months this circuit tended to be best between one and two hours later in the day than at Salisbury. This was true also of the circuits still further south. At Sasolburg (ZS4SA), Orange Free State, the beacon was monitored regularly during the period January to April, 1964. The reliability of this circuit is summarized in the series of histograms (Fig. 2). On the average this circuit was about 50 per cent less reliable than the Limassol/Salisbury circuit, although the same general propagation pattern is evident in the histograms for both circuits.

The average diurnal signal level graphs (Fig. 3) give an indication of signal levels encountered on the Salisbury path reported on the usual amateur reporting scale. These results are qualitative rather than quantitative, although the signal levels reported at Bulawayo were much the same. In examining them it is worth remembering that the signal source in Limassol had a power output of 25 watts to a 0·6λ vertical aerial mounted 20 ft. above street level on the roof of a block of flats in downtown Limassol. Hence it is evident that the results achieved are well within the capabilities of low power amateur equipment. They serve as illustration too of the low path loss encountered over the trans-equatorial circuits.

In the main the signal levels followed the same hourly pattern as the circuit reliability, i.e., during the periods when the circuits were most reliable, signals were at their strongest: an indication that during these periods the m.u.f. was close to the beacon operating frequency. Generally, the signals received at Sasolburg (ZS4SA) and Worcester (ZS1LA), Cape Province, were about 2 to 3 S units weaker than the signals received in Bulawayo and Salisbury: indicative of an increase in path loss of between 8 and 15db on the longer circuits. The increased path loss is possibly due to another hop and if this is so then the ionosphere south of Rhodesia was capable of supporting propagation on 29 Mc/s.

Again the diurnal signal level graphs for the months of September and October show the anomalous propagation phenomena after sunset, peculiar to the transequatorial circuit, when both signal levels and reliability increased. This was a familiar pattern in preceeding years of higher sunspot activity and in the past it was found that the highest frequencies were propagated after ground sunset time over the Salisbury/Limassol path. After the March equinox there is evidence of an early morning peak in signal levels, but the post sunset rise in signal strength is no longer in evidence. In previous years about 50 per cent of the signals propagated over the transequatorial circuit after ground sunset time displayed a form of flutter fading, similar to that displayed by auroral propagated signals. However, with the decline in post sunset activity, flutter fading has been less and less in evidence and it is probable that these two phenomena are linked with each other and influenced by the decline in sunspot numbers.

During the months of January through to April the Salisbury Police transmissions on 40·15 Mc/s were monitored in Limassol. The Police were aware of this and recordings of their signals were sent to them for their information. During March, the best month, they were received on the average on four days out of ten around 12.00 GMT and two days out of ten around 17.00 GMT. These are the two peak times for the transequatorial circuit. Because of the sporadic nature of these transmissions the results obtained give little indication of circuit performance but they do show how high the transequatorial circuit m.u.f. rose with low sunspot activity. It is interesting to note that during March they were receivable after sunset. On the only occasion that

Summary of Reception Reports of 50 Mc/s Beacon Transmitter, ZE1AZC, Salisbury, Rhodesia

Observer	QTH	Date	Time (GMT)	RST	Remarks
5B4WR	Cyprus	27.3.64	17.20/17.50	227	Flutter fading
WA4AGE	USA	30.6.64	00.00	57	
W4JQB	USA	1.7.64	00.39/00.44	?	
D. Douglas	Dundee, Scotland	2.7.64	05.00/05.05	226	Rapid fading
		10.7.64	05.12/05.18	338	Moderate fading
		18.8.64	21.30/21.48	469/348	Pings at 4min intervals
DE-A-00544	Germany	9.9.64	02.12/02.44	48	
D. Douglas	Dundee, Scotland	13.9.64	05.30/05.36	S6	Slow fading
		14.9.64	04.28/04.36	S8	Slow fading
		19.9.64	21.32/21.49	S2	Rapid fading
		20.9.64	21.00/21.06	S3	Rapid fading
		21.9.64	00.10/00.16	S2	Rapid fading
		24.9.64	21.10/21.12	S4	
		26.9.64	06.00/06.09	S7	Slow fading
		27.9.64	05.32/05.36	S4	Rapid fading
		1.11.64	22.32/22.46	229	Rapid fading
		2.11.64	23.50/23.58	349	High noise level
		13.11.64	05.10/05.12	339	
		20.11.64	21.40/21.50	229	
		2.12.64	23.30/23.35	339	High noise level

ZE1AZC on 50·008 Mc/s was received in Limassol it was received around 17.30 hours GMT, again in March, 1964. It should be noted, however, that monitoring on 50 Mc/s in Limassol was carried out only occasionally.

ZE1AZC has been received at several locations: in Europe, USA and Scotland. The most consistent reporter was the Dundee observer. The reports are summarized in Fig. 4, and they provide a good deal of food for thought as they underline several unsuspected possibilities of the transequatorial circuit. However, because of the intermittent nature of these reports it is not possible to draw any definite conclusions. At certain times the Dundee observer noticed flutter fading on the received signals which he compared with the fading effects noticed on signals propagated via the aurora. It should be noted too that all the reception times are for when darkness prevailed at the beacon location. The times of reception are generally late evening, around midnight and early morning when related to the sending end of the transequatorial circuit. Reception is reported at both an equinoctial and a solstice period although in general stronger signals were receivable at the September equinox. It is, of course, possible that two modes of propagation are involved here and that this is not just straightforward transequatorial propagation. More data is required and more observers are needed.

It has now been established that throughout the sunspot cycle the transequatorial propagation path can be worked using higher frequencies than previously anticipated. Sporadically, frequencies as high as 90 Mc/s have been usable on t.e. paths of between 3500 and 5000 miles.

M.u.f.'s vary appreciably with the seasons, and as the high density zones vary in density, so paths of different lengths become usable, but between Cyprus and Rhodesia equinoctial conditions bring the highest m.u.f.'s and reliability.

It is possible that t.e.p. conditions extend as far north as Scotland (the Geomagnetic Equator on a great circle path from Britain lies well to the north of the Geographic Equator) and this is especially interesting for amateur exploitation as it has a variety and complexity that is always intriguing, together with the ability to transmit low power signals over long distances with little attenuation. It is predicted with considerable confidence that 70 Mc/s propagation from Britain to ZE, ZS, CR6 and CR7 will be possible when sunspot numbers rise again.

The value of beacon transmitters in radio propagation studies has been proved beyond question, and much thought and development has gone into the design and the type of transmission employed. ZE1AZC is a small transmitter built right into the aerial itself, producing 40 watts f.s.k., coded for recorders, into its ground plane aerial. Built by ZS1LA and erected by ZE3JJ and ZE2JV it has operated continuously without maintenance since its installation in March, 1964.

T.e.p. has been mainly an Amateur discovery, and the team work which has gone into its development is of the type that should in some measure justify the continued allocation of frequencies for amateur use, and has been, to quote Ed Tilton, V.H.F. Editor of *QST* [8], "One of the finest examples of Amateur Radio's potential for worthwhile contributions to wave-propagation knowledge."

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Brief Bulletins

The Institution of Electrical and Electronics Technician Engineers Limited is the name approved by the Board of Trade for the new engineering body which is being established by the Association of Supervisory Electrical Engineers with the support of the Institution of Electrical Engineers.

What's up there? According to President Johnson's report to Congress on space activities, delivered January 27, 1965, the number of American satellites sent into earth orbit and beyond since the beginning of the space age is 258. *Flight International* calculates the Soviet total—up to the end of 1964—as 90. Nearly 150 objects of all kinds—satellites, last stage rockets and the like—are still orbiting the earth. The US space agency (NASA) has about 50 scientific satellites in space—21 of them sending signals back to earth. Both Anglo-American satellites are still transmitting and the second one, *Ariel 2*, continues to provide useful data.

CO-AXIAL RELAYS†

By H. J. DOHLUS, DJ3QC*

IN most v.h.f. and u.h.f. installations, co-axial cable is employed for the transfer of r.f. power from the transmitter to the aerial, and from the aerial to the receiving system. For rapid changeover of the aerial between the receive and transmit modes, a relay is required which, ideally, has been specifically designed to function with this type of cable. These are known as co-axial relays.

Co-axial relays are constructed so that they exhibit a characteristic impedance which matches that of the co-axial cable with which they have to work. When the impedance of the relay and that of the cable are identical, no mismatch

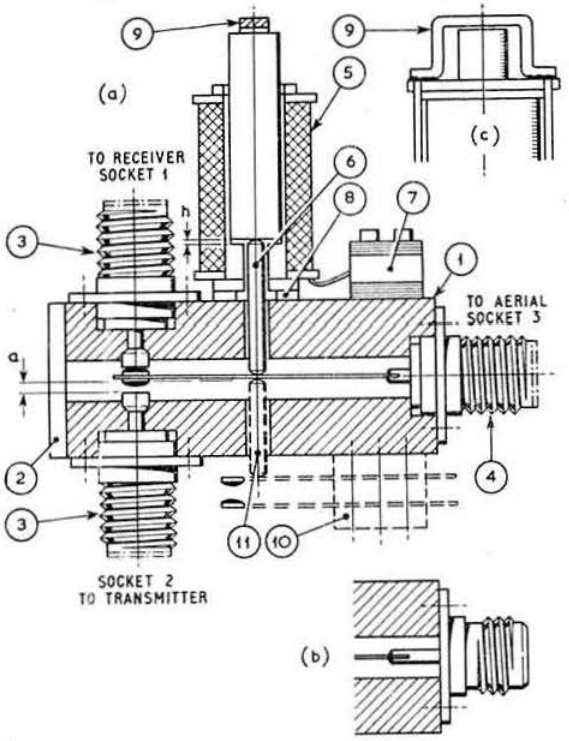


Fig. 1. (a) A sectional view of the coaxial relay, version (A). (b) An alternative arrangement to enable the German DIN 47281 coaxial sockets to be employed (B). (c) An additional elevation showing the method of mounting the plunger retaining loop 9

point will be introduced into the transmission line to degrade the standing wave ratio and produce reflections in the feed system. In practice, absolute perfection in matching is rarely, if ever, attained, due in the main to the fact that the impedance quoted for co-axial cable is normally a nominal figure, and subject to some variation.

Several types of low-loss co-axial relays have been described in *UKW* and these have led to the development of the relay to be detailed in this article.

The relay to be described may be constructed for co-axial line impedances of 52 ohms, 60 ohms or 75 ohms, the impedance being determined by the dimensions of the cavity containing the switching arm, and the size of the switching arm itself. Full dimensions are given, and while these are expressed in millimetres, they may be converted into inches by use of the following formula: $Inches = \frac{x}{25{\cdot}4}$ where x is the dimension given in millimetres.

One particular feature of the relays is their good crosstalk damping level, and this is of special interest in receiving systems employing high conductance frame grid triodes which can be quite easily damaged by excessive r.f. leakage during transmission periods. Specific information on the crosstalk level is given later.

The form of the relay is such that it can be mechanically linked to other contact sets and so be built up into a complete master control unit. When giving thought to such an arrangement, however, the possible need to arrange sequential switching should be remembered, and as will be seen, this is related to the r.f. power that the co-axial relay is expected to carry.

Mechanical Description

Fig. 1 shows the cross section through the relay.

Three co-axial sockets (3) (4) are fitted to a rectangular brass block which has been drilled out both horizontally and vertically to produce a cross-shaped cavity. Socket 3 (4) which is fitted to the right-hand end, carries a spring switching strip fitted with double contacts, these being positioned precisely in line with the stubs on sockets 1 and 2 (3). The stubs of sockets 1 and 2 (3) are fitted with contacts and these will mate with those on the spring arm.

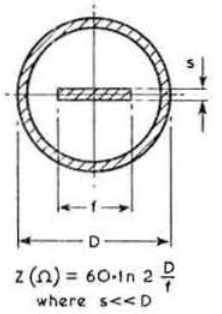
The spring strip attached to socket 3 (4) is formed so that it is normally in contact with the stub of socket 1. Pressure on the actuating rod (6) will move the spring strip from its rest position in contact with socket 1, over to the contact on socket 2. The actuating rod (6) is powered by the solenoid (5) and its associated plunger. The extent of the movement of the plunger/actuating rod is shown as (h) on the drawing.

A second actuating rod (11) may be fitted opposite the primary actuating rod (6). This allows switching of other contact strips (10) which may be built on to the co-axial relay unit and employed for control switching purposes.

After the position of the spring switching strip, and the contact separation (a) have been adjusted, the front of the brass block (1) is closed by fitting the cover (2), and the leads from the solenoid terminated on the connecting block (7).

Design Impedance

Co-axial cable usually employed has an impedance of either 52 ohms, 60 ohms or 75 ohms. For the reasons already covered, the characteristic impedance of the relay, sockets and cable should all be the same, and this means that the relay must be designed to operate with the particular cable concerned in respect of its quoted impedance. The section



Z (Ω)	f (mm)	D (mm)	VERSION
52	6·7	8	A
60	5·9	8	A
75	4·6	8	A
52	8·0	9·5	B
60	7·0	9·5	B
75	5·5	9·5	B

Fig. 2. Conductor dimensions for different impedances.

* (852) Erlangen, Gleiwitzerstrasse 45, Germany.

† Adapted from an article in *UKW-Berichte*, March 1963, published by the Austrian Society, Österreichischev Versuchssenderverband.

of an asymmetrical h.f. conductor corresponding to the relay is shown in Fig. 2.

The flat spring strip of width (f) and thickness (s) lies centrally in the circular conductor, this being formed by the horizontal bore through the block (1). The characteristic impedance Z with air dielectric ($K = 1$) can be calculated from the formula given in Fig. 2, or derived from the graphs of Fig. 3. The dimensions required to produce specific impedances are given in the table associated with Fig. 2.

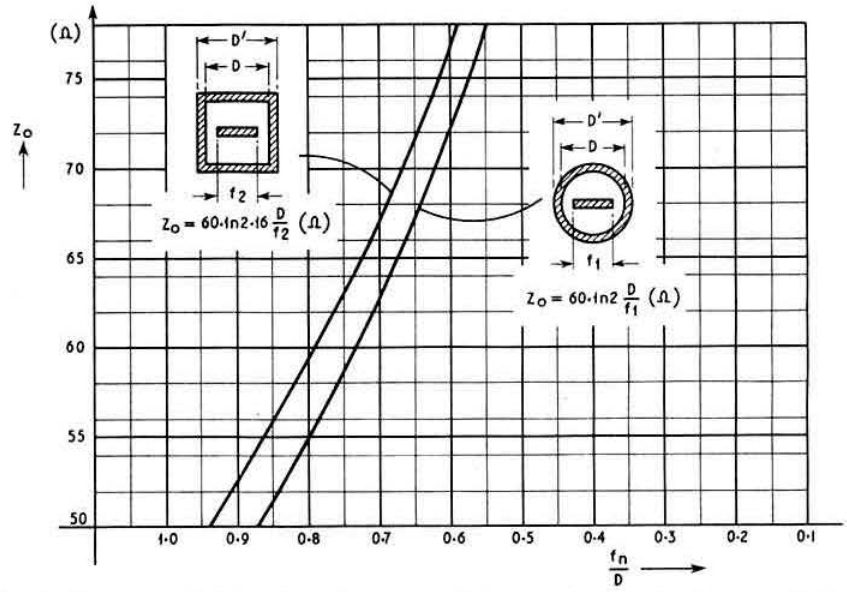


Fig. 3. The characteristic impedance of a conductor having circular or rectangular cross-section, assuming an air dielectric (K = 1).

Co-axial Sockets

Two versions of the relay are illustrated, but they are only different insofar as the type of co-axial socket is concerned. Both versions *A* and *B* can be made to suit the required impedance.

The normal American h.f. co-axial sockets with a square mounting flange have, on their mounting side, one or more cylindrical steps. This means that the relay body (1) has to be counter-bored accordingly. As the dimensions of these steps differ according to the manufacturer, the dimensions of the counterbore will have to be adjusted according to the exact type of socket employed. For this reason no specific size is given. What is particularly important is that the end of the socket's outer conductor makes good electrical contact with the base of the counterbored hole.

In version *A*, which employs American sockets, the following type numbers are suitable:

JAN Series	*JAN Type No.*	*Impedance*
VHF	SO-239	50 ohms
UHF	SO-239(A)	50 ohms
N	UG-58A/U	50 ohms
C	UG-568/U	50 ohms

The characteristics and insulation of these sockets are as follows: SO-239 uses compressed mica dielectric, and is suitable for frequencies up to 200 Mc/s; SO-239A employs Teflon (p.t.f.e.) insulation and may be used on frequencies up to 500 Mc/s. This particular socket is not waterproof, and neither type should be operated in excess of 500 volts.

The N series is rated for use on frequencies up to 10,000 Mc/s, but in practice is not generally used above 3000 Mc/s. The insulation may either be Teflon or polystyrene according to the manufacturer. They are waterproof and can handle up to 1500 volts, and may be obtained for 70-ohms impedance. The C series has the same characteristics and is available in 50-ohms or 70-ohms impedance.

Connectors are available for matching and interconnecting one series with another.

In version B, only sockets meeting the German specification DIN 47281 are employed. These have a flat base—without the circular flanges of the American type—and this makes construction somewhat simpler since the relay body does not have to be counterbored. Great care must, however, be taken when fitting these sockets to ensure that the stub is precisely central to the bore of the relay block. Particularly is this so in the case of the socket identified as (4) in Fig. 1.

Suitable sockets meeting the DIN 47281 specification are as follows:

Type	*List No.*	*Impedance*
3·5/9·5	BN 4171	60 ohms
4·1/9·5	BN 9812	50 ohms
3·5/9·5	BN 5845	75 ohms

Type 3·5/9·5 is compensated and meets all requirements up to 3000 Mc/s, as do the alternative impedance versions.

Construction

It has been mentioned that two versions of the relay are shown, the differences being accounted for by the physical construction of the co-axial sockets employed.

Some simplification of the construction when American-type sockets are employed can be secured by ignoring the stepped shoulders on these sockets. In this event the diameter of the cavity bore is made constant from one end of the block to the other. That is, the diameter (b) on the left-hand side of the section A-B is increased to the same as that of (c) on the right-hand side (Fig. 5).

Making this bore a constant 9·5mm throughout its length will clear the shoulders of the American sockets. If this course is adopted, the impedance of the relay is adjusted by correct selection of the size of the switching arm. This will be found in the table associated with Fig. 2, the first three lines of which should now be ignored.

Ideally, the main cavity containing the switching arm should be drilled about 0·2mm undersize, and then finished with a reamer. The final surface must be smooth and free from burrs, particularly at the intersections with cross drilled holes.

The hole (e) which accommodates the actuating rod should not exceed 3·2mm in diameter, and if it is required that the co-axial relay shall operate other contact sets driven by the same energizing system, then this hole should be drilled right through the block.

The main cavity bore housing the switching arm should will be silver plated.

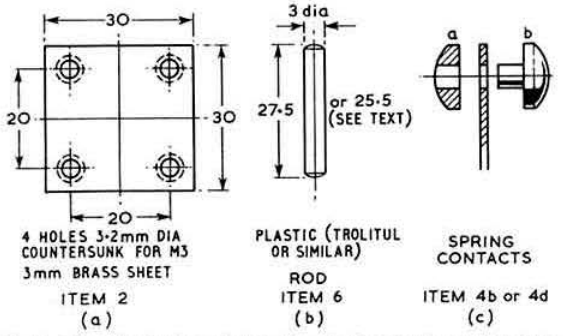


Fig. 4. The relay body end plate, the plastic actuating rod, and the method of assembling the spring contacts.

The solenoid is secured to the body of the relay by two countersunk brass screws which pass right through the body of the relay block, and this is illustrated in section X-Y in Fig. 5, the screws being designated M3.

The solenoid specified has only a very small hole in its base, and this has to be increased to 3·2mm in order to accommodate the 3mm actuating rod. If it is made larger than 3·2mm, the performance of the solenoid will be affected.

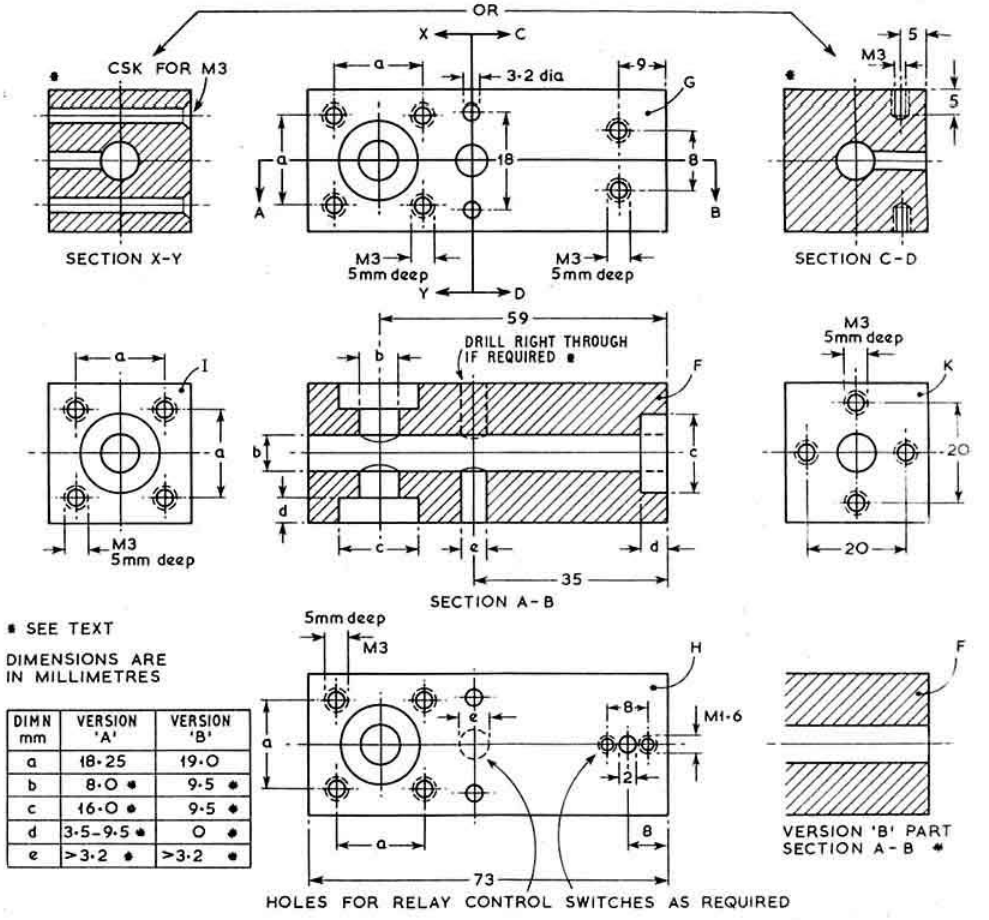
Prior to plating the main cavity, the solenoid should be secured to the main block, and the alignment of the drilling of the base of the solenoid to that of the hole in the block which accommodates the actuating arm, checked. Any adjustments that are found to be required should be made before the cavity is plated.

After assembling the relay and checking the contacts, the wire loop (9) Fig. 9, is soldered to the magnet frame as shown in Fig. 1 (c) to prevent the plunger falling out of its housing.

The rod (6) shown in Fig. 4(b) and in Fig. 1, should be 25·5mm long, but if the solenoid is mounted on an angle piece (8) in Fig. 1 and Fig. 10, instead of being secured directly to the main body of the block, it will have to be increased to 27·5mm. The rod is made from 3mm diameter polystyrene stock, as is that for coupling in other contact sets if they are fitted (11).

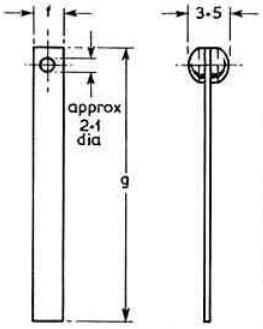
Assembly

Fig. 6 provides details of the manner in which the contact



DIMN mm	VERSION 'A'	VERSION 'B'
a	18·25	19·0
b	8·0 *	9·5 *
c	16·0 *	9·5 *
d	3·5–9·5 *	0 *
e	>3·2 *	>3·2 *

Fig. 5. Item 1—the relay body component parts.



DIMN (mm)	VERSION 'A'	VERSION 'B'
g	55	53
f	See Fig 2/3	
Part	4b	4d

Fig. 6. The switch spring strip dimensions.

is fitted to the spring arm, while Fig. 4(c) illustrates how the contacts are prepared prior to being fitted.

The shaft of one of the contact rivets is removed, and the back then filed flat. This rivet is then drilled centrally with a hole equal to the diameter of the shaft of the other rivet. A sandwich is made consisting of the stemmed rivet passing through the spring arm—previously drilled to take the stem

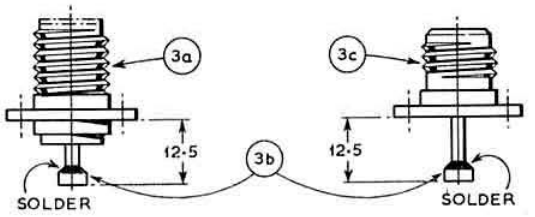


Fig. 7. Versions A and B of the coaxial sockets (3), with contact rivet fitted.

as shown in Fig. 4(c)—and the drilled rivet head slipped over the stem. The shaft which protrudes through the drilled contact head is marked at about 0·3mm proud of the dome of the head and carefully cut at this point. The shaft is now dressed back with a light hammer until a hemispherical head is produced with the spring strip firmly clamped. Provided

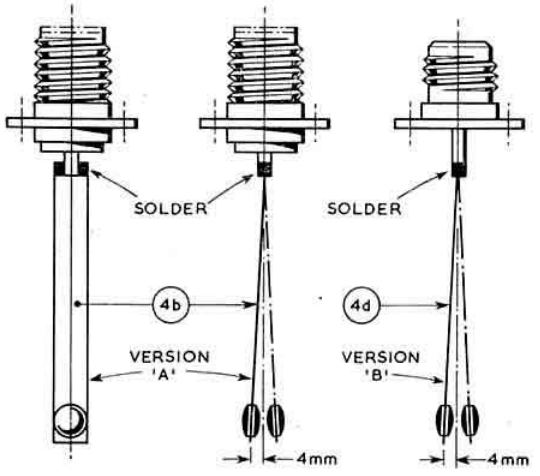
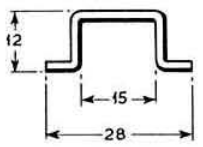


Fig. 8. The switch strip can be soldered direct into the centre conductor of either the A or B version sockets (4).

that the rivetting has been correctly done, soldering will not be necessary. Finally, a small radius is filed on each corner of the spring strip adjacent to the contacts.

Before soldering either the spring arm or the contacts to the sockets, a plug should be mated with the socket concerned. Under the heat of soldering, the insulation may well soften and cause displacement of the centre conductor, and the plug will assist in retaining this conductor in its correct position.

Fig. 7 shows how the contacts are fitted to the sockets identified as (3) in Fig. 1. The smooth contact rivet (3b) is inserted in the end of the socket's inner conductor, clamped, and then lightly soldered all round, taking care that no solder reaches the contact surface.



ITEM 9 LOOP
14 swg COPPER WIRE
BENT TO SHAPE AS SHOWN

Fig. 9. The plunger retaining loop—item 9.

Prior to fitting the contact spring switch arm, the end opposite to that carrying the contact set should be provided with a small slot—using a coping saw—of sufficient size to accept the centre spigot. A small jig, made from wire, should be devised to hold the co-axial socket and the spring arm in their correctly related positions while the soldering is undertaken. Without such an arrangement it will be very difficult to position the spring centrally to the spigot on the socket.

After the spring arm has been fitted to the socket, but before the socket is fitted to the body of the relay, a small set should be made in the spring arm so that it deviates by about 4mm, see Fig. 8, centre illustration. This will produce a contact pressure of about 50 grams, which is correct.

Once the relay has been assembled, it is checked for contact pressure and contact register. The " unenergized " position should present no difficulty since this is determined

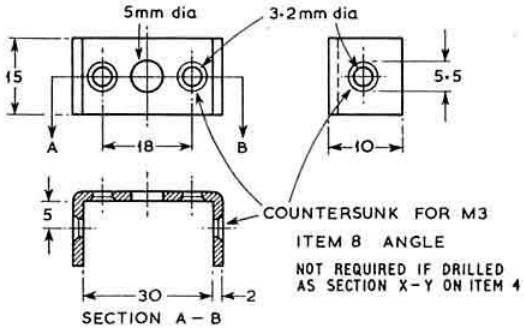
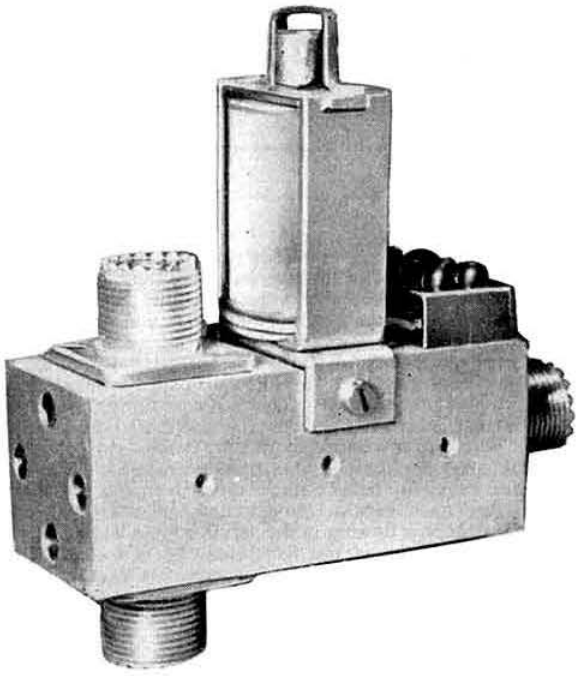


Fig. 10. The U-support for the solenoid. This item is not required if the solenoid is mounted direct on the relay body.

by the angle of the set placed in the arm. However, with the solenoid energized, the switching strip should not be bowed too far by the actuating rod (6). Adjusting the length of this rod will vary the contact pressure, and consequently the amount of " bow " in the switching strip. Finally, the cover (2) should be screwed into position.

Measured Parameters

With the relay terminated in a 60-ohms impedance, the



A co-axial relay, version *A*, constructed by DJ3QC.

following figures were obtained, the relay itself, of course, having been designed for 60-ohms operation.

Frequency	*Reflected Power*	*Crosstalk level*
145 Mc/s	0·1 per cent	−40db
435 Mc/s	0·7 per cent	−32db
600 Mc/s	1·0 per cent	−30db
1000 Mc/s	4·0 per cent	−23db

On 145 Mc/s and 435 Mc/s the relay proved itself capable of handling more than 200 watts of r.f. power. Its performance in this respect on higher frequencies has not so far been checked.

When switching appreciable r.f. power, it is not recommended that this should be done by the relay directly. Rather, sequential switching should be employed, the power being applied after the switching action has taken place. Failure to observe this requirement could lead to flash-over and arcing with serious damage to the contact surfaces.

Conclusion

Although the illustrations may give the impression that full machine shop facilities are required to construct these relays, such is not the case. True, reasonable facilities are required, but provided great care is taken to keep all drilling square and accurate, no particular difficulties should be encountered. It should be borne in mind that a small local engineering company may be prepared to undertake the drilling and reaming, or alternatively, a model maker or instrument engineer may be persuaded to assist.

Webbs Radio Log Book

The Society has taken over the log book previously published by Webbs Radio and copies are obtainable from RSGB Headquarters, price 6s. 3d. post paid. Bulk supplies are available to the trade on the usual terms.

NEWS . . .

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

Early Bird Earns Top Marks. The largest audience of all time, according to the world's press, participated in the pioneer public demonstration of Early Bird during the evening (in Western Europe) of Sunday, May 2, 1965. Those who marvelled most were those who appreciated most the immensity of the technical achievement—and to think it all happened because somewhere in space, 22,300 miles above the South Atlantic, off the east cost of Brazil, hovered a small drum shaped device, of lampshade appearance—a mere 28 in. in diameter, 23 in. high and weighing only 85 lb.—the first commercial communications satellite. Well done Early Bird!

SECAM Came First. After two weeks of technical discussion and a display of politics foreign to CCIR Study Group meetings the 200 delegates from 45 countries who met in Vienna failed to reach agreement on a standard international colour TV system for Europe. A majority (22) of nations voted for the French SECAM system but as the list of supporters included Cameroons, Gaboon, Mali, Monaco, Niger and Upper Volga little serious attention could be taken of the voting—political to a high degree. The German PAL system attracted 11 votes and the American NTSC system, backed by the United Kingdom, a bare six. As soon as it became apparent that agreement could not be reached the Postmaster General (Rt. Hon. Anthony Wedgwood Benn) informed Parliament that no date could yet be fixed for the introduction of a colour TV service in Britain. Reading between the lines it seems possible that the UK may eventually adopt a modified version of PAL.

Pioneer Honoured. Mr S. R. Mullard, M.B.E., founder of the Company that bears his name has received the City and Guilds of London Insignia Award in Technology.

Bit High for Amateurs at Present. An experimental millimetre-wave communication system is now transmitting across Long Island Sound, New York—a distance of two miles—on a frequency of 90 Gc/s—one of the highest frequencies to be utilized so far for communication purposes. The system shows considerable promise for future use in densely populated areas because of the large number of channels which could operate in the same vicinity without interference. The link was established by General Telephones & Electronics Laboratories.

Comsat Agreement. Forty-five countries have now signed a provisional agreement to establish a Global Commercial Communications Satellite System, which, if all goes well, will operate from the end of 1967.

German TV Booming. Although post-war TV is only about 12 years old in the North West part and even less in the South and South West parts of the country, Germany now ranks second only in Europe to the UK in respect of the number of viewers. The three German TV programmes are broadcast by about 650 transmitters, converters and passive relay systems to more than ten million subscribers. The rapid development of German TV will be a special feature of the Radio Products Fair to be held in Stuttgart from August 27 to September 5, 1965.

The Luck of the Irish. The Irish Radio Transmitters' Society decided three years ago to abolish their Trustee Fund and to invest the proceeds in 14 Prize Bonds. Recently one of the Bonds came up with a £100 win.

Radio Astronomics and TV. For some time the Mullard Radio Observatory at Cambridge, under the direction of Professor Martin Ryle, G3CY, has been making observations using frequencies in Channel 6 (176·25-179·75 Mc/s). One series of observations is concerned with a vitally important

(Continued on page 386)

QUA Associates

conducted by "JIX"

IT does appear that progress towards using our great hobby as a central activity in boys' clubs has been very slow. I cannot say that I know any Youth Centre or Club with an active station and radio construction room which is regularly used by the lads. Also, I have not been able to raise, even with your help, a posse of Amateurs and other chaps with know-how who might form a nucleus of leadership upon which to draw. All this is something odd in the electronic and scientific age in which we live. Your keen interests (those members who drop a line to " QUA. . . .") is in contrast to this. It is fine to read of endeavours carried out. But most activity is of an isolated type: one experimenter or listener, with, strangely enough, little " communication " between each person, as it were. What have we discussed here in the past year? There was an " A " members' meeting called about a year ago. With hundreds of young members in the London area, about six came along. Then a camp or weekend course was mentioned, but only two or so responded. Plenty has been said about clubs for boys, but nothing has been done. Do you think that young people are already believers in the " don't get involved " doctrine common these days? Perhaps your scribe has always been involved with groups on some project or another, and is biased (positively, I hope!). I have a suspicion that an *attack* outside the ranks of our Society might be the only way to press forward with these plans. New converts are always the most enthusiastic, and if made in a group or club—they tend to become the most loyal too.

I hope you will liase with me, and try to raise chats, demonstrations and meetings in your area for other young people's groups, such as the local Youth Clubs, Scouts, Boys Brigade groups etc. And remember, our hobby isn't just sitting by a CR100, etc., listening, but developing techniques, building, studying, helping out with radio control projects, electronic devices, Radio Astronomy and other natural radio signal observations. I say this because from the majority of your letters the effects of modern and technical education seem to be producing a deeper interest in the technical side; physics is often mentioned, so is maths! But, herein lies a slight danger, for these subjects can be surprisingly impersonal and may explain the weak social abilities mentioned earlier. Always the techniques are means, it is the other fellow who is the end.

From encouragement in letters from you, the " technical snippet " form of short article is popular, and the technical paragraph in " QUA. . . ." will reflect this by using an old technique in writing, namely working through the alphabet with short discussions on topics under each letter. Many items must be left out of course, but let's see what can be covered.

So we start with—A.

A is for:

Aerial

This should be the first resonant circuit in your receiving or transmitting system. The secret of success with an aerial is to have it out in the open intercepting the strongest r.f. field possible, and tuned to resonate at the frequency of interest. Unlike a *lumped* tuned circuit an aerial will tune or resonate at a number of frequencies at the same time. This is because of its *distributed* inductance and capacity, the lowest frequency of resonance is that which makes the aerial one half wave long. A quarter wave aerial is also resonant because of the reflected " image " in the ground (making a half wavelength). This is how ground-plane aerials work. If you cannot get a half wave length of wire up (or a quarter wave plus a good earth), then it is possible to deceive the shorter wire into resonance by placing *lumped* extra tuning (loading coils) in circuit. Hence mobile whips have loading coils and " capacity hats." But it is worth tuning any short wire to resonance, because the gain and sensitivity goes up. Once the energy is flowing in the aerial it must be fed to the receiver. This requires the techniques of *matching*. The impedance looking into the receiver terminals should be the

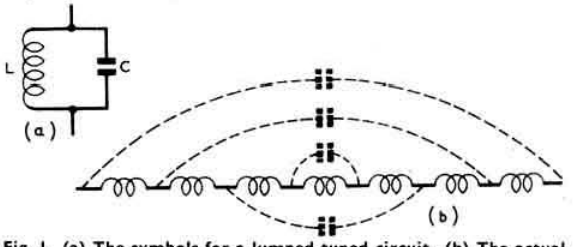


Fig. 1. (a) The symbols for a lumped tuned circuit. (b) The actual state of affairs along an aerial wire.

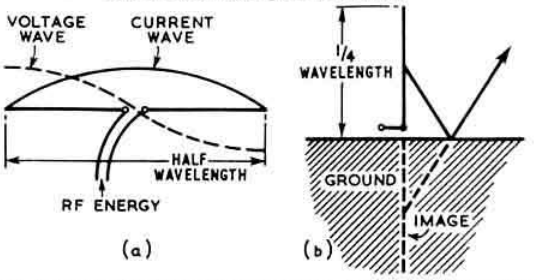


Fig. 2. (a) The half-wave aerial, or dipole, is well known, but the quarter wave vertical aerial is really a half-wave type with the lower half a " mirror image " of the upper (b).

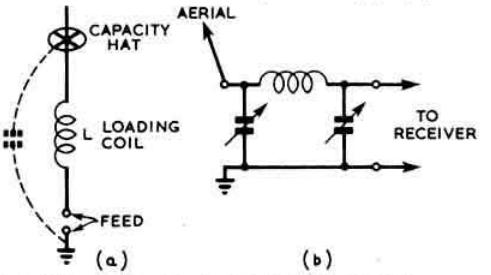


Fig. 3. (a) The usual methods of bringing an aerial to resonance, especially for low frequency band mobile use. (b) A π circuit which is commonly used to " match " impedances.

* K. L. Smith, G3JIX, 82 Granville Road, Walthamstow, London, E.17.

same as that offered by the aerial. When these two are equal maximum power is coupled into the receiver. This is where the " aerial tuning " unit (properly called aerial matching unit) comes in.

Amplifier

The whole of radio and electronics developed because devices were discovered that gave the possibility of producing large powerful signals from tiny weak ones. The vital point is that the output is a true replica of the input. In other words, the output is always *proportional* to the input, and

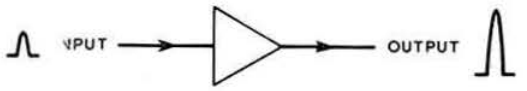


Fig. 4. The symbol representing an amplifier.

the *ratio* of this output to the input is greater than 1, and is known as the *gain*. All ordinary practical amplifiers fall short of these ideals; thus the output may not be a true replica of the input. This is called *distortion*. The amplifier usually introduces random signals of its own such as noise and hum, which limit the smallness of the input that can be handled, whatever the gain. It is the " *signal to noise ratio* " that is important. Most amplifiers have a limited *frequency response*. This means that although they are designed to amplify a.c. signals, they do not have the same gain at all frequencies. Many have no gain at all for zero frequency (d.c.) and hardly any at very high frequencies. The mid-frequency range in between these two drop offs is known as the *bandwidth*. Some amplifiers are designed to amplify d.c. signals, but the great plague of the d.c. amplifier is *drift*, which means the output d.c. level varies slowly with time, because of random changes in mains voltages, temperature and so on.

Other amplifiers are deliberately made to have a *narrow band* response. They usually have tuned circuits in the circuit, and are most commonly found in receivers as r.f. and i.f. stages. These types are also known as *selective amplifiers*.

Once the idea of amplification is understood, then many other radio circuits are covered. An oscillator is an amplifier supplying its own input signal. The circuit continuously produces an output for no external input, and we say it is oscillating. If a wide-band amplifier is used, the oscillations are at many frequencies all at the same time, and the device is usually called a *relaxation oscillator*, an example of which is the *multivibrator*. If a narrow band or tuned amplifier is used, then the output is at one frequency. Such an oscillator is the *Hartley*, for example. Another, common in amateur transmitters is known as the *Clapp circuit*. Given half a chance, ordinary amplifiers will " go off " and oscillate even when not required to do so. All that is needed is a small fraction of the large output signal to get back into the early part of the circuit. This brings the problem of *stability* to the attention of the experimenter or designer. Many circuits exist: valve and transistor, resistance-capacity coupled, transformer coupled, push-pull stages, pre-amplifiers, voltage and current amplifiers, power amplifiers, and many others. As usual, the field is wide, but the principles are relatively simple.

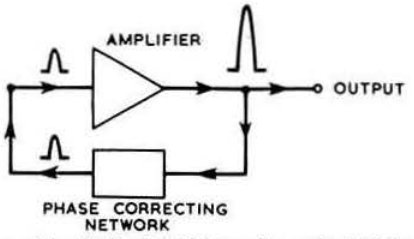


Fig. 5. By applying feedback, which supplies a signal of the correct amplitude and " phase " (i.e., the right polarity) the amplifier becomes an oscillator.

Your Communications Network; Letters this Month

A couple of letters from new members of the Society open this month's news and views. We extend a welcome to **Dave Dade, A4500**, who lives in Bromley, Kent. Dave says, " . . . and I would like to say how pleasant it is to find such a friendly atmosphere among Radio Amateurs." I'm sure we all agree with that, and extend it ourselves to younger beginners. Also to **Peter Osborn, A4364**, who has an " ancient " 5V5 communications receiver, and uses it on 160, 80 and 20m. Peter doesn't mention the aerial he uses at his QTH in St. Albans. The QTH often makes as much difference to reception as a change of receiver, of course.

Paul Gaskell, A4035, writes a sizeable note again. The receiver now in use is an HRO, and the 50ft. aerial is to be replaced by a 40m dipole soon. But Paul says that many lads at school are not prepared to co-operate in a project, or that they cash in afterwards—a " something for nothing " attitude in fact (all this came up from G3RKK's comments in a previous " QUA. . . ."). I assured Paul that I have no truck with those attitudes! Again it is the service to others and the movement which is important. There is no substitute to making friends, because co-operative relationships do not produce selfish attitudes but just the opposite.

George Fettes, A4076, writes for the first time. There were a number of suggestions in George's letter, and obviously the more of these, the merrier for future tech. topics in " QUA. . . ." (with acknowledgements to Pat Hawker, '3VA!). George also says that studying for the RAE is a bit difficult, with all his other commitments, one of which is his work as a Cub Scouter (very good work is possible here, what say, George?). Concerning the studies, perhaps corresponding with one or two other " RAE swotters " might help? (George is in Glasgow.)

A. M. Fletcher, A3994, hails from Aylesbury, Bucks. He says that he had a few replies concerning the note in last January's " QUA Associates." Perhaps other readers may like to write to A3994 also. In the letter was an aerial design and comments on circuitry; mainly transistor techniques. A hint was also dropped that tape correspondence would be very welcome (3¾ in. per sec., two track). A3994's address is 60 Cottesloe Road, Aylesbury, Bucks.

There is good news from **Andrew Wheele, A4267.** He wrote to me saying that a group of lads have got together in Welwyn and formed a club. This group is named the Rollswood Boys' Society, and in fact, a visit was made by these keen lads to the HQ of the Roding Boys' Society. Close links will no doubt be forged between these two groups, so may we wish all the best to this, the first pioneering boys' club to set up activities similar to the original aims of the RBS (Wanstead).

Once again we sign off, so to all lads everywhere in the RSGB, this is JIX wishing you 73 for this month.

Swedish Summer Camp

The Malmoe Amateur Radio Club has extended an invitation to British amateurs to attend a summer camp in South Sweden from July 3 to 11. The site is a military camp beside the small lake Yddingen, 16 km from Malmoe. Accommodation is limited, but there is room for camping, although sheets or sleeping bags are not provided. The cost is kr 12 per day per person. Further information may be obtained from Gunnar Silvén, SM7BJ, Mariedalsvägen 35A, Malmoe V, Sweden.

A V.H.F. Beam Rotator

By A. W. TOMALIN, G3PTB *

FROM conversations with numerous 2m operators, it is apparent that quite a number of people are without means of rotating the aerial system. Equally, there are many highly sophisticated systems in use and an even larger number of unsatisfactory devices.

The system to be described was developed as a reasonably simple device which could be constructed by those possessing only the " usual tools found in any amateur shack." The basic idea sprung from the discovery that 2 in. alloy pole of the scaffolding or heavy duty TV mast variety with a wall thickness of $\frac{1}{8}$ in. would take a $1\frac{1}{2}$ in. pipe thread.

A local plumber was therefore prevailed upon to put about 2 in. of thread on one end of a 20 ft. 2 in. pole (*A* in Fig. 1), obtained from a scaffolding firm for £3 10s., taking care to ensure that the thread was square to the pipe. Two $1\frac{1}{2}$ in. pipe flanges (*F*) were bought (4s. 6d. each) having three $\frac{3}{8}$ in. holes near the periphery. One was screwed tight onto the pole and any thread protruding through the flange trimmed off. A visit to a local garage produced a second-hand but serviceable ball-race (*L*) of inner diameter such that it was a drive-fit on 1 in. alloy tube (believed to be a motorcycle main shaft bearing). A piece of 1 in. tube (*B*) was selected to be straight and true and carefully scraped (with a Skarsten-type scraper) until the ball-race could be carefully driven down the 1 in. tube until it was about 3 ft. from one end. In one version the ball-race was warmed up to expand it so that it shrunk onto the tube as it cooled.

The following operations will be described firstly as would be done by those having access to a lathe etc., and secondly for the benefit of those without. A piece (*D*) of brass bar 2 in. long was turned down to be a slide fit inside the 2 in. tube. A $\frac{5}{8}$ in. hole was bored into one end for about 1 in., leaving the drill-taper shape in the bottom of the hole. A $\frac{1}{8}$ in. hole (*B*) was then bored right through to act as a drain hole in the event of water getting in.

A further piece of 1 in. stock was shaped as a bearing journal (*C*) to be a drive fit in the lower end of the 1 in. tube and then reducing in diameter for about $\frac{3}{4}$ in. to be a slack fit ($\frac{1}{64}$ in. undersize on diameter) in the hole in the bearing block *D*. A $\frac{3}{8}$ in. drill was run into the small end of the journal for about $\frac{1}{4}$ in. to provide a location for the $\frac{1}{2}$ in. steel ball *E* (old bagatelle ball) which forms the lower bearing of the inner tube. A $\frac{1}{4}$ in. locating hole *N* was then drilled about 3-4 ft. down from the top of the 2 in. tube. This hole was either tapped suitably or a $\frac{1}{4}$ in. long self tapping screw was inserted. The bearing block *D* was liberally anointed with grease and pushed down from the top of the 2 in. tube until it rested on the locating screw *N*. Three suitable holes (0 BA or similar) were then drilled through the tube into the bearing block, tapped and the securing screws *K* inserted. The steel ball was then dropped down into the centre hole. The 1 in. tube, bearing the ball-race and with the bearing-journal fixed in place, was then inserted into the 2 in. tube such that the journal entered its socket in the bearing block. The initial position of the ball-race was determined by suitable measurement and then moved about 1 ft. further away from the lower end of the 1 in. tube. With the rotating member in place the ball-race was tapped down until it rested on the flange of the 2 in. tube.

For those without access to a lathe, use was made of the hub from a bicycle front wheel. The spokes were removed leaving the axle and spoke flanges. The axle was adjusted until about $\frac{3}{4}$ in. protruded from one side and then securely lock-nutted into place. Three holes were then drilled radially in the 2 in. tube, similar to holes *K* above, tapped 0 BA or $\frac{1}{4}$ BSW. The lower end of the 1 in. tube was force-fitted with an oak plug which was then drilled to be a drive fit on the bicycle axle which was then driven home. The 1 in. tube was then lowered into place as before and three long bolts screwed into holes *K* so that they gripped the centre of the axle casing. A certain amount of adjustment on the bolts enabled the bearing to be centred in the 2 in. tube. This could be improved by adding another set of centring bolts $1\frac{1}{2}$ in. below the first three.

A cross arm (*H*) of 1 in. × 1 in. × $\frac{1}{8}$ in. angle steel or full-size " Dexion " (the small-size material is not rigid enough) about 2 ft. long was drilled to locate on two of the holes in the top flange plate. The second flange was then put into place and, with the cross-bar, bolted home (bolts *G*) ensuring that the ball-race was centred on the 2 in. tube, checked by seeing that the 1 in. tube revolved easily.

Two 6 in. discs of 1 in. hardwood (preferably teak) were cut out, either with a coping saw or fly-cutter, glued and pinned together. A hole was bored through the centre so that the disc was a force fit on the 1 in. tube. Two 8 in. diameter discs of 18 s.w.g. aluminium or similar material were pinned to the wood discs to form the pulley P1 which was then positioned a few inches above the ball-race. Two long screws were driven into radial holes in the pulley and into small holes in the 1 in. tube to anchor the pulley securely. Two shrouded pulleys P2 and P3 of the clothes-line variety were then bolted to the extremities of the cross arm such that the tops of the pulleys were level with the centre of the large pulley. A suitable length of cord or plastic clothes line was then

(*continued on page 403*

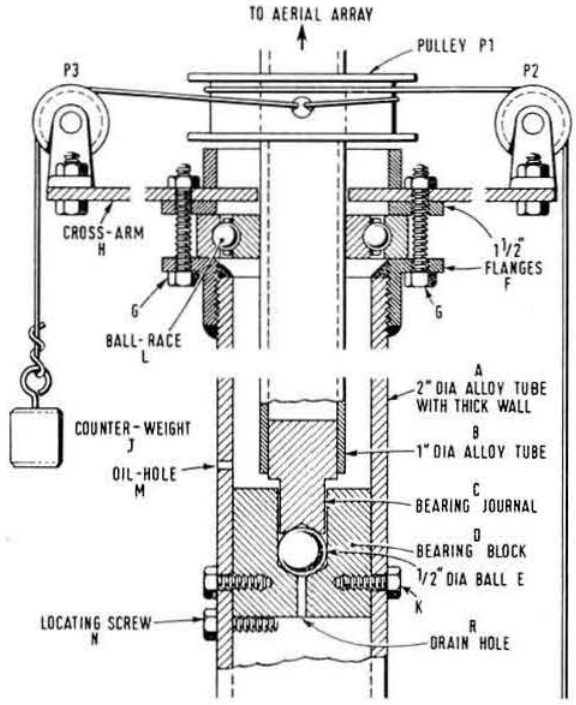


Fig. 1 Sectional views of the rotating mechanisms for the mast.

* Chapel Street, Barford, Norwich, Norfolk, NOR 38X

A DISTRIBUTIVE SURVEY OF AMATEUR RADIO IN THE BRITISH ISLES

By T. H. HOLBERT, GM3DXJ*

IT is unfortunate but inevitable that a survey of the type presented here is obsolescent before it is written. Obviously with the rate of the order of 3,000 alterations and additions per annum, the 1965 edition of the RSGB *Amateur Radio Callbook*, the main source of information, is in part already out of date. Therefore the figures quoted are only as accurate as the *Callbook*. However, as an exercise, this survey

—amateurs serving overseas—

serves a useful purpose in that a general picture emerges which, for all practical purposes, is sufficiently topical to be used as a basis for comment.

Other minor errors are unavoidable owing to Service amateurs living overseas, licensees withholding their addresses, and ambiguous addresses which complicate allocation of call-signs to specific counties, and even in a few cases to countries. Although every effort has been made to ensure accuracy, the writer is human and fallible and must inevitably introduce minor errors in a task of this magnitude.

After this somewhat apologetic start, however (the umbrella having been well and truly raised) let it be said that the accumulated error is only about 2 per cent. This, in a technology accustomed to the acceptance of 20 per cent tolerance, is considered to be a reasonable figure.

Overall Information

Table 1 shows the distribution of licensed amateurs by the countries of the British Isles. No distinction has been made between the types of licence issued. It will be noted that G moves into second place in the column quoting amateurs per square mile. As a matter of interest approximate figures for the United States are:

Per head 1/700. Per square mile 0·09.

The numerical dominance of the G3 + 3 block, and post-war licences is evident in Table 2. It may be objected that the G2 + 3 category is misplaced because the full radiating facility was only granted post-war. However, the basic licence was a pre-war issue and permission to radiate was, after all, only an addition to the basic licence.

In the case of EI, due to the different system of allocating call-signs, only two groupings are possible. These are best termed "early" and "more recent." No doubt the IRTS has a more elegant system of classification than this, which is quite arbitrary. It is hoped that no hard feelings are aroused by such cavalier treatment and that showers of Irish confetti will not be thrown across St. George's Channel.

Survey by Counties

The main purpose of the breakdown by counties of Great Britain given in Table 3 is to show the comparative G-DX value of each county. The table is based on the list of counties for RSGB Contests, which is shown in Table 10. A similar breakdown for the counties of Eire is given in Table 4.

It will be seen that in Great Britain there are five listings

—should solve the holiday problem—

(including Scilly) where incumbents sit in solitary state, and two available with vacant possession. This should solve the holiday problem for the G-DX minded.

TABLE I

Summary of Licences in the British Isles.

	Prefix	Country	Licences	Population (1961)	Per Head	Area Sq. Miles	Per Sq. Mile
1	GC	Channel Is.	44	104,398	1/1930	75	0·58
2	GD	Isle of Man	25	48,151	1/2370	221	0·11
3	G	England	9692	43,430,972	1/4480	50,874	0·19
4	GW	Wales	436	2,640,632	1/6000	7466	0·06
5	GI	N. Ireland	224	1,425,127	1/6330	5237	0·04
6	GM	Scotland	700	5,178,490	1/7430	30,405	0·23
7	EI	Eire	223	2,814,703	1/12,530	26,601	0·009
	Totals	British Isles	11,344	55,642,473	1/4820	120,679	0·094

* 19 Thomson Drive, Currie, Midlothian.

TABLE 2

Analysis of Licences by Prefixes

Prefix	G	GC	GD	GI	GM	GW	Totals
	Pre-war Licences						
G2 + 2	262	4	—	2	7	7	282
G2 + 3	704	5	1	12	26	34	782
G3 + 2	273	1	1	8	14	16	313
G4	193	1	1	2	12	6	215
G5	285	1	1	7	13	12	319
G6 + 2	276	1	2	5	21	9	314
G8 + 2	241	3	—	4	12	16	276
Total							2501

Prefix	G	GC	GD	GI	GM	GW	Totals
	Post-war Licences						
G3 + 3	7364	28	19	184	594	333	8522
G6 + 3	33	—	—	—	1	1	35
G8 + 3	61	—	—	—	—	2	63
Total							8598
EIx + 1							125
EIx + 2							98

TABLE 3

Analysis of Licences by Counties of Great Britain

	County	Licences	Prefix
1	Yorkshire	820	G
2	Lancashire	797	G
3	London P.D.	692	G
4	Kent	521	G
5	Surrey	502	G
6	Essex	478	G
7	Warwick	468	G
8	Hampshire	433	G
9	Cheshire	407	G
10	Middlesex	381	G
11	Stafford	311	G
12	Sussex	295	G
13	Somerset	291	G
14	Hertford	283	G
15	Lincoln	203	G
16	Buckingham	195	G
17	Glamorgan	186	GW
18	Nottingham	178	G
19	Lanark	172	GM
20	Berkshire	171	G
	Worcester	171	G
21	Leicester	161	G
22	Durham	157	G
23	Derby	136	G
24	Gloucester	127	G
25	Northampton	116	G
26	Norfolk	115	G
27	Wiltshire	113	G
28	Cornwall	109*	G
29	Dorset	105	G
30	Bedford	100	G
	Northumberland	100	G
31	Devon	94	G
32	Suffolk	87	G
33	Antrim	85	GI
34	Midlothian	79	GM
35	Down	77	GI
36	Cambridge	70	G
37	Oxford	67	G
38	Monmouth	66†	GW
	Shropshire	66	G
39	Fife	61	GM
40	Aberdeen	52	GM
41	Ayr	51	GM
42	Renfrew	45	GM
43	Stirling	40	GM
44	Caernarvon	36	GW
45	Cumberland	35	G
46	Denbigh	33	GW
47	Londonderry	30	GI
48	Isle of Man	25	GD
49	Angus	24	GM
	Flint	24	GW
50	Guernsey	22	GC
	Huntingdon	22	G
	Pembroke	22	GW
51	Hereford	21	G
	Jersey	21	GC
52	Anglesey	17	GW
53	Tyrone	16	GI
54	Carmarthen	14	GW
	Moray	14	GM
55	Caithness	13	GM
	Wigtown	13	GM
56	Cardigan	11	GW
	Dumfries	11	GM
	Westmorland	11	G
57	Dunbarton	10	GM
	Shetland	10	GM
58	Banff	9	GM
	Inverness	9	GM
	Perth	9	GM
	West Lothian	9	GM
59	Argyll	8	GM
	Armagh	8	GI
	Ross & Cromarty	8	GM
60	Clackmannanshire	7	GM
	Merioneth	7	GW
	Roxburgh	7	GM
61	Orkney	6	GM
	Radnor	6	GW
	Rutland	6	G
62	Brecknock	5	GW
63	East Lothian	4	GM
	Selkirk	4	GM
64	Bute	3	GM
	Kirkcudbright	3	GM
65	Berwick	2	GM
	Fermanagh	2	GI
	Kincardine	2	GM
	Nairn	2	GM
66	Alderney	1	GC
	Montgomery	1	GW
	Peebles	1	GM
	Sutherland	1	GM
67	Kinross	0	GM
	Sark	0	GC

* Includes 1 Isles of Scilly

† Includes 10 G prefixes

TABLE 4

Analysis of Licences by Counties of Eire

	County	Ref.	Licences
1	Dublin	DU	101
2	Cork	CK	24
3	Donegal	DO	18
4	Louth	LH	10
	Waterford	WA	10
5	Limerick	LI	6
	Mayo	MA	6
	West Meath	WM	6
6	Kildare	KD	5
7	Galway	GA	4
	Kerry	KE	4
	Sligo	SL	4
8	Cavan	CA	3
	Wicklow	WI	3
9	Clare	CL	2
	Leitrim	LE	2
	Tipperary	TI	2
10	Longford	LO	1
	Monaghan	MO	1
	Offaly	OF	1
	Wexford	WE	1
11	Carlow	CW	0
	Kilkenny	KI	0
	Laoighis	LA	0
	Roscommon	RO	0

TABLE 5

Licences per Head of Population in Selected Cities

	City	Licences	Population	Per Head
1	Cambridge	50	94,810	1/1890
2	Norwich	52	119,650	1/2300
3	Leicester	101	273,130	1/2730
4	Bristol	123	436,000	1/3500
5	Manchester	156	660,300	1/4230
6	Belfast	96	440,000	1/4570
7	Cardiff	55	256,900	1/4670
8	Brighton	33	161,190	1/4920
9	Birmingham	226	1,110,290	1/5000
10	Newcastle	48	267,230	1/5570
11	Leeds	80	511,650	1/6390
12	Liverpool	101	745,810	1/6400
13	Edinburgh	70	474,060	1/6770
14	Dublin	71	504,000	1/7200
15	Glasgow	118	1,056,000	1/9000
16	London	692	8,151,750	1/11,640

TABLE 6

Amateur Sound Mobile Licences

	Prefix	Mobiles	Per Cent
1	G	1556	15
2	GI	33	14.7
3	GW	55	12·6
4	GD	3	12·0
5	GC	4	10·0
6	GM	54	8·5
Great Britain		1705	15

TABLE 7

Amateur Sound Mobile Licences by Counties

Counties not listed have less than 10 licences.

	County	Mobiles	Prefix
1	Lancashire	132	G
2	Yorkshire	129	G
3	London P.D.	115	G
4	Essex	85	G
	Warwick	85	G
5	Surrey	76	G
6	Kent	72	G
7	Cheshire	70	G
8	Somerset	52	G
	Stafford	50	G
9	Middlesex	46	G
10	Hertford	45	G
11	Hampshire	43	G
	Leicester	43	G
12	Sussex	38	G
13	Durham	35	G
14	Lincoln	34	G
15	Worcester	32	G
16	Buckingham	28	G
17	Northampton	27	G
18	Nottingham	24	G
19	Derby	23	G
20	Glamorgan	22	GW
	Gloucester	22	G
21	Norfolk	20	G
22	Devon	18	G
	Wiltshire	18	G
23	Berkshire	17	G
	Dorset	17	G
	Northumberland	17	G
24	Antrim	16	GI
25	Cornwall	15	G
26	Bedford	14	G
27	Shropshire	13	G
	Suffolk	13	G
28	Cambridge	12	G
29	Lanark	10	GM

TABLE 8

Amateur Television Licences

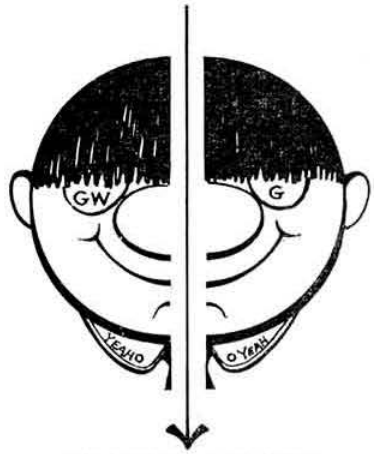
London	18
Warwick	15
Lancashire	9
Surrey	9
Cheshire	9
Essex	7
Middlesex	7
Stafford	7
Others (under 5 per county)	70
Wales (GW)	8
Scotland (GM)	4
N. Ireland (GI)	1
Total	165

TABLE 9

Licences in the Zones of the Two Metre Band Plan

Zone	Licences
8	2134
5	2129
4	1318
9	1246
6	1112
7	902
2	866
3	729
1	494

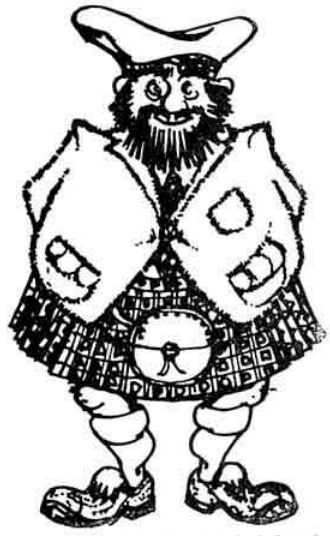
It is realized that the information given in Tables 3 and 4 is not easily digestible, and that a tabular-type presentation may not appeal to some Members. Thus the data has been summarized and is shown on the map, Fig. 1. The solid blocks in the counties around London and other principal centres of population emphasize in the main the concentration of electrical and electronic industries. Surprisingly, there are plenty of G-DX prospects within easy reach of all these densely populated areas.



—acquired a split personality—

The only oddity in the list is the county of Monmouth. Although politically an English county, at some time in the dim and distant past, Amateur Radio in Monmouth acquired a split personality in that either a G or GW prefix may be requested. As the GW listings predominate by 5 to 1, the allegiance is apparent. Monmouth is therefore shown with Wales. The " foreigners " are requested to show stiff upper lips. Belfast, a County Borough, also presented difficulty which has only been resolved by arbitrarily allocating its amateur population equally to Antrim and Down.

Obviously this sort of statistical game can be played almost *ad infinitum* and all sorts of attractive figures could be produced to portray various other aspects of the hobby. The only really useful one would be some sort of activity table, but this is quite out of the question.



—Glasgow's figure is slightly inflated—

Selected Cities

One of the minor extravagances attempted is given in Table 5 where certain selected cities are listed on a per head

(*Continued on page 386*)

TABLE 10

List of Counties for RSGB Contests

England (G)					
1	Bedford	BD	22	London (Postal District(s)	LD
2	Berkshire	BD			
3	Bucks	BS	23	Middlesex	MX
4	Cambridge	CE	24	Monmouth	MH
5	Cheshire	CH	25	Norfolk	NK
6	Cornwall	CL	26	Northampton	NR
7	Cumberland	CD	27	Northumberland	ND
8	Derby	DY	29	Nottingham	NM
9	Devon	DN	29	Oxford	OX
10	Dorset	DT	30	Rutland	RD
11	Durham	DH	31	Shropshire	SE
12	Essex	EX	32	Somerset	ST
13	Gloucester	GR	33	Stafford	SD
14	Hampshire	HE	34	Suffolk	SF
15	Hereford	HD	35	Surrey	SY
16	Hertford	HF	36	Sussex	SX
17	Huntingdon	HN	37	Warwickshire	WK
18	Kent	KT	38	Westmorland	WD
19	Lancashire	LE	39	Wiltshire	WE
20	Leicester	LR	40	Worcestershire	WR
21	Lincoln	LN	41	Yorkshire	YS
Scotland (GM)					
42	Aberdeen	AN	59	Lanark	LK
43	Angus	AS	60	Mid-Lothian	MN
44	Argyll	AL	61	Moray	MY
45	Ayr	AY	62	Nairn	NN
46	Banff	BF	63	Orkney	OY
47	Berwick	BW	64	Peebles	PB
48	Bute	BU	65	Perth	PH
49	Caithness	CT	66	Renfrew	RW
50	Clackmannan	CN	67	Ross & Cromarty	RY
51	Dumbarton	DU	68	Roxburgh	RH
52	Dumfries	DF	69	Selkirk	SK
53	East Lothian	EL	70	Shetland	SL
54	Fife	FE	71	Stirling	SG
55	Inverness	IS	72	Sutherland	SU
56	Kincardine	KE	73	West Lothian	WN
57	Kinross	KS	74	Wigtown	WG
59	Kirkcudbright	KB			
Wales (GW)					
75	Anglesey	AG	81	Flint	FT
76	Brecknock	BR	82	Glamorgan	GN
77	Cardigan	CA	83	Merioneth	MR
78	Carmarthen	CR	84	Montgomery	MG
79	Caernarvon	CV	85	Pembroke	PK
80	Denbigh	DB	86	Radnor	RN
Northern Ireland (GI)					
87	Antrim	AM	90	Fermanagh	FH
88	Armagh	AH	91	Londonderry	LY
89	Down	DW	92	Tyrone	TE
Channel Islands (GC)					
93	Alderney	AD	95	Jersey	JY
94	Guernsey	GY	96	Sark	SR
97	Isle of Man (GD)	IM			

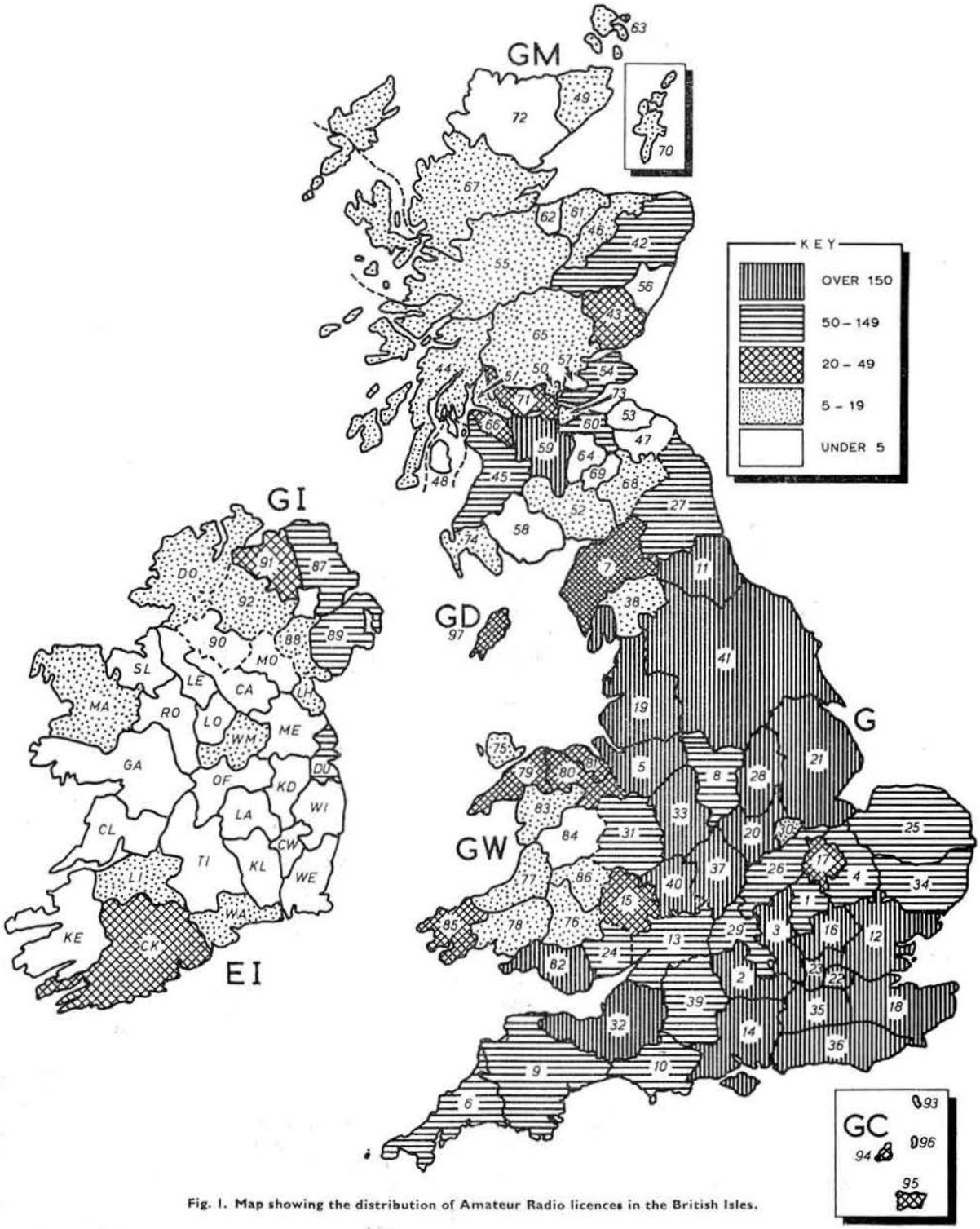


Fig. 1. Map showing the distribution of Amateur Radio licences in the British Isles.

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW*

FOLLOWING the suggestion made in this column that there should be information kiosks and lecturettes at rallies we are taken to task most pleasantly by **G3BID**, who asserts that much harm might be done to Amateur Radio by trying to " sell " it to the general public with the aim of gaining recruits to the hobby. Referring to an article published under his name in the August 1963 issue of *CQ Magazine* he maintains that any country can support a maximum number of amateurs and any increase will be to the detriment of the hobby, and he holds up the state of the hobby in the US as a " horrible example."

However, aggressive salesmanship was the last thing in mind when we made the suggestions in February. The lecturettes we had in mind were of a technical nature to attract and interest radio amateurs. As for information bureaux, who has not been met with the question from an obviously puzzled stranger at any rally open to the general public, " Excuse me, but what is this all about? ". There is a world of difference between helping the genuinely enthusiastic newcomer, or answering the questions of the unknowing public, and high pressure salesmanship. The former is good public relations work.

An Interesting Suppression Problem

From **G3HZG** (Redditch) comes a letter describing a cure for some interference in his Ford " Cortina." It appears that the fuel and temperature gauges are supplied with power through a device which the manufacturers call a " voltage stabilizer." In fact, current flows through a coil wound round a light bi-metal strip inside the device and out via a contact switch so that the current is interrupted for times proportional to the voltage when the voltage rises above a certain level. The gauges themselves are thermally operated and have a long time constant and are thus not affected by the breaks in supply of operating power in so far as their instantaneous reading goes. G3HZG found that the noise from the device was sufficient to swamp an S7 signal. A 1μF capacitor affected the switching rate considerably and so a TCC type TCB/PF universal motor suppressor was fitted with complete success. This is, in fact, three capacitors in one case, so that when connected, 0·07μF was placed across the " stabilizer's " terminals and 0·0025μF to earth from each terminal. It might be possible to remove the device completely from the circuit, but errors in gauge readings would then be proportional to the square of the voltage.

The writer wishes to thank Beacon Motors Ltd., of Birmingham, for their help when he discussed the problem with them.

Rally News

The **Sligo and Leitrim Radio and Electronic Society** is organizing a Hamfest for Whitsun weekend, June 5 and 6, and Whit Monday, June 7. Amongst the weekend activities will be an exhibition of home-constructed equipment, a D/F hunt, and a film show. A dinner will follow on Whit Monday night at Kelly's Hotel, Sligo, Eire, at 7 p.m., the charge for which is £1 1s. An invitation has been extended to all EIs, GIs, Gs, GMs, GWs etc., and their XYLs, to take part in what promises to be a most enjoyable " Western " Whitsun Holiday. All enquiries should be addressed to M. Meldrum, EI5AH (ex-G3HNH), 21 Wolfe Tone Street, Sligo, or B. Gilmurray, New Line, Manorhamilton, Co. Leitrim.

Reading ARS is holding a Mobile Picnic at the Childe Beale Trust Pavilion, Lower Basildon, Pangbourne, Berks. on June 20. Talk-in on 144·779 Mc/s will be by G3TOQ and on 1915 kc/s by G3EJA. Windscreen stickers (which will assist parking) and further details are obtainable from N. C. Taylor, G3TOQ, 83 Stoneham Close, Tilehurst, Reading, Berks.

Loughton and District RS is to hold its first full-scale rally at Loughton Hall, Rectory Lane, Loughton, Essex on Saturday, June 26. The site is in the Epping Forest area about 12 miles from London. There will be displays of fencing, judo and archery; film shows; various competitions and sports for all members of the family in addition to the usual exhibition of equipment, bargain sale, etc. In the evening there will be Old Time Dancing. Talk-in will be on 160m and 2m. Application has been made to the Post Office for the use of the call-sign GB3LOU for this station.

North Eastern Amateur Radio Mobile Rally. Organized by South Shields and District ARC, this event is to be held at Bents Park Recreation Ground, Coast Road, South Shields, on July 11. The site is adjacent to a wide expanse of beach. Competitions include a concours d'elegance (which includes tests of operation), a driving test, a transmitter test and a novel quiz contest. Competitive games will be organized for jnr. ops. and XYLs. A prize will be awarded to the mobile operator travelling the greatest distance to attend on the day of the rally. Talk-in will be by G3DDI on 160m from 11 a.m., and another station will stand by on 145·8 Mc/s.

The fourth **Bodensee-Treffen** will be held in Konstanz on June 26 and 27. There will be a D/F contest and a mobile rally in addition to a trade fair. At night there will be a dance in the 500 year old Council building, when prizes will be presented to competition and raffle winners.

RSGB
MOBILE SAFETY RECOMMENDATIONS

1. All equipment should be so constructed and installed that in the event of accident or sudden braking it cannot injure the occupants of the car.
2. Mobile aerials should be soundly constructed, taking into account flexing at speed and possible danger to other vehicles or pedestrians. The maximum height must not exceed 14 ft. above ground.
3. Wiring should not constitute a hazard, either electrical or mechanical, to driver or passengers.
4. All equipment should be adequately fused and a battery isolation switch is desirable.
5. The transmit/receive switch should be within easy access of the operator and one changeover switch should perform all functions.
6. The microphone should be attached to the vehicle so that it does not impair the vision or movement of the driver.
7. A driver/operator should not use a hand microphone or double headphone.
8. All major adjustments, e.g. band change by a driver/operator, should be carried out whilst the vehicle is stationary.
9. Essential equipment controls should be adequately illuminated during the hours of darkness.
10. Logging must not be attempted by the driver whilst the vehicle is in motion.
11. All equipment must be switched off when fuelling and when in close proximity to petrol tanks.
12. A suitable fire extinguisher should be carried and be readily accessible.

* 1 Shortbutts Lane, Lichfield, Staffs.

MOBILE RALLIES 1965

June 5, 6, 7.....Sligo and Leitrim Hamfest, Eire

See page 385

Organized by the Sligo and Leitrim Radio and Electronic Society

June 6.....RSGB National Mobile Rally Wethersfield

See page 387

Organized by the Radio Society of Great Britain

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

See page 303, May, 1965

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 20.....Reading Mobile Picnic

See page 384

Organized by the Reading Amateur Radio Club

June 20.....Saundersfoot Bucket and Spade Party

Regency Hall, Saundersfoot.

An informal gathering for all mobile operators, YLs, XYLs, Jnr Ops and SWLs. A prize of £5 will be awarded to the mobile op. who travels the furthest distance to the rally that day.

Organized by the Pembrokeshire and District Radio and Electronic Club

June 26.....Loughton Mobile Rally

See page 384

Organized by the Loughton and District Radio Society

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

See page 384

June 27.....Longleat Mobile Rally

Longleat Park, on the Frome-Warminster Road, A362

This rally is held in the grounds of Longleat House, home of the Marquis of Bath. The house and gardens are open to the public, and there are ample catering facilities. Several contests, a treasure hunt, balloon race, electric maze, raffle, etc., will be held.

Talk-in stations on 1·88 Mc/s, 4m and 2m from 10 a.m.

Organized by the Bristol RSGB Group

July 11.....North-Eastern Mobile Rally, South Shields

See page 384

Organized by the South Shields and District Amateur Radio Club

July 11..... Tenth Anniversary Mobile Rally, Oxford

See page 387

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

July 11.....Torbay Mobile Rally

Junior Leaders Regiment, Royal Signals, Denbury Camp, Newton Abbot, South Devon

This rally will take place regardless of the weather: plenty of indoor entertainment will be provided. Refreshments will be available. A heated swimming pool is nearby.

G3NJA/A	1·880 Mc/s	talk-in stations
G3PYZ	3·660 Mc/s	
G3LMG/A	70·25 Mc/s	
G3LMG/A	144·13 Mc/s	

Organized by the Torbay Amateur Radio Society

July 25.....Cornish Mobile Rally

Newquay

Organized by the Cornish Radio Amateur Club

August 15.....Derby Mobile Rally

Rykneld Schools, Derby

Organized by the Derby and District Radio Society

August 30.....Peterborough Mobile Rally

River Embankment, Peterborough

Organized by the Peterborough and District Amateur Radio Society

September 12.....RSGB National Mobile Rally

Woburn Abbey, Bedfordshire

Organized by the RSGB Mobile Committee

September 12.....UBA International Mobile Rally

See below

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

September 26.....Harlow Mobile Rally

Magdalen Laver Village Hall, Magdalen Laver, near Harlow

Organized by the Harlow and District Radio Society

Temporary DL licences are available, on production of national licences, from DJ1DR.

Further details may be obtained from the organizing committee at Konstanz 3, POB 3029, German Federal Republic. For accommodation, enquiries should go to Verkehrsverein Konstanz—Amateur-Meeting 1965, Konstanz, German Federal Republic.

"Ardennes Brabanconnes" Rally. This international event is being organized by the Brabant-Sud and Brabant-Sud Est branches of UBA, and is being held on September 12, starting from Court St. Etienne (25 km S/E of Brussels, between Wavre and Nivelles) and is open to any Belgian or other amateur holding a Belgian /M licence.

Applications for entry (accompanied by entry fee of 100 Belgian francs) must be made to Godon Marcel, 83 rue de l'Institut, Rixensart, Belgium, by August 31, giving the following information: full name and address, station call-sign, Belgian /M call-sign allotted, mode and band desired (a.m./s.s.b., 3·5 *or* 144 Mc/s).

Luncheon is available on pre-payment of a further 50 fr. per head, exclusive of wines. All remittances, including those made by international postale mandate, should be made to Compte cheque postal No 21.53.20.

Applications for temporary /M licences should be made to M. le Directeur Général des Radiocommunications de la PTT, 42 rue des Palais, Bruxelles 3, Belgium and requires a photostat of the applicant's British licence, in addition to full name and address, vehicle registration no., date and duration (not exceeding one month) of the visit. This application must be made three weeks before arrival in Belgium.

Incidentally, we understand that a reciprocal arrangement

(continued on page 386)

exists between Holland and Belgium so that temporary licences granted by either country can be validated in both.

The Amateur Radio Mobile Society has been invited to participate in a **Red Cross Event** on Saturday, June 26, at Melbourne Park, Chelmsford, organized by the Essex Branch of the British Red Cross Society.

There will be adequate car-park, refreshment and toilet-facilities and cover in the event of rain. The site will be well sign-posted. There will be many attractions, including two performances of a Pageant telling the story of the Red Cross, with a cast of over 150 people and the commentary by Michael Flanders; tombola with hundreds of valuable prizes; performances by a military band, pipe band and Scottish dancers; bingo; dancing; barbecue; baby and flower shows; demonstrations of Red Cross work at home and abroad; Army demonstrations of casualty evacuation in battle by helicopter.

A 160-page handbook is available at 3s. 1d., including postage, from Mrs. Sylvia Margolis, 95 Collinwood Gardens, Clayhall, Ilford, Essex. Entry to the event is 1s. for adults, 6d. for children; handbook holders will be admitted free of charge. All proceeds will go to the Red Cross.

NEWS . . . (Continued from page 375)

sky survey of radio stars which will not be completed until next year. Until other frequencies become available to the astronomers, new stations now broadcasting in Channel 6 will be restricted to certain hours each day.

Molniya I, the first Russian communications satellite, launched on April 23, 1965, put up a star performance on May Day when the traditional celebrations in Red Square, Moscow, were seen by viewers at distances up to 5000 miles. *Molniya I* has an orbit time of 11 hours 40 minutes.

Smaller and Smaller. A digital computer that can perform 25,000 instructions per second yet weighs no more than 26 lb. and measures only $3\frac{1}{2}$ in. × $10\frac{1}{4}$ in. × $11\frac{1}{2}$ in. has been developed by IBM for the US Navy. The new unit, used in aircraft to calculate the release point for bombs and missiles, employs thin film circuits made by vacuum deposition.

Want an IOTA? Latest among the many awards available to the DX fraternity is the IOTA—Islands on the Air. G. Watts, 62 Belmore Road, Norwich, Norfolk will send a list of islands which count for the award and other information on receipt of a remittance for 2s.

Useful for NFD. The first two cylindrical television masts in the UK, one at Winter Hill and the other on Emley Moor, have now reached their full heights of 1015 ft. and 1275 ft. respectively. Erected by British Insulated Callender's Construction Co. for E.M.I. Electronics Ltd., the Winter Hill mast will support aerials for both BBC and ITA.

Mullard Film Meetings will be held in Scarborough (Royal Hotel) on June 14, Hull (Royal Station Hotel) on June 15, Blackburn (Town Hall, Regency Room) on June 23, Coventry (Leofric Hotel) on June 28, Blackpool (Norbreck Hydro) on June 29, and Belfast (King George VI Youth Centre) on July 1. The talk at each meeting will be "Transistor Topics" and the films to be shown are titled Thin-film Microcurrents and Electromagnetic Waves, Part II. Tickets can be obtained upon application to Mr Ian Nicholson, Films & Lectures Organization, Mullard House, Torrington Place, London, W.C.1.

Hollow Cable of a new type recently developed in Western Germany operates at frequencies approaching the speed of light. The cable will enable a million telephone calls or a thousand television broadcasts to be transmitted simultaneously. Traditional cables can handle not more than about 2,700 telephone calls or three television broadcasts at the same time.

Distributive Survey of Amateur Radio

(Continued from page 382)

of population basis. Glasgow's figure is slightly inflated due to certain ambiguities in postal addresses, but the degree of error has been reduced as much as possible.

Amateur Mobiles

The distribution of mobile licences is shown in Table 6 by countries, and in Table 7 by counties. It would appear likely that some 40 call-signs are exclusively mobile since no address appears against the call in the main list! A few counties have remarkably high percentages of mobiles, for example Leicester 26 per cent and Durham 22 per cent. There are three maritime mobiles, two G and one GI.

Amateur Television

It must be a hard life on /T as is evident from Table 8. However, there are other compensations and it seems unlikely that a DX rat-race will ever manifest itself.

Two Metre Band Plan

A map showing the Two Metre Band Plan is published at intervals in the BULLETIN. The total amateur occupancy of the zones is given in Table 9.

Special Events Stations

During the annual reunion of the Royal Signals at Catterick Camp, the Headquarters Station of the Royal Signals Amateur Radio Society will be operating under its special call-sign **GB3RCS.** The station will be on the air from 08.00 to 22.00 GMT on June 25, 26 and 27, mainly on 14 Mc/s. Other bands will be used whenever additional operators are available.

A demonstration station with the call-sign **G3TIH/A** will be operating on 160m and 20m during a Garden Party at St. Thomas's Church, Garretts Green, Birmingham, on June 12. QSLs may be sent direct to the operator, A. A. Bickers, 192 Garretts Green Lane, Birmingham 26.

On Saturday, June 26, **GB3MAA** (Marconi Apprentice Association) will be on 160m, 80m, 20m, 4m, and 2m during the annual gala day of the Marconi Company. The station, which will be active from 2 p.m. to 7 p.m., will be manned by G3RHU, G3RTF, G3TJK, G3OCM and G3SXK. A special QSL card will be issued to confirm all contacts.

TENTH ANNIVERSARY MOBILE RALLY
SUNDAY, JULY 11, 1965
College of Technology, Headington, Oxford

Talk-in stations will be in operation on 160m, 80m, 4m and 2m.

It is hoped to have the following attractions: Morris dancing, lecturettes, films, raffle and lucky-dip, demonstrations, competitions, trade exhibitions and home built equipment.

Light refreshments, complete cover and car parking facilities in grounds will be available.

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

Sir Edward Appleton

Another link between the Society and the pioneers of radio was broken last month when the death occurred of Sir Edward Victor Appleton, G.B.E., K.C.B., Principal and Vice Chancellor of Edinburgh University. During the time Professor Appleton held the Wheatstone chair of Physics at Kings College, London (1924-1936), he lectured several times to the Society on the propagation of radio waves and their reflection and refraction, in which field of research he became world famous. In 1925 he provided experimental proof of the existence of the Heaviside-Kennelly (*E*) Layers using frequency-change techniques and later demonstrated the existence of the *F* layer which now bears his name. His researches were fundamental in the development of radar. Sir Edward was secretary of DSIR during the early part of the war. Since his appointment to Edinburgh University he sat on numerous important Government committees and played a leading part in many scientific associations of an international character.

V.H.F. Band Plans

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

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

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

RSGB National Mobile Rally
United States Air Force Base, Wethersfield, near Braintree, Essex
SUNDAY, JUNE 6, 1965

To be opened at 11 a.m. by Col. Baer, Wing Commander of the USAF Base

Talk-in stations will be operating from 10 a.m. GB3RS on 1·8 Mc/s; GB2VHF on 70 Mc/s and 144 Mc/s

The proposed programme includes:

Grand raffle, exhibition stations, static aircraft display, RTTY display, fire-fighting display, Go-Karts, PT display, model aircraft demonstration, trade exhibition, RSGB bookstall, raffle for a DX40, baseball match, Civil Defence display, Laser demonstration, a tour of the control tower, and a children's lucky dip.

Refreshment stalls will be available, and there will be two acres under cover. Car parking facilities have been centralized.

Further information will be broadcast in GB2RS News Bulletins

Organized by the Radio Society of Great Britain

RAOTA REUNION

Sir Albert Mumford Guest of Honour

SIR ALBERT MUMFORD, K.B.E., until recently Engineer-in-Chief of the Post Office and currently the Immediate Past President of the Institution of Electrical Engineers, was guest of honour at the Seventh Annual Reunion of the Radio Amateur Old Timers' Association held at The Horse Shoe Hotel, Tottenham Court Road, London, on May 7, 1965.

RSGB Past President Arthur Milne, G2MI—subject of Profile in the May BULLETIN—was in the Chair, supported by Past Presidents Ernest Gardiner, G6GR (1944-46), Victor Desmond, G5VM (1948-49), Fred "Dud" Charman, B.E.M., G6CJ (1952) and Leslie Cooper, G5LC (1953). Vice-Presidents Bert Allen, G2UJ and Jimmy Matthews, G6LL, with Council Members Jim Foster, G2JF and Louis Varney, G5RV, were also present.

Introducing Sir Albert Mumford "as my recent boss," Arthur Milne spoke of Sir Albert's long association with the Society and of the many services he had rendered to the Society in the past.

Sir Albert reminisced in most entertaining style tracing back his interest in radio with the Post Office to the early days of the Dollis Hill Research Station, G5DH. In quipping mood he claimed to have experimented there with the single side-band mode of transmission in 1927. He recalled developments at Leafield and Rugby and of visits paid to both stations and to Dollis Hill by RSGB members long before the war. Sir Albert referred to the wartime efforts made by the Society to prepare for peace by negotiating with the Post Office for the early return of licences. He spoke about the Atlantic City Radio Conference (1947) and revealed a number of interesting facts about the Conference which had not previously been mentioned at any gathering of radio amateurs. (Mr. Mumford, as he then was, attended the Conference as deputy leader of the UK Delegation.) He recalled that at a critical stage of the Conference, when deadlock had been reached on the frequency allocation table, he, together with one delegate each from Russia, USA and France* locked themselves in a small room until the deadlock was broken. Sir Albert told how he had to obtain the support of the two RSGB/IARU observers at the Conference, President Stanley Lewer, G6LJ, and Secretary John Clarricoats, G6CL, to a compromise solution of amateur frequency problems. That compromise resulted in the unfortunate loss of 50 kc/s between 14·35 and 14·4 Mc/s but it led to the retention of Top Band and 3·5 Mc/s and to the acquisition of a new band at 21 Mc/s.

Sir Albert remarked that he had greatly admired the pioneer work of amateurs both before and after the war and he paid tribute to their war-time activities having had close personal knowledge of some of their work, much of which had not been publicly disclosed even up to this late date. He had had the pleasure of meeting all the RSGB Past Presidents present that evening when he had attended RSGB Amateur Radio Exhibitions at the Royal Hotel in the years after the war and he had also enjoyed the experience of opening one of the recent exhibitions held at Seymour Hall. He expressed his interest in RAOTA and spoke of his long friendship with the Secretary, G6CL. He extended best wishes for the continued success of the Association.

"Nostalgia"—a feature of all Reunions—was introduced by Bill Corsham, G2UV, who enlivened his remarks by playing-back tape recordings of sounds produced by various types of early transmitting equipment, which he had specially constructed for the purpose, beginning with spark and Poulsen arc. He also reproduced recordings of early phone transmissions dating back to 1922, including a talk which he gave from 2LO on behalf of the Wireless Society of London during 1923.

In his account of the year's work the Founder-Secretary (John Clarricoats, G6CL) reported that membership had risen to 180—an increase of 23—and that five members (G2FM, 5MM, 6IO, 6SC and 6UT) had become "Silent Keys." The Benevolent Fund had provided assistance to the widow of one very old-timer and to several old-timers. Christmas parcels had been sent to the widows of seven members. A contact had been established with Mrs Anne Simmonds, widow of the late pioneer DX-worker Ernest Simmonds, G2OD, and as a result of the contact a wealth of unique historic information as well as many photographs of G2OD's famous station had been acquired.

A suggestion received from one Provincial member that future reunions be held during the period of the RSGB Exhibition in November received no support from either the London or Provincial members present.

Marcuse Memorial Fund

For the second year in succession no entry had been received for the Marcuse Memorial Prize. The Secretary intimated that if no entry is received after publication of the rules in the December, 1965, RSGB BULLETIN the balance of the Prize Fund, most of which had been donated by RAOTA members, would be transferred to the RAOTA Benevolent Fund.

New Honorary Member

A proposal by the Secretary that Sir Albert Mumford be elected an Honorary Member of the Association met with the unanimous approval of those present. Sir Albert expressed his appreciation and promised his continued support for Amateur Radio.

Roll Call

The following were present at the Seventh Reunion: G2DC, DX, IY, JF, KI, KJ, MI, MR, NH, NJ, NN, PU, UJ, UV, VB, YL, G3AG, FG, HT, MI, G5BV, BZ, CV, DJ, FI, GR, JO, KH, LC, MA, PP, RV, UM, VM, WP, XW, ZK, G6CJ, CL, FI, GR, HR, IF, JQ, LL, LQ, MN, NR, PA, QM, RB, XY, G8DF, DT, NY, PB, TY, May Gadsden "G1YL," Horace Freeman "Ad-Man," and Sir Albert Mumford.

G6CL

* The four delegates were all frequency experts and spokesmen on frequency matters for their administrations. J.C.

SAID LONG AGO

"The density of the ionosphere appears to follow the sunspot cycle of 11 years and it will be of great interest to continue the measurements now in progress until the next sunspot maximum in 1939. The minimum of solar activity occurred about the middle of 1933 and both magnetic and radio observations now show that activity is increasing again. It is expected, as a result, that the radio engineer will find substantial differences in the wireless wavelengths best suited to his purpose for long-distance communication."

Professor E. V. (later Sir Edward) Appleton, D.Sc., F.R.S.
T & R Bulletin, November 1935. J. C.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By M. E. BAZLEY, G3HDA*

ON the morning of April 27 CE0XA began operating from Desventorados Island in the San Felix group, causing initial QRM on the h.f. bands. Two stations, one using faultless code and the other on single sideband were to operate around the clock for approximately 75 hours giving contacts to all and sundry at a peak rate of 120 per hour. To an outside observer the spending of £1,750 to reach a small piece of land miles from anywhere to hand out RSTs to other amateurs so that they may have the pleasure of exchanging QSLs may seem pointless; but from those three days of activity it became quite clear that 15m was once again proving to be a real DX band, with CE0XA putting workable signals into Europe on c.w. and s.s.b. from 14.00 until after 24.00 and for most of that time they were the only stations audible on this band. Likewise it was proving easier to work them on 80m (between 05.00-06.00) and 40m (between 07.30-08.30) than it was to make contact with the station on *the DX band* 20m.

This apparent rise in conditions on bands other than 20m was not just a chance opening peculiar to CE0XA as other DXpeditions and active DX stations have proved time and time again in the past. It seems a pity that stations have to crowd on 20m in the belief that this is the only band to work DX on, when paths are often open on other bands which are not being used due to lack of activity. Possibly one cannot lay all the blame on the old excuse of the sunspot cycle and conditions; and if some of the equipment, time and energy used by stations chasing DX on 20m were applied to 10 and 15, conditions of these bands no doubt would " improve " and some spectacular contacts be made.

If it takes a trip by four men to a small piece of land in the middle of nowhere to make us use fully the h.f. bands allocated to us, then all the money spent on this trip will have not been used only to give pleasure, and perhaps amateurs throughout the world could participate in a worthwhile contribution to IQSY.

NFD News

The Radio Society of Zambia is organizing a field day station 20 miles West of Kitwe with the special call-sign **9J6AA/P.** The station will be active from 13.00 GMT on June 12 until 15.00 GMT on Sunday, June 13. Two transmitters will be used, and the " A " station will operate contest-style throughout the period using c.w. on all bands from 160 to 10m and will be particularly interested in contacting European portables although all calls will be answered. The " B " station will concentrate more on local publicity and will operate a.m. phone and c.w. at a more leisurely pace. All contacts will be confirmed.

Tops C.W. Club members DJ6SI, DJ7LQ and DJ8CN will be operating from Luxembourg during this year's NFD using the call-sign **DJ6SI/LX/P.** All bands will be used and equipment will be KWM2 into a variety of aerials.

News from Overseas

News from North Borneo comes via **9M6BM** and active stations are 9M6AB, 9M6AC and 9M6BM. 9M6BM runs a KW2000 into a half size G5RV on 20 and 15m. Preferred frequencies are 14005, 21005 kc/s c.w. and 14110, 21250 kc/s s.s.b. and it is hoped to have a cubical quad up soon when no doubt more potent signals will be heard. Of particular interest to Top Band users, 9M6BM has been granted permission to operate between 1·8 and 1·9 Mc/s from October 1 until February 28, 1966. Skeds may be arranged by writing to Flt/Lt. W. McLardy, RAF, Tawau, BFPO 663, using Forces Airmail. All contacts with 9M6BM will be confirmed through W2CTN who is acting as QSL manager.

MP4BBE who has been active on c.w. for a number of years and responsible for giving many stations their only Bahrein Island contact is now back in this country. John intends to take the RAE in November and hopes to have a G licence soon after. QSL's for MP4BBE may be sent via G2MI.

VP3BF was the call originally issued to 9G1BF when he arrived in British Guiana. This has now been changed to **VP3JR;** QSLs should continue to go to W3HQO.

G3NKQ, who is ex-ZB1CR, passes on the new address of VK2AVU who operated from Willis Island under the call-sign **VK4JQ.** The address is as follows: 2/4 Wyuna Avenue, Harbord, New South Wales, Australia.

VK4SS passes along the following information on Pacific activity. **VK9CJ** (Port Moresby) now operative on all h.f. bands using a.m. and c.w. and is always on the lookout for

Left to right: G5LC with K8GOP and K8ZNC (Bill and Binnie Besse) during a recent trip to the USA.

* Please send all reports and news items to RSGB Headquarters to arrive not later than **June 17** for the **July** issue and **July 15** for the **August** issue.

European contacts. **VR4CR** is active on 20m c.w. and was heard calling CQ Europe. Also on from the Solomon Islands is **VR4CM** who prefers c.w. **YJ1DL** using c.w. on 40 and 20m mainly at weekends. **FK8AH, AL** and **BG** are on 40 and 20m from 04.00 onwards.

HZ1AT's (G5KW) travels have taken him into the two Middle Eastern Neutral Zones during the past month. Cards should be sent to G8KS from whom they will be collected when Ken returns to the UK in June.

Stations who contacted a " **YU1SJ** " on Top Band during September 1964 unfortunately worked a pirate, as a QSL sent by G3RSD has been returned with the comment that YU1SJ does not possess Top Band gear.

Finally, the following is quoted from the April issue of *Auto-Call*, the italics are ours. " Potomac Valley Radio Society amassed a total points score in the ARRL phone contest surpassing any previous effort. Multi-op W3MSK wound up with a record 1·5 million points score, working more than 1,500 DX stations during the 96 hour contest period. *The new 80m rotary* accounted for 45 countries on that band " . . . (the days of the trap loaded Top Band beam are near!!!)

Awards

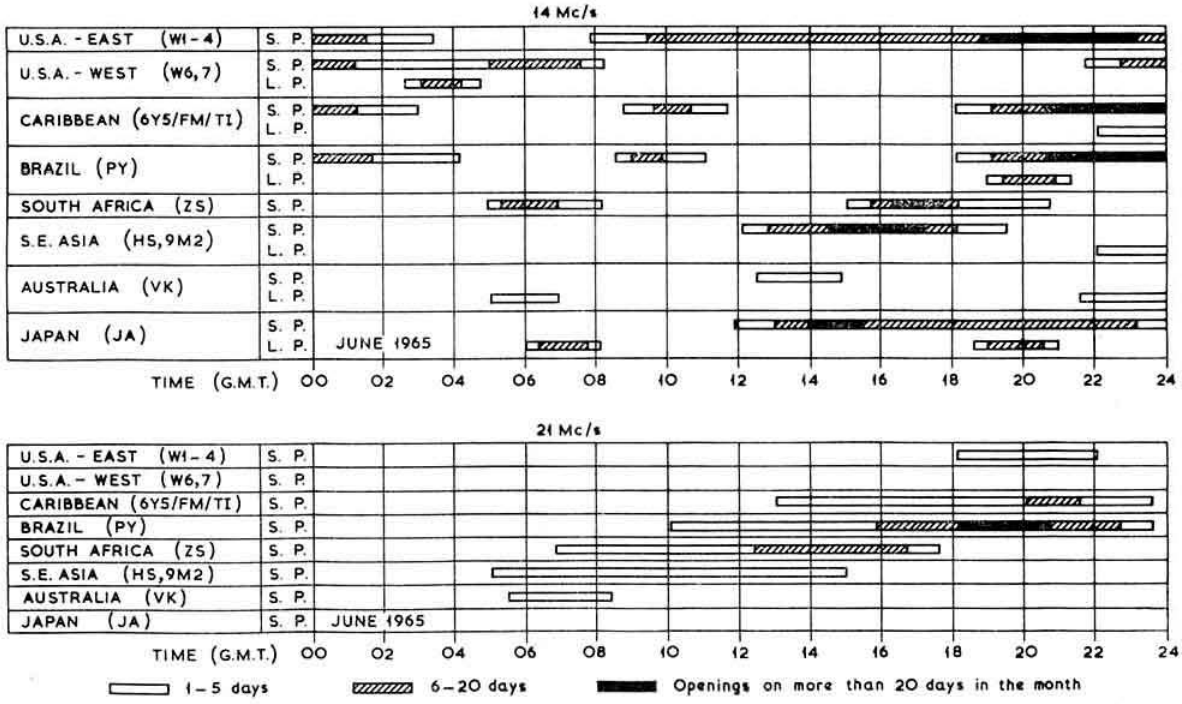
The **Diploma of Saint James** is sponsored by amateurs in the Galician region of Spain and may be claimed by working ten of their number between July 25, 1964 and December 31, 1965. Anyone interested in obtaining this award may have a leaflet giving full details from G3HDA.

The *IOTA Directory of Islands* contains some 500 entries. Six continental sections list all the main Island groups, the majority of known minor groups, larger Islands not covered by a group name, most of the remote Islands of the World's oceans and includes all present DXCC islands. The cost of the *Directory* is: UK 2/-, Overseas (by surface mail) four IRC's. In connection with the *IOTA Directory* the following awards are available:

IOTA AFRICA AWARD	IOTA NORTH AMERICA AWARD
IOTA ANTARTICA AWARD	IOTA OCEANIA AWARD
IOTA ASIA AWARD	IOTA SOUTH AMERICA AWARD
IOTA EUROPE AWARD	IOTA WORLD AWARD

IOTA CENTURY CLUB 100 AWARD

PROPAGATION PREDICTIONS



The month of June, together with the months of May, July and August, is a typical summer month and will produce few good openings for DX on the two higher frequency bands. Owing to the low level of sunspot activity, 28 Mc/s continues to be of little practical use for DX, though in exceptional cases the band may open to Africa from 14.00 to 18.30 GMT, and to South America from 18.00 to 21.00 GMT. Together with 21 Mc/s, the band will produce some contacts via short skip sporadic-E over distances from 300 to 1,200 miles. On 21 Mc/s, only DX traffic with South America and Africa will be certain and then only for a few hours. North America will only come through under exceptional conditions, and Western North America and Japan will not be heard. The main DX band will be 14 Mc/s, especially in the afternoon and evening, and also frequently during the night and early morning. It will therefore pay those interested in DX contacts to spend some time on the band during the night. In the majority of cases, the DX results on 14 Mc/s should be good. The summer conditions frequently permit contacts on 14 Mc/s via the long path, in particular with Western North America, Japan, Australia and South America, and in exceptional cases with South East Asia and Central America. On suitable days contacts with Hawaii should be possible via the short path on 14 Mc/s between 05.00 and 09.30 GMT. On 7 and 3·5 Mc/s DX contacts are basically possible when the greater part of the transmission path lies in darkness, and this condition applies particularly to 3·5 Mc/s. As the QRN, which is generally more severe on 3·5 than on 7 Mc/s, reaches its maximum during June and July, 3·5 Mc/s will only occasionally open for DX. Local traffic on 7 Mc/s will frequently be affected by the dead zone, because during the present phase of the sunspot cycle the daytime F2 m.u.f. often falls below 7 Mc/s. At the present time 3·5 Mc/s can be used day and night for local traffic without interruption by the dead zone.

The provisional sunspot number for April 1965 was 6·8 with the sunspot activity concentrated in the second half of the month. The predicted numbers for August, September and October are 17, 18 and 20 respectively.

QTH Corner

EL7B	Via G3NMR, 95 Collinwood Gardens, Ilford, Essex.
ET3DR	Via K8KLV, 258 S. Burgess Avenue, Columbus, Ohio, USA.
G3KPY	(ex-9M2DQ), Millstones, Beaulieu Road, Bexhill-on-Sea.
GM3RKO	(ex 9M4LJ), 1 Bowhill Terrace, Kinloss, Forres, Morayshire.
HI8MMN	Via W2CTN.
HP1PV	Box 1149, Panama City.
IP1ZGY	Via IT1TAI, via Terresanta 58, Palermo, Sicily.
KG1AD	Via K0ACI, 2780 S. Raleigh Street, Denver 19, Colorado.
KH6EDY	USCG. USNS, Box 36, c/o FPO, San Francisco, Calif. 96640.
KH6FBJ/KJ6	Via KH6FBJ, 1132 McMorris Drive, Honolulu 18, Oahu, Hawaiian Islands.
KR6JZ	Via W2CTN.
KS6BN/KB6	Box 87, Canton Islands, South Pacific.
KW6EK	Box 544, Wake Island.
OA8D/3	Via W2CTN.
OY7ML	Via DL6EQ, Traubenstr. 3, 655 Bad Kreuznach, West Germany.
OH0	QSL Bureau Box 1, Mariehamn, Finland.
SV0WF	Via W2PCJ, 18 Adrian Street, East Northport, New York, USA.
TG9EP	Box 684, Guatemala City.
VK4TE	Via VK2AGH, 79 Kyle Parade, South Hortsville, NSW.
VK9AG	Malaguna Road, Rabual, TNG.
VP2KL	Via Hammarlund.
VR1S	Box 288, Suva, Fiji Islands.
YN9JUL	Box 25, Matagalpa, Nicaragua.
YS1RFE	Via K7UCH, 11103 N.E. Fremont Street, Portland 20, Oregon, USA.
ZD7IP	Via RSGB.
ZL3VB	Via ZL2GX, 152 Lytton Road, Gisborne, New Zealand.
5H3JR	Via W2SNM, 2483 Third Avenue, East Meadow, NY, USA.
5W1AZ	G. W. Ashton, Faleolo Airport, Apia, Western Samoa.
HZ1AT/8Z4 HZ1AT/8Z5	Via G8KS, Orchard Lodge, St. Leonards Road, Eastbourne.
9L1MJ	Box 907, Freetown, Sierra Leone.
9M6BM	Via W2CTN.
9M2KZ	Via GW3IEQ, " Silhill," Dinas Dinlle, Llandwrog, Caernarvon.

* * *

RSGB QSL Bureau: G2MI, Bromley, Kent.

The following requirements are necessary for awards:

(i) Each Continental award equals 75 per cent of the activated Islands/groups in that continent.
(ii) IOTA World Award equals 50 per cent of the activated Islands/groups in each of the seven continents.
(iii) IOTA Century Club 100 Award equals any 100 activated Islands/groups appearing in the Directory of Islands and must include at least one from each of the seven continents.
(iv) Contacts for IOTA Awards count only from December 1, 1964

Address all award applications with QSL's, or orders for the IOTA Directory to G. Watts, 62 Belmore Road, Norwich, Norfolk, NOR-72-T.

The **European DX-Diploma** is a new award being sponsored by DARC. Briefly this award has to be re-applied for each year starting from 1964 and is based upon working countries from the DARC DX report list in the proportion of 20 European countries to 30 other countries. This is a minimum requirement for the award and stickers for each additional 10 countries must be in the same ratio of four from Europe to six from the rest of the world. Further information together with application forms may be obtained by sending an IRC to DARC—Geschaftsstelle, Hans Hanson DL1JB, 2300 Kiel, Beselerallee 10, West Germany.

Readers will be sorry to learn that the latest news on Clif Evans, K6BX is that he has now only 10 per cent vision in his remaining " good eye." The *Directory of Certificates* will continue but current orders are understandably running a little late.

Smitty, WB6IEV, operating the club station KX6BQ. The rig comprises a Collins " S " line into a TA33 at 100 ft.

DXpedition News

W4DQS, who was one of the operators in the recent **CE0XA** trip, in a letter to G3HDA outlines the frustrations experienced by the gang in getting this country on the air. The original boat chartered by them fell through due to a break-up in the partnership of the boat owners. After numerous cables and through the efforts of CE1GJ another boat was found and the gang proceeded to Chile three days later than originally planned. On arrival in Chile the troubles really began as port clearance could not be obtained and after five days' wait they were preparing to return to the United States when they were granted the necessary permission to proceed. The five days lost were lost forever, and meant that there were five days less to have on the Island. The landing on the Island was made at nightfall and 30 minutes after their last contact as CE0XA/MM the first QSO from CE0XA was made. A second station was set up the following day and beams were erected for both stations. Operations continued for three and a half days and the last contact was made at 09.50 on April 30, when 6,500 contacts were in the log from 75 countries.

Conditions were fair to excellent and one of the best openings was on 15m on April 29, when over 1,000 contacts were made by the c.w. station in 11 hours. QSL cards are in the process of being printed and it is expected that all requests will have been despatched before July 1. Contributions towards the cost of this trip would be appreciated. All QSL requests must be sent to W4DQS and if a direct reply is required return postage and a self addressed envelope are essential.

K1QHP will be active again from French Somaliland using the call **FL8AK** from June 4 until June 14 on 14040, 21040 kc/s c.w. and 14250, 21250 kc/s s.s.b. All QSLs via K7UCH.

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.

Gus Browning, W4BPD, still manages to make the pulse quicken whenever he is heard as no one is ever certain from which part of the globe he will turn up next. After a spell of activity from AC3H Gus is due to show up from Tibet signing **AC5H/AC4** during the first or second week of June.

The University College of North Wales and the North Notts Amateur Radio Societies are organizing a joint DXpedition to the Isles of Scilly this summer. GW3PMR and G3NHE will operate from July 4 until July 16 using the call-sign **G3RCW/P.** Activity will be on 160m c.w. with the possibility of some 40 and 80m operation.

ZL3VB will be the call used by Ian ex-ZL1ABZ, who arrived at Chatham Island on May 16 and will remain until June 14. If conditions are good the stay may be extended for an extra four weeks. Preferred frequencies are *C.W.*: 3540, 7020, 14040, 21040 kc/s. *S.S.B.*: 3610, 3750, 3810, 7070, 14120, 14270, 14335 and 21380 kc/s. Times of operation will be limited as power is not available on the Island for 24 hours a day.

KH6FBJ/KJ6 will have a further one week's activity on Johnston Island from June 1 using 14257 kc/s each day for European contacts.

VK3AHO will operate from Timor as **CR8BH.** Operation will commence on May 27 and last until June 15, after which Bill will have one week's activity as **VK3AHO/8.** QSLs via Hammarlund.

The rumour corner offers the following doubtful information: Clipperton Island—W6FAY is trying for a licence. Swan and Navassa Island activity by VP7CX in July. UW0IN should be active from Wrangel Island during June.

Asiatic USSR Prefixes

Area	Prefix	Zone
— Chelyabinsk	UA9A-B	17
— Sverdlovsk	UA9C-D	17
Perm, Tagil —	UA9E-F	17
Tomsk	UA9H	18
Tyumen, Hanti —	UA9J	17
Omsk	UA9M	17
— Novosibirsk	UA9O-P	18
Kurgan	UA9Q	17
Orenburg	UA9S-T	16
Kemerov	UA9U-V	18
— Bashkir	UA9W	16
— Komi and Vorkutu	UA9X	17
Altai and Barnaul	UA9Y	18
Krasnoyarsk, Nobilsk	UA0A-B	18
Cape Chelyuskin —	UA0KAE	18
—	UA0B	
Dickson Island	UA0KAR	18
	UA0AZ-BC-BD-BF	
Khabarovsk	UA0C	19
	UA0G	
Sakhalin Island —	UA0E-F	19 or 25
Cape Schmidt, Bering, Pevek, Magadan, Wrangel Is. —	UA0I	19
— Blagoveshchensk (Amur)	UA0J	19
Port Nahodka	UA0K	19
— Vladivostok	UA0L	19
Ussuriisk	UA0M	19
Buryat-Mongolia, Ulan-Ude —	UA0O	18
Yakutsk, Olenek —	UA0Q-R	19
— Irkutsk	UA0S-T	18
— Chita	UA0U-V	18
Tannu-Tuva	UA0Y	23
Kamchatka, Petropavlovsk	UA0Z	19
UPOL Stations	North Pole Drifting Stations	40
UA1KED	Alexander Island, Franz Josef Land	
UA1KAE	Mirny Base, Antarctica	29, 30
UA1KAE/1	Dmegrosky Base	
UA1KAE/2	Oaza Base	
UA1KAE/3	Pionierskaja Base	
UA1KAE/4	Komsomolskaja Base	
UA1KAE/6	Vostok Base	
UA1KAE/7	Sovietskaja Base	

This list is based on information supplied by GM3ITN.

Contest News

The annual **WADM C.W.** contest will take place this year between 20.00 GMT on October 2 and 20.00 GMT October 3, using all bands from 80 to 10m. A six-figure number will be exchanged (RST plus QSO serial number) and each complete contact with a DM station counts three points, incomplete contacts are worth only one point. The multiplier is the sum of all districts contacted on each band and each district is identified by the last letter of the call. Logs, which must be for all band operation only, from single operator or multi operator stations should be posted not later than October 30 to Radio Club Der DDR-DM Contestbureau, Box 30, Berlin 55, East Germany.

From W1WY of *CQ Magazine* comes the results of the 1964 *CQ* Phone Contest which attracted over 700 entries but as usual very few were received from the United Kingdom. An interesting feature of this year's contest was that the top honours were all taken by Venezuelan stations. Our congratulations to **GI3CDF** for being world leader on 80m and to **G3FXB** for being European leader on 20m.

Top Ten
All Band—Single Operator

YV5BIG	.. 757,874		ZL1AIX	..	486,402
CX3BH	.. 617,148		DJ2QZ	..	479,386
W3MSK	.. 598,620		K2HLB	..	473,556
HC2JT	.. 586,713		ZE1JE	..	427,575
DJ6QT	.. 538,916		HB9ZY	..	412,895

Top Six
Multi-Operator Single Transmission

YV9AA	.. 1,382,036		I1RB	..	649,000
TI0RC	.. 740,526		HC2LDA	..	524,208
DL1JW	.. 701,274		K2IEG	..	487,326

Leading UK Station GW3NWV (GW3NWV and GW3DIX) 403782.

Top Station
Multi Operation Multi Transmitter

YV5AKU .. 1,463,871

Continental Leaders
Single Band
28 Mc/s

LU1DAB	.. 35,136		4X4MJ	..	1,632
	K6CT .. 560				

21 Mc/s

WA2SFP	.. 100,287		DJ1ZG	..	71,463
CR6JL	.. 84,240		KH6FJL	..	25,912
	PY5EG .. 15,120				

14 Mc/s

CX2CO	.. 414,005		G3FXB	..	**251,540**
5A1TW	.. 291,870		4X4GQ	..	211,050
VP7NS	.. 286,003		KH6FBJ	..	127,350

7 Mc/s

DJ2YA ..	14,965	JA2BTV ..	13,050
K2GXI ..	14,706	PY4ND ..	2,996
	ZL4BO ..	2,900		

3·8 Mc/s

GI3CDF ..	**35,052**	W1BU ..	21,390
4X4AS ..	29,392	YV5ANS ..	7,161

England

G3DYY	**A**	**58,830**	**226**	**44**	**84**
G3MWZ	,,	6,264	58	19	35
G2AJB	,,	4,472	64	14	29
G3MKX	,,	4,042	63	13	30
C3CAZ	**21**	**23,256**	**167**	**18**	**33**
G3RMF	21	8,976	81	16	28
G3PZO	,,	8,624	75	16	33
G3FXB	**14**	**251,640**	**778**	**33**	**87**
G3LSF	,,	142,010	476	39	71
G3HDA	**7**	**14,326**	**142**	**22**	**50**

Northern Ireland

GI3SXG	**A**	**61,908**	**348**	**25**	**52**
GI3CDF	**3·8**	**35,052**	**309**	**19**	**50**

Scotland

GM3BCL	**A**	**60,120**	**262**	**41**	**79**
GM3JDR	**21**	**6,626**	**70**	**15**	**23**
GM3SFH	**14**	**1,056**	**47**	**4**	**18**
GM3NQB	**3·8**	**3,668**	**130**	**5**	**23**

Wales

GW3SFC	**A**	**2,970**	**66**	**9**	**24**
GW3OCD	**14**	**21,945**	**186**	**19**	**38**

Number groups after call letters denote the following: Band (A-all), Final Score, Number of QSOs, Zones and Countries. Certificate winners are listed **in bold face.**

Commonwealth Call Areas Table

	1·8	3·5	7	14	21	28 Mc/s	Total
G3KSH	—	26	24	66	25	—	141
G3DYY	—	9	27	51	16	2	105
G8JM	4	—	—	66	13	1	84
VO1FB	11	15	13	31	8	1	79
G3AAE	—	—	7	40	22	—	69
G3LHJ	3	3	5	29	26	2	68
5N2AAF	—	—	5	19	4	—	28
DL2CT	3	6	3	7	2	—	21
A2498	2	8	8	71	29	6	124
A2340	6	13	22	51	18	1	111
A4048	5	12	5	55	15	2	94
A4311	1	10	1	60	17	3	92
A4201	4	9	4	53	13	3	86
A4552	—	2	—	34	44	5	85
A4431	3	8	34	38	31	1	85
A3902	2	14	2	41	20	2	81
A3699	5	11	10	34	20	—	80
A3942	4	14	19	32	7	—	76
A4311	1	8	—	54	9	2	74
A4038	3	5	5	40	16	2	71
A4391	4	6	2	22	19	3	56
A3766	1	6	1	26	11	—	45

Band Activities

Another very good month, particularly on 14 Mc/s where morning openings to the Pacific have been consistently good and have sometimes lasted up to three or four hours. It has also been gratifying to hear the band open every night to North, Central and South America with excellent signals coming through.

It is also pleasing to note the increase of activity on 10m. On this band **ZE6JL** reports contacts with EA, FK8, OD5, UA, UB, UL7, VK2, VK6, YK and ZC4. From W/land comes reports of contacts with South America and South Africa while activity in the Pacific is supplied by VK5KO who reports contacts with Ws and 9M4LP. On February 21 at 07.15, VK5KO heard an OZ station calling CQ on 28020 kc/s.

Contributors are thanked for their interest, and once again it must be stated that all lists should be in alphabetical order as the writer had to wade through over 1,000 call-signs this month, which were supplied by: DL2CT, G2BOZ, G2LB, G2RO, G3APZ, G3DO, G3AAE, G3FKM, G3HCT, G3KSH, G3KSK, G3PUF, G3SML, GI3PLL, GM3ITN, G4MJ, G8JM, A2498, A3374, A3699, A3902, A3942, A4048, A4124, A4311, A4431, A4552 and A4574.

1·8 Mc/s C.W.: OK1KGA (23.00), OL6AAD (23.00) and OL6AAE (23.15).

3·5 Mc/s C.W.: CE0XA (05.00-06.00).

3·5 Mc/s S.S.B.: KZ5WI (06.25), OH0NC Aland Is. (22.40), OY7ML (21.35), VE1AZ (23.00), VE1IE (23.10), VO1FB (23.10), ZL2RK (06.15), ZL3LE (06.40), ZL4LN (06.15), 4U1ITU (22.10-23.40) and HZ1AT/8Z4 (22.40).

7 Mc/s C.W.: AC3H (17.17), CE0XA (07.00-08.30), EL2AD (23.30), FG7XI (02.45), HI8IBC (23.20), HI8RVD (23.05), HK1JF (02.50), HK3ASI (01.15), HK7UL (02.50), KP4ASN (23.55), KV4CI (23.30), MP4TBO (20.00), UA0KSB (23.45), VP4VU (21.50), ZL3UY (09.00), 4U3ITU (21.01), 7X2AH (21.59), 9J2DR (21.45) and 9J2DT (21.10).

7 Mc/s S.S.B.: ET3USA/P (20.35), OH0NI (07.10), MP4TBL (20.50), OA4MX (07.10), VK2AVA (20.50), VK3AHO (19.45), VK3ATN (21.15), VP2SM (23.10), YA4A (20.10), ZL3UY (07.15, 09.10), ZP5KT (22.28), ZS1XR (22.30), ZS1XX (20.25), ZS5GY (21.55), ZS6YQ/ZS9 (20.45), 4U4ITU (22.30), 5N2RJO (20.30), 7Q7PBD (20.00, 20.15) and 9J2WR (21.00).

14 Mc/s A.M.: CR5SP (21.55), CR6GB (17.35), CT2AM (17.55), EA8EX (16.52), ET3USA (17.05, 20.32), FM7WN (20.55), FU8AG (10.15), HI4XAB (22.25), HI4XEC (22.46), MP4TBC (17.00), PX1AC (17.00), PX1AD (12.54), TN8BG (20.25), TU2AP (06.50), UI8KOO (08.58), VE3CVL/SU (07.40), VE8SK (19.50), ZE1AE (18.00), ZS1YR (17.45), 5Z4GT (17.45), 7X2MD (07.30), 9G1SC (20.30), 9J2DT (20.28), 9U5BB (19.53).

14 Mc/s C.W.: AC3H (14.00), AC6H (12.05), AC9H (13.08), AC0H (12.50), AP5HQ (13.13), BY3NA (12.00), BY9SX (12.00), CE0XA (17.00, 21.00), CM1AG (20.00), CO2KG (18.50), CO2KG (19.55), CP1EA (22.30), CP3CD (21.40), CR4AE (07.15), CR4AJ (18.20), CR9AH (12.35), CT3AQ (20.50), DU1OR (14.17), DU9FB (13.40), EL2AC (18.13), FG7XC (19.20, 19.45), FG7XS (22.40), FK8AT (08.15), FL8RA (16.37), FO8AQ (06.55), FO8BJ (08.55), FR7ZI (16.20), FU8AG (08.00-10.15), FY7YJ (21.45), HI8MMN (21.20), HM1BB (09.00), HM5CP (09.30), HP1AC (23.00), HP1BR (21.48), JT1AE (09.50), JT1AJ (15.45), KA9MF (10.50), KB6YQM (07.30), KG6SB (09.26), KR6JZ (13.55), KR8AX (16.11), KS6BN (06.40), KS6BV (07.25), KW6EK (08.45, 09.00), KX6DQ (09.00), KZ5RD (23.18), LA2QJ/P Jan Mayen (10.00), LA4EJ/P (17.25), LA5ZJ/P Jan Mayen (09.37), LA8FI/P (21.00), OA6AW (20.10), PZ1CL (21.40), PZ1CM (19.45, 20.45), PJ2ME (22.10), PZ1CM (20.45), TI2WD/8 (21.05), TN8AF (19.00), TU2AN (21.00), VK4TE (Willis Island 09.30), VP2AV (21.15, 21.50), VP5BR (Turks 22.45), VP5RH (Turks 19.30), VP6BW (22.00) VP8HJ (19.45), VQ8BY (17.00), VQ9HB (18.30), VR1B (11.30), VR1S (07.30-10.15), VR2BZ (08.50), VR2ER (07.18, 07.55), VR1S (07.30-10.15), VR2BZ (08.50), VR2ER (07.18, 07.55),

(VR4ED (09.30), VS6FK (13.20, 15.55), VS9OB (16.50), VS9OC (15.15), VU2GW (15.10), XE1OE (23.22), YK1AA 16.00), YS1O (23.45), YS1RFE (20.43), ZD7IP (07.40), 20.00), ZD8BB (08.00, 09.00), 3V8AX (18.00), 4S7EC (16.30), 4S7WP (18.45), 4U5ITU (20.00), 5W1AZ (07.30-08.45), 6O6BW (22.25), 6Y5AR (21.30), 9G1FK (12.30), 9M6LX (16.15) and 9X5MW (18.50).

14 Mc/s S.S.B.: AC3H (14.20), AC8H (15.58), AC9H (16.35), AP5KC (06.30), BV1USA (13.20), CE0XA (21.15), CO2KG (18.45), CR4AJ (09.50), CR9AI (14.55), CR9AK (15.54), DU1AA (15.45), DU1LM (14.35), DU1MR (14.05), DU9FB (15.00), EL2I (08.16), EL2Y (07.23), EP2NO (15.00), EP2RW (13.20), ET3DR (17.10), FG7XL (21.40), FG7XR (17.00), FG7XS (21.00), FG7XT/FS7 (18.25), FH8CD (16.43), FO8AG (07.35), HB0LL (20.50), HC8FN (19.24), HI8JAL (19.25), HI8RBG (12.22), HK0QA (20.20), HM1AB (10.37), HP1SH (21.50), HR1SO (21.25), HR3HH (11.35), HS1HS (15.48), HV1CN (19.00), HZ1AT (17.20), HZ1AT/8Z4 (17.20), IP1ZGY Pantellaria Is. (19.10), KB6CB (07.45), KB6EPN (08.25), KC4USA (06.45), KC4USB (08.40), KC4USV (06.48), KG6IG (08.50), KG6SB (10.55), K7MAH/KG6 (11.00), K5CQK/KH6 Kure Island (06.40), KJ6BZ (10.00), KH6FBJ/KJ6 (08.20), K7TJC/KJ6 (07.50), W9FKL/KJ6 (09.06), KM6BI (06.45), KM6CE (08.25), KR6UL (19.15), KR8CA (15.15), KS6BA (06.50), KS6BK (07.45), KS6BO (07.47), KS6BQ (07.45), KV4CF (19.35), KV4CX (19.45), KW6CV (08.10), KW6CP (09.07), KW6EB (09.10), KW6EJ (08.03), KX6BB (09.20), KX6BO (09.45), KX6BU (07.36), KX6BR (08.06), KX6DQ (09.55), KX6NG (06.55), M1ZG (13.05), MP4TBM (16.45), MP4TBO (14.30), OH0NI (12.45), PJ2CR (21.00), PZ1AG (20.00), TG8GZ (22.30), TG9EP (20.00), TG9OO (00.35), TG9RR (21.17), TI2KMC (20.45), TI5RC (16.30), TJ1AC (18.10), TU2AW (07.37) UA0YP (Zone 23 10.15), VK9AG TNG (14.30), VK9CR Cocos—Keeling (15.15), VK9JV TNG (13.25), VK0GW (09.58), VP2GCA (17.00), VP2GTA (21.28), VP2KD (21.50), VP2KL (21.30), VP2SM (19.00), VP2SRC (22.27), VP3HAG (22.22), VP4VP (21.02), VP7NQ (17.10), VQ9HB (16.16), VR1B (10.00), VR2EK (08.55), VR2ET (08.38), VS5MH (14.20), VS6AJ (14.45), VS9MB (16.23), VS9PCZ Perim Is. (05.10), W2ZIA/ZK1 (07.05), XE1OE (19.50), XE1RRW (23.55), XW8AY (16.06), XW8AZ (14.15), YK1AA (07.22), YS1SRD (20.30), YS2MFI (20.55), YA3TNC (15.40Z), YN3FP (22.05), YA4A (08.45), YN9JUL (21.25), ZB2AK (12.55), ZD5R (17.40), ZD8BI, HL, JC, JG, JL, LT, SI, TV (16.35-23.00), ZP9AY (22.30), ZS6YQ/ZS9 (18.05), 4S7GM (14.20), 4U1SU (18.50), 4U6ITU (10.00), 4W1Z (14.35), 5U7AC (17.10), 5X5IU (19.00), 6O6BW (21.00), 6W8AG (12.33), 6Y5DM (11.37), 6Y5RD (20.40), HZ1AT/8Z4 (06.37), HZ3TYQ/8Z5 (20.20), 9K2BY (18.45), 9L1MJ (18.40), 9M6BM (16.30), 9M6LX (17.35), 9N1MM (14.30) and 9U5ID.

21 Mc/s C.W.: CE0XA (14.00-24.00), CR4AE (20.24), CR6AI (14.00), CR6HG (17.50), CR6JA (07.20), ET3USA (14.30), HM1BV (10.50), HM5BF (12.16), JAs (08.58-10.20), KG6IG Bonin Islands (10.43), MP4QBP (11.11), TN8AA (11.20), VS6FF (11.31), VS9AWR (09.40), VU2GG (11.29), ZB2A (20.00), ZD7IP (10.23), 5R8CB (17.40), 9H1AB (19.30), 9K2AD (18.36), 9L1TL (14.12), 9Q5TJ (14.08).

21 Mc/s A.M.: CE3XP (16.38), CR5AS (16.00), CR5SP (10.32), CR6AF, DU, GF, GV, JT, JM (12.57-17.56), CR7FR (10.20), CR7GH (15.15), CX2CM (17.32), EL1H (17.35), EL2Y (10.30), ET3USA (15.25), FM7WN (19.06), FR7ZD (16.32), KZ5HK (17.05), MP4BEN (08.10), MP4TBO (13.10), OA4OS (18.04), OD5CY (14.24), PZ1CP (21.30), TI2XZ (17.17), TN8BK (19.15), TU2AE (17.23), TU2AN (17.10), UF6CW (11.50), VK6GL (12.25), YA1AW (08.24), ZP3AL (18.40), 5H3JR (17.10), 5N2AAC (13.50), 5X5JK (18.25), 6W8AJ (18.55), 9G1DM (17.07), 9G1RH (13.54), 9H1K (16.00), 9H1R (18.25), 9K2AD (08.35), 9L1WN (17.10), 9Q5RB (17.55), 9U5AB (16.50), 9X5AV (17.35), 9X5RZ (16.39).

21 Mc/s S.S.B.: CE0XA (16.02-24.00), CE3RC (19.25), CX3DH (16.40), EA6AM (18.15), EL6E (16.16), EL8D (17.09), JA6BEE (12.00), KV4CX (16.00), KZ5AB (16.35), KZ5AW (17.35), LU7DGM (16.25), M1ZG (14.30), OD5BZ (12.09), TL8SW (16.35), TG0AA (22.00), UJ8KAA (09.58), UW9AF (12.10), VK3ATN (08.20), VP7DD (17.10), VS9AWR (10.15), VS9MB (15.00), YA4A (13.25), ZD7SE (17.15), ZD8BB, DX, HL, JC, TV (14.38-16.26), ZP5KT (14.50), ZS6BBB/ZS9 (10.00), 4U1SU (16.42), 5H3JR (17.40), 5N2JEB (17.19), 5X5IU (16.30), 5Z4AA (16.55), 6O6BW (12.28), 7Q7PBD (15.54), 7Q7PM (17.58), 9G1EC (17.33), 9J2WR (16.08) and 9Q5QR (16.45).

28 Mc/s A.M.: CR6GV (16.51), LU6DAF (15.00), LX1DC (16.15), OD5CC (16.35), ZC4GT (12.20), ZE1BB (15.50), ZE2JA (14.49), ZE2JE (16.00), ZS6BDT (13.36), 9G1DM (16.11), 9J2DT (13.15), 9Q5DT (13.53).

28 Mc/s C.W.: DL, EA, EA6, HA, HB, I, LA, OE, OH, OZ, SM, UA, UB, UC, UP, UQ, UR, YO, YU (08.00-17.00), VS9OC (11.45), 4X4AF (13.05), 4X4WF (13.05), 7Q7RM (14.05), 7X2RW (09.50), 9J2BC (10.20) and 9J2DT (09.55).

28 Mc/s S.S.B.: LU1HHH (13.25), OD5BZ (14.01), 5H3JJ (16.32), 9G1KS (16.18) and 9J2WR (14.46).

DX Briefs

5W1AZ, who is ex-ZK1BV, is now active from Western Samoa. George prefers operating around 14085 kc/s at 08.00.

VU2DIA is reported to be a new station active from the Andaman Islands and will operate mostly on 14 Mc/s c.w. during his three-year stay there.

KM6DJ promises c.w. activity most days on 14010 kc/s from 06.30 until 08.30 GMT. Joe expects to remain on Midway Island until the end of June or July. QSLs may be sent via KM6CE or the Bureau.

W2JAE is scheduled to be active from **FP8CK** using all bands from June 1 until June 18.

VK4TE of Willis Island is often a strong signal in Europe on 14063 kc/s between 09.00 and 11.00.

VR1S appears to be crystal controlled on 14015 kc/s and has been putting strong signals into the UK at weekends between 08.30 and 11.00.

UA0YP is a new station active on s.s.b. from Zone 23 and has been worked at weekends on 14110 kc/s. Patience is required as Fedor's English is not fluent.

ZD7IP has been very active on the h.f. bands using 20 watts to a Vee beam on G. George says there is no need to worry about pile-ups as he thinks that in the next two years he should remove St. Helena from everyone's wanted list. QSLs via the RSGB Bureau.

VS9SJF who operated from Socotra Island recently, is now back in the UK and has been issued with the call G3UCQ.

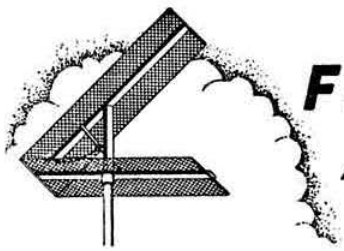
CR5SP is now active on single sideband and is usually found between 21,110 and 21,170 kc/s.

Gus Browning appeared from Tibet earlier than anticipated and has been signing **AC4H**. After a further three days of operation from AC3 he will return to Britain.

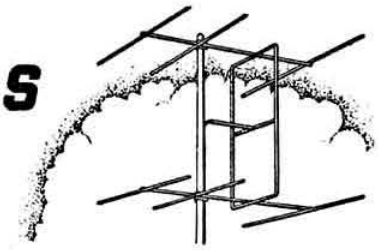
W5OLG will assist in skeds with VR6TC and suggests 14,040 kc/s on Tuesday mornings between 05.00 and 06.00 GMT. QSLs via W4TAJ.

* * *

Correspondents are thanked for their co-operation and acknowledgment is made to the *West Gulf DX Club Bulletin* (W5IGJ) and the *LIDXA Bulletin* (W2GFD/W2MES). Please send all items to arrive not later than **June 17,** 1965, for the **July** issue and **July 15** for the **August** issue.



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW*

SOME interesting news has been received from F3SK. (" Uncle ") of Biarritz, who is a pioneer of u.h.f. practice, particularly in the field of transistorized apparatus In co-operation with F9BP/P he has been making the first duplex QSOs between 23cm and 2m using only transistors in the u.h.f. system. On April 20 and 21 tests were made over a distance of half a mile to check the rigs. F3SK used a corner aerial inside the house (180 ft. a.s.l.) on the ground floor, and F9BP/P had F3SK's all transistor receiver. Reception of course was good. The big corner array was then attached to F3SK's transmitter and F9BP/P went to a 330-ft. hill six miles away. He had good reception of F3SK's c.w. using only a small corner. On the 21st, F9BP/P went with the same equipment to another hill 400 ft. a.s.l., but not in an optical path, near the Spanish border. He received F3SK's c.w. very clearly and re-transmitted it with his 2m mobile rig as before. The signals were RST539 with a slight chirp. The receiver was the old " de luxe " all transistor receiver for 24/30 Mc/s. This also contains the 2m and 70cm section entirely rebuilt with many Siemens AF139s, and the recently finished 23cm converter which includes an AF102 Chow overtone oscillator with a 53 Mc/s crystal; AF102 trebler to 159 Mc/s; AF102 buffer; AF139 doubling at 318 Mc/s; AF139 doubling at 636 Mc/s; AF139 buffer in class A; AF139 doubling at 1272 Mc/s; mixer 1N21B; and an AF102 broad-band preamplifier at the i.f. of 24-28 Mc/s. All the circuits at 636, 1272 and 1296 Mc/s use flat lines, well shielded and folded to the chassis to get the best magnification. The power supply is a 12V battery.

The transmitter is based on the 2m all transistor transmitter, using six stages beginning with a 2N1143 Chow overtone oscillator giving about 24·0516 Mc/s and using in the p.a. a PSI 2M1505 with double pi-output circuit. A transistorized system delivers (from a 12V battery) 20V to all the r.f. stages except the p.a., which receives 30V. The output power is 500 mW on phone and 1200 mW on c.w. On the top of this transmitter F3SK mounted two frequency triplers (from the booklet of Microwave Associates *Varactor Harmonic Generation*, Page II, diagram 7); the first one with a PSI PC115/10 delivers about 0·5 W on 432·930 Mc/s, while the second one, built in a hurry, uses an ultra high speed, high *Q* switching Fairchild diode 1N914. Keying is achieved by cutting the power applied to the overtone oscillator.

The transmitting aerial is a home built 90° corner with sides of two wavelengths and an adjustable dipole, while the receiving aerial is F8OL's horn aerial with a 2 ft. × 2 ft. aperture, giving a gain of 16db. He also uses a home built corner similar to the larger one, but with sides of but one wavelength. Tests across the border with Spain will take place soon. Some delay was caused by an unfortunate motor accident in which F3SK was injured, but he says he is quite well again now, for which we are all glad.

These tests, incidentally, are taking place 10 years, almost to the day, after F8OL and F3SK had their first 23cm QSO (April 30, 1955).

UK Activity on Twenty-three Centimetres

G2CIW (Birmingham 31) would like to see an activity list and sends a report to encourage this. Having been on 23cm almost a year now he has worked G3KFD, G3NBQ, G3BNL, G3KPT, G3FP, G3LTF, G3LQR, G3MAR/P and PA0COB. G2RD has been heard and G2CIW has been heard by F8MX/A. Incidentally, it has been found that signals between G2CIW and G3BNL (Nottingham, about 50 miles away) can be exchanged even during rock bottom conditions. The receiving equipment consists of a trough-line converter with an E88CC amplifier feeding into home-built double superhet, and the transmitter is a 3CX100A5 tripler running 60 watts input at 1298·25 Mc/s. The aerial is a corner-reflector trough.

G3NBQ (Coventry) received G3BNL (1296·82 Mc/s) for the first time on April 25. His signal was RST229. On the 26th, G2CIW (1298·25 Mc/s) was received from the new QTH at RST549 and G3KEF and G3NBQ exchanged S9 phone signals.

Another newcomer is **G8AFY** (Hinckley) who is using an RSGB *Handbook* type converter and a 4-over-4 aerial. He has received G3NBQ, G3KEF and G3BNL, all at Q5. **G3FNW** has now completed his 2C39A tripler and tests are being carried out. **G8ABB** is almost ready, and others known to be interested are **G8AEK** and **G3BKQ**. **G3MCS** has just completed an 8 ft. dish and expects to get it up to 30 ft. soon. Tests between G3NBQ and G3MCS and G3GWL have not yet succeeded.

G3JGJ (Moretonhampstead) is hoping to start on 23cm and would like to hear from interested parties. He is looking for some equipment and plans to use an A2521 in the proposed transmitter and receiver.

Seventy Centimetres

G8AAC (Barnsley) is looking for skeds and contacts locally and further afield. He is on QRP, with an ASZ21 in the final stage modulated by an ASY26 and ASY28 class B pair. The receiver is a modified G2DD converter feeding another converter to a 19 set. Skeds have been arranged in conjunction with G8AGQ (they both operate /A in the Sheffield area). Calls are started at 20.00 GMT. For the first 10 minutes of each half hour they listen on 70cm; for the second 10 minute period on 2m and for the third period on 4m. The first QSO was crossband (2m) with G3LLE. The transmitter used ½ watt to an A2521, seriously under-modulated owing to a transistor failure, with a 2 element Yagi. Despite a hill of over 200 ft. between the stations they

* 21 Bridge Way, Whitton, Middlesex. Please send all reports for the **July** issue by **June 11** and for the **August** issue by **July 9.**

received a report of RS56 over a distance of six miles. Local stations G8AET and G8AGN are building for the band: G8AET should be operating very soon. G8KB listens on 70cm and G3LIE can operate on the band.

G3NBQ (Coventry) now regularly works G8AEX. G8ADC, G8ABB, G3GWL, G3MCS, G3BNL and others. The aerials are now outdoors. Local activity is now good, with the following regularly heard and worked: G2CIW, G3RYB/T / G8AHR, G3KEF, G8AFY, G8ABD, G8AGS, G3PTM, G8ABP, G2FNW and G3BKQ. G3NAP is now on 70cm (434·9 Mc/s) and radiating a good signal. G3NBQ now uses an AF139 transistor pre-amp and finds it much better than the A2521.

G3JGJ (Moretonhampstead) is able to operate on 70cm and was receiving G8ADP (Teignmouth) at RS59+. The latter station was worked by G5ZT (Plymouth) who was 59, and G8ADP was 57 at Plymouth.

Two Metres

GI3SLI/M (Co. Down) worked G3SPS/MM from south of Belfast for the last time on March 27. March 30 was "open night" and brought QSOs with G2JF (Kent), G3PRF (Warwickshire), G3OGY (Chorley), G3NAS (Staffs.), GD3FOC (I.O.M.), G3OWA (Surrey), G3SHK (Middlesex), G3BLP (Surrey), G3LTF (Essex), G3PFR (Herts.), G3TGE (Beds.) and G8OU (Ashtead). G8OU seemed rather suspicious of the call-sign, because of the high signal strength (S9). All these stations were worked on phone, and the beacon GB3VHF was at S8 until 08.00 the following morning, when he gave up. G8DV (Cheltenham) was worked c.w. and phone on the night of April 2. GM3FYB (Dunfermline) was heard working GI5AJ on April 11, and so GI3SLI broke in and successfully contacted GM3FYB. On the 16th, a visit was paid to Eire, and personal QSOs were made with EI2AK (Drogheda) and EI2A (Navan). EI2A was first worked from just north of the border. GI3SLI's call sign whilst in the Republic was EI5AW/M. When the band is open EI2A uses a frequency of 144·248 because the usual frequency (145·8) is too crowded. A kind of mobile conducted tour of places of interest was carried out during the QSO mentioned above!

EI7AF (Birr, Co. Offaly) is on 144·36 Mc/s and EI6AI (Donegal) is on 145·38 Mc/s; they were tried on sked, but conditions were not good enough. GI3RNO (Antrim) is also on the band. GI3SLI will be on the band until July when he goes to Gibraltar, but the 2m gear will accompany him on the trip. In the meantime, any skeds will be appreciated.

G3EMU (Canterbury) went portable during the Third 144 Mc/s Contest (Portable) on May 2 to their usual site near Folkestone (600 ft. a.s.l.), and enjoyed wonderful weather, together with really good results. The transmitter, with series-gate modulation, performed very well. QSOs were made with six PAs, three ONs and four Fs, and G6GN and G3KMT represented DX in a new direction. G3LCK again acted as relief operator.

G3XC (Indian Queens) found the contest the most important item of the month. From April 29 the barometer began to fall to the lowest for some time, and this continued until May 2, the day all the Cornish V.H.F. Group had been waiting for. Torrents of rain and a force 7/8 wind kept on until they left the site at 16.15 GMT. Only 12 contacts were made, but to be told after the weather debacle that they were QRMd by out of zone stations was the last straw. Cannot competitors be required to observe the Band Plan in these contests?

G3XC may be making a trip to the Peak District, leaving Cornwall on Sunday, June 13, and making for Gloucester, Derby then Liverpool and back via Birmingham, etc., returning on June 19. It is anticipated portable operation on 2m will be between 18.00/20.00 GMT each evening (subject to conditions).

G2JF reports that there has been a definite improvement in normal tropo propagation since May 6, and at the time of writing conditions had reached a peak. GB3CTC was peaking anything between RS55 and 59 at certain times of the day in East Kent. Presumably the equatorial high pressure system which has been drifting north-east has been a significant factor in this respect. Over the period under review there has not been any indication of extended tropo, except for Sunday morning, May 2, when a GM station was reported as calling G2JF.

F3NB (Orly, near Paris) reports rather belatedly that amongst many other signals received via *OSCAR III* he heard G3EDD of Cambridge and G6GN of Bristol.

G2TH (Ewell) has made an appearance on 2m and is very pleased with his results to date. He runs a QQVO3-20A to 12 watts and radiates from a 4-over-4 Yagi system at 14 ft. He is very impressed with the relative peace of 2m after years on the h.f. bands.

G6AB (Holland on Sea), one time a 160m exponent of some note, has changed his interests in recent years to 2m, and his signals now compare with the best. He has quite recently installed a 60 ft. tower on the top of which his 6-over-6 slot is sending forth a mighty signal with the usual 6AB quality.

G5LC/M created quite a stir in South-East Kent whilst on holiday in Folkestone. While he was there he had the pleasure of working his first mobile contact with F2XO in north France.

G3SPS/MM can be heard consistently these days between Holland and North France. He has changed his frequency to approximately 145·3 Mc/s.

G6XD (Teignmouth) recently worked G2JF for a first contact during a period of fairly good propagational conditions around the middle of May. He runs an input of 15 watts.

PA0CML, who is perhaps one of the strongest signals from the Netherlands, worked 91 stations in the May portable contest, 30 of which were G and 24 were with DL. He reports his best DX contacts as being with G3KMT/P and G3FD/P.

ON8NA, although a new prefix and reserved for visiting amateurs, is not new to 2m. He was formerly ON4NY, and has also been active at various times with PA0 and DL call-signs. His wife, who is also licensed, signs ON8NB.

F9NJ (Lille) would like 23cm contacts with anyone who is capable of operating on this band and reports the new French prefix of F0 for recently licensed amateurs. He expresses the opinion, confirmed by most operators, that conditions during the recent 2m portable contest of May 1 and 2 were by previous standards very poor.

G3OCB (Truro) says that local activity has been good, but

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
April 27	15.02 GMT	112 c/s high
May 4	11.05 GMT	24 c/s high
May 11	11.00 GMT	20 c/s low
May 18	10.30 GMT	1000 c/s low

conditions poor. At lunch times there is activity between G3AET, G3XC, G3IGV and G3OCB/M around 12.00/13.00 GMT, always with the possibility of G3NVJ/M joining in. G5ZT, G3IEA, and G3JGJ have sometimes been heard at these times in their own net, but only G3JGJ has been worked. Otherwise GW3MFY and GW3FSA have been the only QSOs.

G3JGJ worked GC2FZC at 59+ on April 30, while on May 2 he went portable about 300 yards from home and worked, all at 59+, G5ZT, G3XC, GC3KAV, GC3OBM and G3OBD/P. G3IGV was also 59+ for most of the QSO. Stations heard were G6XD (Teignmouth), G3CQE/P (59), and also G3AET. GW3PPD/P, G3KUJ/P (59+) and G3MPS (59+) were heard several times during the day and called without success.

GI3JKO/P (G3JKO/5N2AAF) did not have much luck in Northern Ireland, and wishes he had taken gear for 4m and 10m. Having operated in Derry, Antrim, Armagh, Tyrone and Fermanagh with only very few QSOs, Mike was somewhat discouraged, and says that even GD3FOC, who was worked most evenings, complained about the lack of activity. In fact, anything over 100 miles is exceptional. Operating as GI3JKO/A from GI6TK on 4m, seven stations were worked in five minutes.

In contrast, during the previous week when operating as G3JKO/P on 2m from Sussex, Middlesex, Rutland, Derbyshire, Notts and Leicestershire, there was no difficulty in working stations each evening. In the Midlands, only a Halo was used generally, but it was easy to work at 100 miles distance.

We learn from *QAV Newsletter* that conditions during the 144 Mc/s Portable Contest were above average. Although the AERE-ARC worked only one continental (F9XG) they called several PAs and ONs and in all 108 stations were worked in the nine hours (G3NNG-46, G3TEL-25, G3LIZ-15, G2HIF-14 and G3ROC-8). There were very few gaps in operation.

Four Metres

GB3LER is now in continuous operation from Lerwick (Shetlands) in synchronism with the 10m and 2m transmitters. The station may be heard on 70·330 Mc/s, but if so this is only temporary whilst a new crystal for the intended frequency of 70·305 Mc/s is awaited. GM3LTP will appreciate reports on the reception of this new transmitter. His address is c/o The Observatory, Lerwick, Shetland Is.

G3XC (Indian Queens) finds some improvement on this band. G2AYQ, G2BHW, G3AET and G3RBS all have Pye Communicators operational. These are used either mobile or from fixed QTHs, with whip or vertically polarized dipoles, so that /M visitors to Cornwall may be able to make a few contacts. G3XC has 25 watts and a sensitive Nuvistor converter behind a 4 element Yagi. Fixed operation is not contemplated as permanent, as the equipment was built for portable operation.

News and Views

Harry Wilson, **EI2W**, on an Easter visit to the Near East, found Jerusalem to be a potentially ideal location for v.h.f. operation. The position is 2400 ft. a.s.l. and not the least of its other advantages lies in the fact of numerous temperature inversions due to hot days and cold nights. All it appears to need, in fact, is a population of active v.h.f./u.h.f. operators. Harry's itinerary will have included Egypt, Libya, Jordan, the Lebanon and Greece, and we shall doubtless hear more of his travels when he gets home again. In the meantime he asks to be remembered to all v.h.f./u.h.f. friends.

G3JGO (Slough) sends particulars of the CF2 144 Mc/s TVI filter, manufactured in the USA. If there is anyone interested who cannot cure this trouble, the writer will be pleased to pass on the address of the makers. It is claimed that this filter will attenuate spurious signals appearing outside the 2m band by 50db or more, and also that it attenuates below 2m. Further details can be found in the October, 1964, issue of *QST*.

A very lively v.h.f./u.h.f. situation exists in East Germany, and **DM2AWD**, the V.H.F. Manager, has sent a list of DX on 2m and 70cm, together with news of forthcoming contests and meetings. Further details may be obtained by sending an s.a.e. to G2AIW.

It was reported in *QST* (April) that two Alaskan amateurs, **KL7CQS** (Anchorage) and **KL7ECO** (Fairbanks), have been bouncing 2m signals off Mt. McKinley, North America's highest mountain, to one another. They have been keeping successful schedules since November 26, 1964, and have also established RTTY on 2m.

We also learn from the same issue of *QST* that a new **21,000 Mc/s record** has been made. This took place on October 24 last between W2UKL/2 (about 21,900 Mc/s) and WA2VWI/2 (about 21,957 Mc/s) from a high point in Schenectady, NY, to Mt. McGregor, a distance of slightly over 27 miles. Q5 copy was achieved in both directions on phone and tone-modulated telegraphy.

G2CUZ reports that the Ainsdale Radio Club held its **expedition to Westmorland** on April 18, which coincided with the RSGB Region 1 V.H.F. Contest. An early start was made, and the party arrived at about 08.00, where G3FNQ was already waiting. Three more arrived later, to make a total of 10 operators. Tent and aerials were soon up, and the first 2m QSO was made within two minutes of switching on. The 2m gear comprised G2CUZ's home transmitter and modulator running from a TT pack and 12V generator, with a 6 element beam. The 4m gear was G2DQX's, with two TT packs and a converted HRO fed from a vibrapack. The aerial was a 4 element, and extra gear in the form of two B44s was available. Activity was much heavier on 4m than on 2m, but they had a very enjoyable day in spite of afternoon storms, with snow, hail, thunder and lightning. There was unfortunately no real DX, the best on 2m being Wales and South Cheshire, and on 4m Shropshire and Montgomery. Afternoon activity on 2m was bad, even though 4m was going strong. On 2m, G3AOS could be heard (off the back of his beam) calling Midland stations, but these were not reaching Westmorland. However, all are keen for more, and there will be another trip later. To assess the performance of the gear, reports will be welcomed from anyone who heard them but was unable to make contact.

The **UBA National Station ON4UB** now transmits on 145·35 Mc/s (formerly 145·045 Mc/s). UBA requests that amateurs keep this frequency clear on Sundays from 09.30 to 11.00 GMT while official transmissions are being made. The station also works under the call ON5XA when exercises are arranged by the Belgian National Emergency Network in collaboration with the Belgian Red Cross. (from *IARU Region 1 Bulletin*, April 1965).

G3OCB (Truro) thinks that the s.s.b. 145·1-145·2 Mc/s sub-band would result in less QSOs for remote s.s.b. stations such as his. When stations are beaming s.w. they search the l.f. end carefully. By the time they reach 145 Mc/s, if at all, probably only local stations are heard and it is assumed that there is no one replying from the s.w. The proposed Zone is a good idea for well populated areas, but it is felt there should be no criticism of s.s.b. stations in remoter areas who choose to adhere to the band plan.

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

Scottish V.H.F. Convention

THE City Hotel in the ancient borough of Dunfermline was the scene of the Scottish V.H.F. Convention on Saturday, May 8, 1965.

Despite gusting winds and heavy showers, over 70 people gathered at 2 p.m. to listen to a lecture by C. E. Newton, G2FKZ, on " Radio Aurora." He dealt with the mechanism by which aurora is created, and the results of the IGY and IQSY auroral propagation investigations, for which G2FKZ is co-ordinator. One of the most interesting results explained was that due to the geometry of propagation by reflection at the auroral curtain, there exist limiting minimum and maximum distances for specific stations, and it is generally easier to achieve an east-west contact than on a north-south path.

After a break for tea, the meeting listened to a talk and demonstration by B. G. Taylor, B.Sc., GM3NZI, on " Low Signal Detection by Phase Correlation Methods." GM3NZI, who is engaged in research work at the University of Edinburgh, dealt with a method of detecting the presence of signals in the presence of large noise levels, by the generation of a local reference signal which locks to the phase and frequency of the incoming weak signal. The talk was illustrated with a simulated working demonstration.

The meeting then broke up for informal discussions, and some 50 present re-assembled at 6.15 p.m. for dinner, at which H. G. Henderson, GM3AEY, Chairman of the Dunfermline ARS, took the chair. After an excellent meal, the Rev. Walter Ferrier, GM3BDA, proposed a witty toast to the RSGB to which Geoff Stone, G3FZL, Immediate Past President replied. The toast to the visitors was proposed by J. Fraser Shepherd, GM3EGW, Zone G Representative on Council, and T. P. Hughes, GM3EDZ, President of the Radio Club of Scotland replied on behalf of all visitors to Dunfermline. The Chairman then asked Ray Hills, G3HRH, who was representing the Society as V.H.F. Manager, to say a few words, and then to present the Jock Kyle Memorial Trophy to GM3IQL who received it on behalf of the Dunfermline ARS, overall best performers in the v.h.f. field-day events among Scottish groups and clubs during 1964. The cup was filled with champagne by the Dunfermline ARS and duly passed around the whole gathering to drink to their health and success!

After the formal part of the proceedings was over, GM3EGW gave a short but interesting summary of the *OSCAR III* project, illustrated with tape recordings. The meeting was then thrown open to a general discussion on the results achieved, during which several stations, including G3FZL, G3HRH, G3CCH and GM3GUI commented on the part they had played themselves.

The dinner closed with the drawing of the raffle prizes, which included a separate prize of a Joystick aerial presented by Partridge Electronics in aid of the RAIBC for whom over £5 was raised.

The event, organised by A. Lawrence, GM3IQL, Secretary of the Dunfermline ARS, lived up very well to the standard set by earlier Conventions held in Glasgow and Edinburgh, and, as Geoff Stone remarked, the opening of the new Forth and Tay road bridges should enable succeeding events to be organised successfully even further north of the border.

We hope to have photographs in the next issue.

THE OSCAR STORY—Part III

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

THE *OSCAR III* telemetry beacon on 145·85 Mc/s is still operating well, with the battery voltage at a steady 11 volts, as these notes are being written. A point of interest was the sudden appearance of the tracking beacon signal on 145·95 Mc/s soon after the failure of the translator section. Both the beacon transmitters are of similar power output—25 mW—but there is no comparison between the two signals. G2AOX reports hearing the signal on 145·95 Mc/s during near passes and never more than some 2db above the noise level, whereas the telemetry signal can be received at strengths up to S7 or so when the satellite is on one of its more distant passes. It is now known that several satellites were launched at the same time by the same rocket and it is possible that Oscar suffered some damage to its aerials in the confusion.

Further to the reports last month of stations heard *via* the translator, the following have since been received: G3NNG (Didcot), I1HCJ and OH1NL on orbit 169 on March 21, G5ZT (Plymouth), DJ3EY, G3OST, I1EHC, SM5AIZ and SP3LQJ.

GI5SJ, Belfast, logged 53 separate orbits between March 12 and April 13 and identified the following translated signals. The figures after the calls indicate the orbits on which they were heard. DJ3EB (141), DL3BJD (114), DL3YBA (87,100), DL9GU (100), EA4EO (115, 143, 162, 170), G3LTF (114, 141, 142), G6AG (114, 115, 156, 162), HB9RG (73, 87, 155, 156, 170), ON4FG (148, 162), SM7OSC (100, 101), VE1TT (157), VE3YDA (157), W1BU (157) and WA2WEB (162).

So far as GM3GUI, Friockheim, Angus, was concerned, G3EDD was the last signal to be translated before the satellite's transmitter failed on orbit 203 on March 24. At that time G3EDD had the band to himself. On orbit 237 on March 26 the telemetry signal was extremely loud and considerable noise was heard being radiated on the low frequency end of the translator band. In addition to the " normal " run of translated signals, GM3GUI heard CO8HE on orbit 162 on March 21 when *OSCAR III* was 41° west. Some doubt has been expressed on the authenticity of CO8HE, but in the circumstances he *might* have been genuine. Other signals recorded at the same time included K (or W) 4TFG, a VE3 and an American-sounding voice on s.s.b.

The GB2RS News Broadcast will be carrying *OSCAR III* predictions as long as they are required, supplied as always by G2AOX. The following information will be of assistance to those observers who wish to listen to the telemetry signals: Period 103·51 minutes, daily change 9·14 minutes later and 5·4 further west every 14 orbits, and track separation between successive orbits is 26·10° west.

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

" Dev " Retires

F. J. Devereux, B.Sc., retired last month as Editor of *Wireless World*, after an association with that magazine which began in 1923. " Dev " served as an editorial assistant under the distinguished editorship of Hugh Pocock and later under the equally distinguished editorship of H. L. Smith. He became assistant editor in 1956 and was appointed editor in 1957.

For the past 20 years, or more, " Dev " has been a frequent visitor to RSGB exhibitions and other functions arranged by the Society.

We wish him well in his retirement and thank him for the help he gave to the Society during his long association with *Wireless World*. He is succeeded by H. W. Barnard, who has been Assistant Editor of *Wireless World* for the last eight years. G6CL

Society Affairs

Brief Report on the April, 1965 meeting of the Council

A MEETING of the Council was held on April 9, 1965, at 6.30 p.m. and was attended by Messrs. E. W. Yeomanson (President), H. A. Bartlett, N. Caws, J. C. Foster, J. C. Graham, E. G. Ingram, A. O. Milne, L. E. Newnham, A. D. Patterson, J. Fraser Shepherd, R. F. Stevens, G. M. C. Stone (Members of the Council), John A. Rouse (General Manager and Secretary), and P. C. M. Smee (Minuting Secretary).

Apologies for absence were submitted on behalf of Messrs. L. N. Goldsbrough, R. C. Hills, R. H. James, F. K. Parker, J. W. Swinnerton and L. Varney.

Half-year Accounts

Consideration was given to the accounts for the half-year ended December 31, 1965.

Recommendations of Committees

The Council accepted recommendations relating to the RSGB 21/28 Mc/s Telephony Contest, 1964, and Affiliated Societies' Contest, 1965 (H.F. Contests Committee), the first 70 Mc/s and first 144 Mc/s Contests 1965 (V.H.F. Contests Committee), to representation at the Scottish V.H.F. Convention in Dunfermline (V.H.F. Committee), the RSGB International Radio Communications Exhibition 1965 (Exhibition Committee), to a Christmas Lecture for young people and a weekend course at Ollerton, near Newark (Educational Committee).

The Council also approved a number of recommendations submitted by the Finance and Staff Committee in connection with the Norman Keith Adams Trust Fund, claims for expenses by members of Committees, staff matters, and increased subscription rates (a statement in connection with the new subscription rates, which will apply from July 1, 1965, appears on page 365.—EDITOR).

Membership

The Council approved 202 applications for membership (154 Corporate and 48 Associate). In addition, 15 applications for transfer from Associate to Corporate grade were accepted. The subscriptions of three applicants were waived on the grounds that they suffer from blindness or are disabled.

Affiliation

The Council granted affiliation to:

Battersea College of Technology Electronics and Amateur Radio Society
Government Communication Amateur Radio Club
Dunfermline Radio Society
Havering and District Amateur Radio Club.

Headquarters Accommodation

It was agreed to enter into a new lease for the present Headquarters offices at an increased rent. When making this decision, due consideration was given to the efforts being made to purchase a suitable Headquarters building.

Annual General Meeting

The Council approved December 17, 1965, and December 9, 1966, as the dates of the 1965 and 1966 Annual General Meetings.

RSGB News Bulletin Service

The appointment of additional newsreaders for the London area and Northern Ireland was approved.

Reports of Committees

The Council received reports on the meetings of the following Committees:

Membership and Representation (5.2.65), Scientific Studies (5.2.65), V.H.F. Contests (10.2.65, and 10.3.65), H.F. Contests (11.2.65, and 11.3.65), Education (13.2.65), Technical (1.3.65), Mobile (4.3.65), V.H.F. (8.3.65), Finance and Staff (15.3.65) and Exhibition (26.3.65).

* * *

The meeting ended at 10.50 p.m.

Affiliated Societies

The following Societies are now affiliated to RSGB:

THE AUCHENHARVIE AND DISTRICT AMATEUR RADIO CLUB:
c/o B. N. Robertson, 11 Hillcrest Drive, Stevenston, Ayrshire.

HOWARD HOUSE (BRUNSWICK) BOYS' CLUB:
c/o S. L. Del-Roy, 30 Belsize Avenue, London, N.W.3.

Representation

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

NORWICH AND DISTRICT RADIO CLUB:
O. F. Simkin, G3HYJ, 15 Hillside Road, Thorpe St. Andrew, Norwich, Norfolk, NOR 48T.

The following are additions to the list of Area Representatives:

BARNSLEY & DISTRICT:
J. WALKER, G3GNK, 23 Locke Avenue, Barnsley, Yorkshire.

NORTH BERKSHIRE:
C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Berkshire.

GREAT YARMOUTH & DISTRICT AMATEUR RADIO CLUB:
D. L. Buddery, G3SEP, 72 Albany Road, Great Yarmouth, Norfolk.

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.

RSGB Slow Morse Practice Transmissions

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

Time	Call-sign	kc/s	Town
Sundays			
08.00	G3KLT	1827	Birmingham
09.30 †	G3KZZ	1920	South Shields, Co. Durham
	G3TNF		
10.00	GW3TMH	1980	Rhyl, Flints.
10.15	G3CGD	1875	Cheltenham
10.30	GI3JEX	1860	Belfast
11.00	G2FXA	1900	Stockton-on-Tees
12.00	GM3HBY	1903	Glasgow
12.00 †	G3HVI	1890	Stoke-on-Trent
	G3OGD		
12.00	G3SVD	1870	Reading, Berks.
12.00	G3PAI	1825	Ongar, Essex.
18.00	GW3TMP	1980	Mold, Flints.
18.30	G3NCZ	1920	Blackburn, Lancs.
19.00	G3NPB	1875	Hexham, Northumberland
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.30	G3NQR	1875	Harrow Weald, Middx.
Mondays			
18.00	G3SWR	1980	Middlesbro', Yorks.
18.30	G3NCZ	1920	Blackburn, Lancs.
18.45	GW3PMR	1920	Bangor, Caerns.
19.00	G3MXS	1875	Birkenhead
19.00	G3NPB	1875	Hexham, Northumberland
19.30 †	G2ATM	1890	Heanor, Derbys.
	G3KTP		
	G3OKX		
	G3ONB		
	G3RTO		
	G3RUB		
	G3RWN		
19.30	G3SRY	1920	Cheam, Surrey
20.00	G3HJG	1980	Manchester
20.00	G3IBJ	1910	Southampton, Hants.
20.00	G3PKZ	1930	London N.22
20.15	G3SAZ	1845	Ashford, Middx.
20.30	G3TOF	1925	Harlow, Essex
20.30	G3MJS	1980	Leigh-on-Sea, Essex.
21.00 †	G3IRM	1981	Bury St. Edmunds
	G3MWO		
	G3PHW		
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.15	G3ADQ	1990	Bradford, Yorks.
21.30 †	G2BSW	1865	Studley, Warks.
	G3TBW	1865	Redditch, Worcs
Tuesdays			
19.00	G3NPB	1875	Hexham, Northumberland
19.00	G3NUE	144-26 Mc/s	Worcester
19.30	G3RFL	1910	Great Harwood, Lancs.
20.00	G3RZO	1865	Redditch, Worcs.
20.00	G3PJI	1910	Southampton
20.00	G3AYJ	1925	Birmingham
20.30	G3NKX	1915	Loughton
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.30 †	G3HZG	1865	Redditch, Worcs.
	G3TNI	1865	Bromsgrove, Worcs.
22.00	G3AWL	1980	Wingate, Co. Durham
22.00	G3HZM	1925	Manchester
Wednesdays			
18.30	G2FXA	1900	Stockton-on-Tees
18.45	GW3PMR	1920	Bangor, Caerns.
19.00	G3GBS	1865	Moseley
19.00	G3GBJ	1870	Redditch, Worcs.
19.00	GW3CJR	1930	Newbridge, Mon.
19.00	G3RBP	1860	Oxford
20.00	G3RQX	1840	Wolverhampton, Staffs.
20.00	G3SAD/A	1980	Stevenage, Herts.
20.30	G3KGU	1920	Theydon Bois, Essex
20.30	G3AGN	1875	Felixstowe
21.00 †	G3HVI	1890	Stoke-on-Trent
	G3OGD		
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.00	G3POU	1850	Doncaster, Yorks.
	G3SFO		
Thursdays			
18.00	G3SWR	1980	Middlesbro', Yorks.
18.30	G3NC	1968	Swindon
18.30	G3TMI	1840	Canterbury, Kent
19.00	G3NUT	1875	Wallasey
19.00	G3NPB	1875	Hexham, Northumberland
19.30 †	G2ATM	1890	Heanor, Derbys.
	G3KTP		
	G3OKX		
	G3ONB		
	G3RTO		
	G3RUB		
	G3RWN		
19.30	G3RFL	1910	Great Harwood, Lancs.
20.00	G3NHR	1900	Hounslow
20.00	G3LLM	1820	Bath, Somerset
20.00	G5XB	1878	Reading, Berks.
20.30	G3RSF	1925	Harlow, Essex
20.30 †	G3KAD	1850	Swindon, Wilts.
	G3LLZ		
21.00 †	G3IRM	1981	Bury St. Edmunds
	G3MWO		
	G3PHW		
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.00	G3ADQ	1990	Bradford, Yorks.
21.30 †	G3EVT	1865	Redditch, Worcs.
	G3TOI		
22.00	G3AWL	1980	Wingate, Co. Durham
22.00	G3LLM	1820	Bath, Somerset
Fridays			
18.30	G3NCZ	1920	Blackburn, Lancs.
19.00	G3RBP	1860	Oxford
19.00	G3NPB	1875	Hexham, Northumberland
19.30	G3PWU	1850	Reading, Berks.
20.15	G3DXA	1845	Ashford, Middx.
20.30	G3TXI	1925	Nazing, Essex
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		
21.00	G3PKE	1920	Dorking, Surrey
21.30 †	G3RZI	1865	Redditch, Worcs.
	G3TQD	1865	Droitwich, Worcs.
21.30 †	G3UCZ	1900	Pudsey, Yorks.
	G3KSS		Bradford
23.00	GM3HBY	1903	Glasgow
Saturdays			
13.00	G2FXA	1900	Stockton-on-Tees
14.00	GI3JEX	1860	Belfast
14.00	G3SVD	1870	Reading, Berks.
15.30	G3RFL	1910	Great Harwood, Lancs.
18.00	GW3TMP	1980	Mold, Flints.
19.00	G3NPB	1875	Hexham, Northumberland
20.00	G3KPO	1980	Peterborough
20.30	G3TLJ	1925	Roydon, Essex
21.00 †	G3LKT	1892	Salisbury, Wilts.
	G3PLQ		

†*Alternately*

Reports from listeners to these transmissions will be welcomed by the operators concerned.

Letters to the Editor

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

RSGB QSL Bureau

DEAR SIR,—It is, of course, common knowledge that the RSGB QSL Bureau handles the vast majority of cards for radio amateurs in this country, but there is at least one other organization which appears to claim an equal status with the RSGB, to which a not inconsiderable minority of amateurs, including, I am sorry to say, some RSGB members, are sending their cards.

I do not know under what conditions this other organization offers its QSL Service or what if any are the charges made. What is quite obvious is that a large proportion of these cards received by this other Bureau are just passed on to the RSGB for delivery.

Quite recently, several thousand cards, including up to 30 cards from a single call-sign, were delivered by this other organization, late in the evening by private transport to my home. We had cleared the Bureau for the day but to avoid a pile up with the next day's post, my wife and I had to get down to the job of sorting them until well after midnight. Had these cards been sent direct to the RSGB, they would have come with the ordinary post, spread over a period.

There is no way of judging how long some of these cards had been waiting at the other Bureau, but the delay must have been considerable. If the senders had used the RSGB service direct they would have been better served, instead of, presumably, paying one organization and having the work done by another.

The RSGB service is free to members and I suggest that every amateur in this country should belong to the RSGB. This is the only organization with the power and facilities to look after this interest properly, and he should therefore avail himself of the Society's service.

Yours truly,
A. O. MILNE, G2MI
RSGB QSL Bureau Manager

Said Long Ago

DEAR SIR,—The reference to the first presidential lecture and demonstration by Mr Campbell Swinton in 1914 (page 173 of March issue) recalls to my mind one or two historical matters associated with the reception of signals from the Eiffel Tower station, and which are not generally known.

The jamming of the Paris message was only partial, for the preliminary signals came through clearly, as did a few words in termination.

Mr Campbell Swinton, in anticipation of a possible hitch, had previously asked me to arrange a short transmission from my College station (ECX) at Earls Court which operated, in contrast to Paris (FL), a sharply tuned wave of 450 metres and a spark frequency of 1000 cycles. This wavelength was well below that of the Admiralty and was received clearly, without interruption, and signals were perfectly recorded.

It should be remembered that in 1913/14 there were no three electrode valves; even the diodes were of the soft vacuum variety and extremely unpredictable as to life and reliability.

Among the Society's early members we had the exceptionally gifted Mr S. G. Brown, whose famous 8000 ohms adjustable A type headgear 'phones produced double the output of the best iron diaphragm types then in use.

But Mr Brown did not stop at headgear telephones, for the same basic principles of construction were adapted to the manufacture of a unique loudspeaker having a straight upright cone in place of the more usual gramophone trumpet. Further more, the Brown range of sound producing and amplifying instruments included three special relays, the A, B and C types.

Mr Campbell Swinton's demonstration included the use of all three relay types in series or cascade, together with the aforementioned loudspeaker. Thus, instead of headgear 'phones, he used the microphonic A type relay to amplify the rectified output of the crystal h.f. tuned circuit. The output of the A relay operated the more robust B type which energized the loudspeaker, but in addition also energized the type C moving make and break type which operated a Morse printer. The signals were therefore able to be tape recorded as well as heard by the audience in the IEE Lecture Hall.

Sir, if anyone has by any chance one of the original S. G. Brown loudspeakers just described, it would be a fine patriotic gesture if it was offered to the London Science Museum, South Kensington. The Museum informed me very many years ago that they were unable to trace a single genuine specimen. As the speakers were designed to operate with maximum efficiency on 300/1000 c/s they naturally gave poor results for broadcast music and were quickly superseded by the original Lodge patented moving coil type.

Yours faithfully,
Guildford, Surrey. MAURICE CHILD, FSA
ex-NWX, 2DC

Do We Talk Too Much?

DEAR SIR,—Listening around the a.m. 'phone bands, one reaches the inescapable conclusion that the average amateur talks too much.

Why cannot he conduct his rag-chew 'phone QSOs (in which he is fully entitled to indulge if it so pleases him) more on the lines of a land-line conversation, as the s.s.b. boys are more wont to do, instead of hogging the microphone until the last possible moment when, after vainly casting around for something more to say, he has, in desperation, to pass the transmission back to the other man, who by this time has either fallen asleep from sheer boredom, or completely forgotten most of the points about which he would have liked to interject a comment if given the chance?

Why, having asked a question, cannot these gentry have the courtesy to stand by for a reply, instead of promptly proceeding to ramble on interminably on some totally unrelated subject, and from that to another one, and so on, *ad nauseam*—apt word!

The crashing bores who are addicted to these monologues seem mainly to inhabit 160m and 80m, though they are by no means exclusive to those bands. Is it so very laborious to switch from " send " to " receive," or are these egoists so in love with the sound of their own voices that they just cannot bear to relinquish the mic. having once got it into their hands?

Help to improve our " image " by keeping the overs short, chaps!

Yours faithfully,
A. C. W. BIDDELL, G3GNM
Kenton, Harrow, Middlesex.

QRA Locator Maps

DEAR SIR,—Mr. Bastow's letter in the April issue of the BULLETIN calls for a reply to point out that the QRA Locator system of location was devised by v.h.f. operators as a rapid and easy means of establishing position, and is not intended to supplant the orthodox, but nevertheless cumbersome, longitude-latitude method.

If Mr Bastow possess a QRA Locator map of N.W. Europe (5s. 6d. each direct from RSGB Headquarters) he will be in a position to pin-point in a matter of a second a station anywhere in this area to an accuracy of ± 2 km. This system of identification lends itself admirably to contest work and in this context the V.H.F. Contests Committee can check distances at the rate of 25 contacts per minute.

A point which Mr Hills, G3HRH, omitted in his splendid article on the QRA Locator system in the March issue of the BULLETIN was the scale of the QRA Locator map, which should be 25 km per centimetre, or approximately 40 miles to the inch.

Yours faithfully,
J. C. FOSTER, G2JF
Chairman, V.H.F. Contests Committee
Ashford, Kent.

The Bulletin

DEAR SIR,—For the past year I have been a member of the RSGB and have been receiving the BULLETIN. May I compliment you on its policy and contents. Particularly I approve its " state-of-the-art " approach, and I look forward each month to something of real value to me. Keep up the good work!

Sincerely yours,
HUBERT WOODS, W9IK
Northfield, Illinois.

CONTEST NEWS

RESULTS — REPORTS — RULES

Second 144 Mc/s Contest (Open) 1965

The leading position in this contest is filled by Harry Gratton, G6GN (Bristol), who scored a fine total of 10,747 points accumulated from 131 contacts. In last year's event he was placed fourth. In second place we find the Albright and Wilson club station, G3OXD/A (Oldbury, Birmingham), with a score of 10,509 points from 163 contacts; the highest number of QSOs in this event, and 32 more than the winner! Third place is taken by Brian Armstrong, G3EDD (near Cambridge). Brian was twelfth in last year's event. Congratulations are deserved by all three leading stations.

It is worth noting that no adverse comments on the scoring system were received and, despite the extra work involved in making out log sheets, the total entry is considered quite satisfactory. Judging by the number of stations active during the contest, one can assume that there is still plenty of interest in these events, even when taking into account the low entry. In fact it would appear that even if these events were to be organized solely for creating activity, they would be worthwhile.

A perusal of the contest results shows that the honour for the longest distance contact should go to G3PNA (Redhill), for a QSO with PA0ZR/A at 230 miles. GI3SLI worked G3OXD/A at 205 miles, and the club station G3JWT/A (Marconi Apprentices, Chelmsford), with a first ever entry, worked PA0HN/P at 225 miles. G3PMH, the March and District Club station, worked F3LP (Le Havre) at 210 miles. Of special interest is a contact made by G3PQR (Clacton-on-Sea) with G6OX, 83 miles away, for G3PQR was only running an input of 2·5 watts.

Comments from contestants are acknowledged with thanks and will be noted for future events. The Contests Committee is grateful for check logs received from G3EHR and G3CHW.

RESULTS

Position	Call-sign	Aerial	Power (watts)	QSOs	Points
1	G6GN	6/6	80	131	10,747
2	G3OXD/A	6/6/6/6	75	163	10,509
3	G3EDD	4 × 6 ele	120	125	9744
4	G2AUD	2 × 10 ele	100	125	7796
5	G3TR	10 ele	90	146	7684
6	G3SHK	10 ele	65	150	6686
*	G3JTW/A	4/4	100	110	6583
7	G3TLB	4/4	25	124	6456
8	G3PNA	6/6	70	110	6083
9	G3SJO	6/6	90	82	6063
10	GW3RUF/P	5 ele	50	75	5848
11	G3AGN	6/6	60	64	5679
12	G3SWB	8/8	90	116	5603
13	G3SHZ	10 ele	110	129	5492
*†	G3TGE		10	112	5028
*	G3PMH	6/6	25	59	4571
14	G2CDX	4/4	28	70	4112
15	G3SLG	T.S.	25	89	4008
16	G3PTM	6/6	35	85	3960
17	G3FIJ	2 Slots v R	25	64	3959
18	G3LAS	10 ele	90	87	3783
19	G3NEO	5/5	75	53	3315
20	G3BGP	5/5	10	47	2829
‡21	G3OJE	6/6	25	80	2810
22	G2BHN	3 ele	45	42	2568
23	G3TCG	6/6	120	52	2352
24	GC2FZC	4/4	60	16	2016
25	G3SFV	6/6	35	46	1976
26	G3AHB	6/6	80	80	1657
27	G3RZG/P	6/6	10	29	1424
28	G3FNM	5/5	40	43	1423
29	G2BLA	6/6	12	42	1327
30	G8QM	5 ele	72	25	1297
31	G3EKP	5 ele	15	25	1286
32	G2WS	4/4	80	30	1217
33	GI3SLI	10 ele	10	8	820
34	G3PZF	5 ele	20	30	806
35	G3PQR	2 ele	2·5	21	704
36	G5UM	4/4	7	27	698
37	G3IGW	8/8	12	15	616
38	G3OZH	5 ele	20	25	601

* Multi-operator station
† No signed declaration
‡ Member of the V.H.F. Contests Committee

Listeners' V.H.F. Contest

The leading contestant in this event is R. A. Ham, BRS15744 (Storrington, Sussex), who was in the seventh position in the same contest last year. A. W. Blandford, BRS18572 (Mitcham, Surrey), who was second last year, repeats his performance again this year. Third position goes to D. A. R. Poulter, A4048 (Morden, Surrey).

RESULTS

Position	Name		Contacts	Aerial	Points
1	R. A. Ham	BRS15744	109	4/4	2325
2	A. W. Blandford	BRS18572	77	8 ele	1780
3	D. A. R. Poulter	A4048	112	8 ele	1710
4	M. Vincent	A3470	70	8 ele	1650
5	G. W. Rolland	A3766	95	5 ele	1590
6	G. Swan	A3696	71	6/6	1500
7	D. J. Barlow	A3768	58	6/6	1140
8	J. T. Eden	A3604	62	4/4	1130
9	J. K. McHugh	BRS26476	53	4 ele	1110
10	M. Harrison	BRS24733	70	5 ele	945
11	A. A. Goacher	A3942	52	4 ele	795
12	D. J. Reid	A3993	45	dipole	555

It is interesting to note that G. W. Rolland and G. Swan occupy the same positions that they occupied last year, namely fifth and sixth. Propagation was about normal and the general opinion was that conditions and the contest were quite enjoyable.

Correction

During the First 144 Mc/s C. W. Contest (Open), 1965, G3NOH/P operated from a site 8 miles south-west of Newbury, Berks, and not from Wolverhampton, Staffs, as reported in Contest News on page 254 of the April issue.

D/F Qualifying Events

Details of the **Wirral Qualifying Event** are as follows:
Sunday, June 27, 1965.
Organizer: J. K. Birch, G2FOS, 19 Lloyd Drive, Greasby, Upton, Wirral, Cheshire.
Map: Ordnance Survey, New Popular Edition, sheet 109.
Assembly: 13.00 BST for first transmission at 13.20 BST.
Location: Thornton Hough, NGR 330381.
Entries and Tea: Intending competitors should notify the organizer by June 21 stating the number in their party requiring tea.

Details of the **Salisbury Qualifying Event** are as follows:
Sunday, July 4, 1965.
Organizers: Sir Evan Nepean, G5YN, and A. C. A. Newman, G2FIX, 74 Victoria Road, Wilton, near Salisbury, Wilts.
Map: Ordnance Survey, Sheet 167, "Salisbury."
Assembly: 13.00 BST.
Location: 100 yards west of Stonehenge, NGR 121421.
Entries and Tea: Please notify the organizers as soon as possible stating the number in the party requiring tea.

Details of the **Oxford Qualifying Event** are as follows:
Sunday, July 18, 1965.
Organizers: M. P. Hawkins and E. L. Mollart, 17 Spinfield Mount, Marlow, Bucks.
Map: Ordnance Survey, sheet 158, "Oxford and Newbury," 1 in. to 1 mile.
Assembly: 13.00 BST for first transmission at 13.20 BST.

Location: NGR 545826 on the " Fair Mile " ¼ mile N.E. of Lowbury Hill. The point may be approached from Kingstanding Hill on the A417, and although the track is rough for the first ½ mile, it can be negotiated easily with careful driving.
Frequencies and Call-signs: To be announced at the start.
Entries and Tea: Intending competitors should notify Mr E. L. Mollart as soon as possible stating the number in their party requiring tea.

First 70 Mc/s Contest 1965

It is regretted that G3OHH's entry was omitted from the table of results published on page 338 of the May issue of the BULLETIN. G3OHH should have been shown in fifth position in Section A.

Region 1 V.H.F. Contest

For the first time this year a contest for 70 Mc/s and 144 Mc/s has been held for the members resident in Region 1 (i.e. North West England and the Isle of Man). This was done at the suggestion of and organized by the Ainsdale Group.

We are pleased to announce that the winner is Geoff Barnes, G3AOS, who operated exclusively on 2m. Ainsdale Group itself, which staged an expedition especially for the event, split its scores, putting in separate entries for 2 and 4m and came close behind with the 4m entry. G3PLX is third on a basis of his combined score. All contestants have been advised of the results in detail.

Stolen Radio Equipment

During the last nine months, several items of expensive radio equipment have been stolen from wireless stations in Yorkshire and North Lincolnshire. It is possible that some of this equipment may be offered to radio amateurs, and descriptions are therefore given here: two Pye v.h.f. transmitter-receivers model 2702, in blue hammered finished cabinets measuring 20½ in. x 18 in. x 13½ in. deep, bearing the serial nos. 2025 and 2348; one Pye u.h.f. transmitter-receiver, similar to the v.h.f. models, with the serial no. 0402; one Pye u.h.f. receiver, type 10, measuring 17½ in. x 6 in. x 12 in. with a grey panel and bearing the serial no. F.0901; a table microphone in blue and chrome; a Cossor transmitter T.109, serial no. 154; a Cossor receiver R.109, serial no. 436; and a line linking unit serial 104. If anyone has any information on these units, or is actually offered them, would they please inform the Police as soon as possible. The total value of the above equipment is about £1,000.

CONTESTS DIARY

June 4–7	- CHC/FHC/HTH QSO Party.
June 12–13	- National Field Day (see page 119, February, 1965).
June 27	- Wirral D/F Qualifying Event (see page 402).
July 3–5	- Venezuelan Independence Contest (Phone).
July 4	- Fourth 144 Mc/s Contest (Portable) (see page 339, May, 1965).
July 4	- Salisbury D/F Qualifying Event (see page 402).
July 17–18	- 1296 Mc/s Tests.
July 18	- Oxford D/F Qualifying Event (see page 402).
July 25	- Third 70 Mc/s Contest (Portable).
August 1	- Slade D/F Qualifying Event.
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, Derby.
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 23-24	— CQ World Wide Contest (Phone).
November 6-7	— 7 Mc/s DX Contest (C.W.).
November 13-14	— Second 432 Mc/s Contest.
November 20-21	— Second 1·8 Mc/s Contest.
November 28-29	— CQ World Wide Contest (C.W.).
December 5	— Fourth 70 Mc/s Contest (C.W.).

Edinburgh Electronics Exhibition

On Saturday, June 26, George Watson's College Radio Society is holding a " Careers in Electronics " Exhibition at the College, Colinton Road, Edinburgh 10. Admission will be 2s. and 1s.

In addition to displays and demonstrations by leading manufacturers, an exhibition station will be active on all bands under the call-sign GB3GWC.

Appeal for Rare Drugs

Members are reminded that the policy of the British Red Cross Society is not to accept requests for rare drugs from individual radio amateurs even when such requests are passed on to them via the police authorities. The British Red Cross Society recommend that when a United Kingdom amateur is asked by a foreign amateur to accept a message for a rare drug he should advise the sender to contact his National Red Cross Society.

Only requests from, or through, National Red Cross Societies, can be dealt with by the British Red Cross Society and any drugs obtained would be sent to the National Red Cross Society concerned.

V.H.F. Rotator (Continued from page 378)

passed up through one pulley, two or three times round pulley *P*1 and down through *P*2. The centre of the turns around the big pulley was anchored with a wood screw and clamp.

At G3PTB the 2 in. tube is bolted to the side of a telegraph-type wood pole but it can equally well be free-standing and guyed to the three bolts in the top flange. A counterweight (4 lb. distemper tin full of sand) is attached to one end of the cord and the other end taken to a small hand-winch at the operating desk.

The wooden pulley should be well soaked in wood preservative and all moving parts very liberally greased before erection. The aerial array is of course fixed to the protruding length of 1 in. tube which should be of just sufficient length to enable the array to clear the cross arm etc. In one model it was found that the 1 in. tube tended to bend at the point where it emerged from the top bearing. It was therefore cut just above this point and an 18 in. length of ¾ in. conduit or water pipe driven half into each part to provide reinforcement.

For those with suitable rotating motors, the modifications to enable the motor to be mounted on a suitable cross-arm are obvious. In the current version the transmitter of a Desynn type beam position indicator is mounted on the cross arm and driven by Meccano sprocket wheels suitably mounted and linked with Meccano driving chain.

The mechanical construction has proved sound enough to keep a 4-over-4 slot-fed array aloft and had an 8-over-8 mounted on it at one time. It is felt that this design fulfils a need for a simple rotating device which is remarkably cheap to make and far easier to construct than the length of this article might suggest.

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).—June 9, 23, July 7, 8 p.m., 77 Clifton Road, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B & FARS).—Mondays, 8 p.m., (Morse tuition from 7.30 p.m.), Pontins Holiday Camp, Squires Gate.
Bury (BRS).—June 8 ("Amateur Radio Procedure explained," by G3ETU), 8 p.m., Old Boars Head (private room), Crompton Street.
Chester.—Tuesdays, 8 p.m., YMCA, except first Tuesday in each month.
Crewe & District.—June 7, July 5, 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.—June 8, 22, July 6, 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.—June 2, July 7, 125 Regent Road.
Preston.—June 8, 22 (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.—June 2, 16, 30, The Blossoms Hotel, Buxton Road, Stockport.
Wirral.—June 2 (NFD Discussion), June 16, July 7, 7.45 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley.—June 11 ("Mobile Equipment" and display by C. R. Plant, G5CP), June 25 (Ladies Night), King George Hotel, Peel Street.
Bradford.—June 12/13 (NFD), June 22 (NFD Inquest), 7.30 p.m., 66 Little Horton Lane.
Catterick.—Every Tuesday and Thursday, 7.30 p.m., Clubroom, Vimy Road.
Durham.—June 3 (Constructional Competition), June 17 (AGM), 8 p.m., Bridge Hotel, North Road, Durham.
Northern Heights.—June 9 (visit to Manchester Radio Society), June 23 (Junk Sale), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., rear of 3 Trinity Road.
Sheffield.—June 4 (Audio and Hi-Fi Group), June 11 (General Business Meeting), June 18 (General), June 25 ("Wave Propagation," by R. M. Strickland, G8KB), 8 p.m., 8 Sandbeck Place.
Spen Valley.—June 10, June 24 (Open & Final Meeting), 7.30 p.m., Heckmondwike Grammar School.

REGION 3

Birmingham (Slade).—June 11 ("Tapespondence"—tapes from Catalpa RS, Birmingham, Mich., USA), June 25, 7.30 p.m., The Church House, High Street, Erdington.
(South).—June 17, Friends Meeting House, Moseley Road, Birmingham.
Cannock (CCARS).—July 1, 7.30 p.m., The George Inn, Walsall Road, Cannock.
Coventry (CARS).—Mondays, 8 p.m., Westfield House, Radford Road, Coventry.
Dudley (ARC).—Fridays, 8 p.m., Art Gallery, Dudley.
Redditch (EWARG).—June 10 (Lecture and Demonstration on Printed Circuits), July 8 (WIBB Tape Lecture), 8 p.m., Redditch Old People's Centre, Park Road, Redditch.
Salop (ARS).—June 10, 7.30 p.m., Morris Hall, Bellstone, Shrewsbury.
Stratford-upon-Avon (S-u-AARS).—Fridays, 7.30 p.m., Masons Arms, Sanctus Road, Stratford-upon-Avon.
Stourbridge & District (ARS).—July 6 (Talk by G8GF), 7.45 p.m., The Library, Foley Cottage, Stourbridge.
Wolverhampton (ARS).—June 28, 8 p.m., Neachells Cottage, Stockwell Road, Tettenhall.

REGION 4

Derby (D & DARS).—June 2 (Surplus Sale), June 9 (Extra-ordinary General Meeting), June 16 (D/F Practice Run), June 23 ("Introduction to Colour Television," by Mr. R. E. F. Street), June 30 ("The Problems of Effluent and its Treatment," by G. D. Kelsey, B.Sc.), 7.30 p.m., Room 4, 119 Green Lane, Derby.
Heanor (H & DARS).—June 8 (Closed), June 15 (Visit to Notts. County Police Headquarters, Epperstone), June 22 (Surplus Sale), June 29 (Films), 7.30 p.m., Heanor Technical College, Ilkeston Road, Heanor.
Leicester (LRS).—Mondays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Loughborough (LARC).—June 4 (SWL night—E & M—conducted by L. Hellier, G3TED), June 11 (NFD finalization), June 18 (Construction), June 25 (AGM), 7.30 p.m., Club Room, Bleach Yard, Wards End, Loughborough.
Mansfield (MARS).—Fridays, 7.30 p.m., The New Inn, Westgate, Mansfield.
Nottingham (ARCN).—Tuesdays, Thursdays, Room 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood.
Worksop (NNARS).—Tuesdays, (RAE Class), Thursdays (Lectures), 7.30 p.m., Club Room, 13 Gateford Road, Worksop, Notts.

REGION 5

Bedford (B & DARC).—Second Tuesday, and fourth Thursday in each month, Harpur Secondary Modern School, Horne Lane, Bedford.
Cambridge (C & DARC).—June 11 (NFD Preparations), June 12-13 (NFD), June 18 (NFD Inquest), June 22 (Visit to Luton Club), Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road.
Haverhill (H & DARC).—June 12-13 (NFD), Mondays, 7.30 p.m. Members will be notified of meeting-place as soon as arrangements are completed.
Luton (L & DARS).—June 12-13 (NFD), June 15 (NFD Inquest), June 22 (Debate on H.F. *vs* V.H.F. with the Cambridge Club), June 29 (Constructors' Contest), Tuesdays, 8 p.m., ATC Headquarters, Crescent Road, Luton, Beds.
Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Herts.
Shefford (S & DARS).—June 3 (Old Time Radio Gear), June 10 (NFD Preparations), June 12-13 (NFD), June 17 (NFD Post Mortem), June 24 (Demonstration for young members, by P. Screeney), July 1 (Lecture), Thursdays, 7.45 p.m. (Morse classes 7.45-8 p.m.), Church Hall, High Street.

REGION 6

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

REGION 7

Acton, Brentford & Chiswick (ABCRC).—June 15, 7.30 p.m., AEU Club, 66 High Road, Chiswick.
Ashford (Middx.) Echelford ARS.—June 9, 23, 7.30 p.m., Links Hotel, Ashford.
Bexley Heath (NKRS).—June 10 (NFD Briefing), June 24 (Inquest on NFD), 7.30 p.m., Congregational Hall, Chapel Road, Bexley Heath.
Barnet (BRC).—June 15, 8 p.m., Red Lion Hotel, Barnet.
Chingford (Group).—June 18, Contact the secretary, Loughton 2397.
(SRC).—Friday (except first), 8 p.m., Friday Hill House, Simmon's Lane.
Croydon (SRCC).—June 8, 7.30 p.m., Blacksmiths Arms, South End, Croydon.
Dorking (D & DRS).—June 8, 8 p.m., Wheatsheaf, Dorking.
East Ham.—Tuesdays fortnightly, 7.30 p.m., 12 Leigh High Road, East Ham.
East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.
Edgware & Hendon (EADRS).—June 14, 28, 8 p.m., John Keble H.11, Church Close, Dean's Lane, Edgware.
Enfield.—June 17, 8 p.m., George Spicer School, Southbury Road, Enfield.
Gravesend (GRS).—June 16, 7.30 p.m., RAFTA Club, 17 Overcliffe, Gravesend.
Guildford (G & DRS).—June 21, 8 p.m., Guildford Model Engineering Society in Stoke Park.
Harlow (DRS).—Tuesdays and Thursdays, 7.30 p.m., Mark Hall Barn House, First Avenue.
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, Hornsey Road, London, N.7.
Hounslow (HADRS).—June 14, 28, Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (Nr. Seven Kings Station).
Kingston.—June 10 ("Integrated Circuits," by G. Padwick of SGS Fairchild Ltd.), June 24 (NYA), 8 p.m., YMCA, Eden Street. Fridays (Morse classes), 2 Sunray Avenue, Tolworth.
Leyton & Walthamstow.—June 15, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E.10.
London U.H.F. Group.—June 3 ("Technical Topics," by H. Stanesby), 7.30 p.m., Bull & Mouth, Bloomsbury Way, Holborn.
London Members' Luncheon Club.—12.30 p.m., third Friday in each month. See separate advertisement.
Loughton.—First Thursday in each month, 7.30 p.m., Loughton Hall, (Nr. Debden Station).
New Cross (CARS).—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood & South London (CP & DRS).—June 19, 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).—June 18, 8 p.m., Railwaymen's Hall (side entrance), Whytecliffe Road, Purley.
Reigate (RATS).—June 19 (Lecture by Green Ltd.), 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.—June 17, 7.15 p.m., Baden Powell House, Queens Gate, South Kensington.
Science Museum (CSRS).—June 15 (Informal

LOOKING AHEAD

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

Details of Mobile Rallies are given on page 385

LONDON MEMBERS' LUNCHEON CLUB

will meet at the White Hall Hotel, Bloomsbury Square, London, W.C.1 at 12.30 p.m. on Fridays, June 18, and July 16, 1965.

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

meeting), 6.30 p.m., Science Museum, South Kensington.

Sidcup (CVRS).—June 3, 7.30 p.m., Congregational Church Hall, Court Road, Eltham.

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

Southgate & District.—June 10 ("TVI & Cures," by Post Office TVI Dept.), 7.30 p.m., Atlasta Lodge, Tottenhall Road, Palmers Green, London, N.13.

St. Albans (Verulam ARC).—June 16, 8 p.m., Hedley Road.

Sutton & Cheam (SCRS).—June 15, 8 p.m., The Harrow Inn, High Street, Cheam.

Uxbridge.—June 14 (Film Show), June 21 (Lecture by J-Beam Aerials Ltd.), 8 p.m., St. Andrews Scout Hut.

Welwyn Garden City.—June 10 (Planning V.H.F./N.F.D.), 8 p.m., Conference Room, Murphy Radio, Bessemer Road.

Wimbledon (W & DRS).—June 11, 8 p.m., Community Centre, St. Georges Road, Wimbledon, London, S.W.19.

REGION 8

Crawley.—June 9 (Informal), for details contact G3FRV, June 23 (Members' evening), 8 p.m., Trinity Congregational Church, Ifield.

Tunbridge Wells (WKARS).—June 11 (Film show), June 25 (Audio night; demonstrations of members' latest hi-fi audio equipment), July 9 ("430 Mc/s Apparatus," by J. Gould), July 23 (Arrangements for club's entry in V.H.F. NFD), 7.30 p.m., "Culverden House," Culverden Park Road, Tunbridge Wells. Details from R. Trevitt, G6SSE/T, 28 Delves Avenue, Tunbridge Wells.

REGION 9

Bath.—June 18, 7.30 p.m., Room 247, Fourth Floor, Main Building, Bath Technical College.

Bristol.—June 25, 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).—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.—June 14 (Discussion on NFD), 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 11

Bangor (UCNWARS).—Thursdays fortnightly, 5.30 p.m., Dept. of Electronic Engineering, University College of North Wales, Dean Street, Bangor. Details from the Honorary Secretary c/o this address.

Llandudno (CVARC).—June 10 (NFD Final Meeting, followed by Open Night), 7.30 p.m., Cross Keys, Madoc Street, Llandudno.

Prestatyn (FRS).—Last Wednesday in each month, 8 p.m., Railway Hotel, Prestatyn. Details from A. Antley, Fairholme, Fairfield Avenue, Rhyl.

REGION 14

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

REGION 16

Basildon (BDARS).—June 15 (Post-NFD discussion), details from G3IJB.

Chelmsford (CARS).—July 6, 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.

Ipswich (IRC).—June 30 ("Radar," by G3NAZ), 7.30 p.m., the Civic College, Ipswich.

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

Southend (SDARS).—June 4, 18 (Surplus equipment sale), July 2, the Executives' Canteen, E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Details from G3NPF.

LONDON MEMBERS' LUNCHEON CLUB

WHITE HALL HOTEL
BLOOMSBURY SQUARE, LONDON, W.C.1

Members of the club, their XYLs and friends meet on the third Friday in each month at 12.30 p.m. The luncheon usually lasts until about 2 or 2.30 p.m. Table reservations should be telephoned to HOLborn 7373 prior to the day of the luncheon.

Further details may be obtained from the Chairman, Mr A. C. Wilberforce, G2IY, "West Water," Mill Lane, Walton-on-the-Naze, Essex.

VISITORS, PARTICULARLY FROM ABROAD, ARE ALWAYS WELCOME

CHANGING YOUR ADDRESS?

Please inform Headquarters of changes of address in the following form.

Name .....
(BLOCK LETTERS PLEASE)

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Old Address.....

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Call-sign, BRS or A No. .....

New Address .....
(BLOCK LETTERS PLEASE)

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Please return your last Bulletin wrapper with your notification of change of address. Four weeks should be allowed for alterations to take effect.

CLUBROOM

A Monthly Survey of Group and Club Activities

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

Acton, Brentford and Chiswick RC, through the good offices of the Northern Heights ARS, recently had an opportunity to see and hear the slides and tape recording by W1BB on the subject of 160m DX working. (*G3GEH*).

Aldridge and District ARS has an interesting lecture promised under the title " 30 watts on the L.F. Bands." Although mainly directed at the newcomer to transmitter practice, even those versed in the art could possibly pick up a hint or two. (*G3RUI*).

Basildon and District ARC has its site selected for NFD, and the members are busy polishing key contacts. A programme of visits has been arranged for the months of July and August, and these will take the place of the normal meetings. With the co-operation of the local Education Authority, the society is sponsoring an RAE course next winter. This course is open to all interested persons, whether members of BDARS or not (*G3IJB*).

Basingstoke ARC has made Ted Willis (G6OU) a life member to celebrate his 80th birthday. Behind Ted lies 45 years of Radio interest, and the club are proud to have him as a member. There will be no meeting in June, its place being taken by NFD (*G3ADV*).

Bradford RS has been issued with the call-sign G3NN for the club station. (*G3OTO*).

Bristol ARC has proved beyond a shadow of a doubt that home construction of equipment is still as much a part of Amateur Radio as it ever was, and moreover, that present day standards are excellent. This conclusion was reached when its members attended, and took part in, a house warming party for the new Club House in the University settlement. (*G3SXY*).

Bromsgrove and District ARC is going from strength to strength in membership, and has a very creditable list of activities lined up. On June 26 a Social Evening is being held at the Ewe and Lamb on the B4091 at Stoke Prior. (*G2CLN*).

Caithness ARS has cleared the hurdle of its AGM and is now all set for the year ahead, not to mention NFD. (*GM3UBK*).

Cambridge and District ARC finds that one of the most pleasant features of its activities are the visits made to other clubs, and inter-club events. Members went to the Shefford club on May 20 for a special lecture and met fellow enthusiasts from Luton, Bedford and Stevenage. On June 22 they are Luton bound to join in a debate on h.f. versus v.h.f.

Cheshunt and District RC. The second annual Field Day was held on May 1, when some 100 contacts were made on Top Band and 80m. On 80 the power input was limited to 10 watts, but despite this they hooked DL2AF and EI5A. (*G3GBL*).

Cornish ARC has increased its subscription slightly with the object of being able to finance extra activities. Such moves are usually very unpopular, but in this case the membership seems to appreciate that you do only really get what you pay for. (*G3NKE*).

Coventry ARS will be back in the NFD event once again after an absence of many years. This will indeed be a welcome return. With we suspect his tongue in his cheek, G5GR suggests that as QSL means to give a receipt, then we should do just that. As he observes, at least one would have a carbon copy to prove all the QSLs sent. (*G3PQQ*).

Crawley ARC is holding its annual Members' Evening on June 23 when club members will be showing items of home-constructed equipment. G3TIR has shown how DX on Top Band should be worked by scoring an ace with W1BB. (*G3FRV*).

Crystal Palace and District RC has come up with a very good idea to give less experienced operators battle training for NFD. In essence it is to operate two stations, one of which goes all out for scoring, while the other plods along in a more leisurely manner. Quite what happens if the leisurely station beats the other we shudder to think! The club is to be congratulated on a very progressive approach. (*G3FZL*).

East Kent RS has a very strong following amongst the younger generation with 15 members under the age of 21, quite a proportion of whom hold full tickets. Always interested in the off-beat subject, they recently had a lecture on Burglar Alarm Systems. (*G3TMI*).

East Worcs. ARG has been busy erecting its new club hut on a site 500 ft. a.s.l. and is now turning its attention to the interior. There is talk of arranging a barbecue for the opening ceremony which will make a refreshing change from smothering the building in champagne ship style. (*G3HZG*).

Echelford ARS found, as suspected, that the general talk and discussion on receivers proved to be most interesting. The main conclusion seems to have been the very real advisability of having a full demonstration of any secondhand receiver, and not to buy on looks alone. The club has recently decided to apply for a permanent licence for use during exhibitions and contests. (*G3ATF*).

Ipswich RC (previously known as the Ipswich and District Electronics Society) has been very pleased to welcome an influx of licensed amateurs and SWLs in recent months. Future programmes include a visit to a nearby TV station, talks on radar, mobile equipment and transistors. (*G3MUT*).

Irish Radio Transmitter's Society has been approached by the Director of Signals as to the willingness of EI amateurs to participate in the operation of an Emergency Communications Network. Needless to say the Society found the response very satisfactory. (*EI9U*).

Keele University is joining the merry throng on NFD, while on June 19, the society will have stations operational on 2m and 160m during the University Fête.

Liverpool University ARS has had a change of QTH and hopes to be active shortly on all bands from 160 to 10m. With a fair number of G8--- call signs on the strength, operation on 70cm is also being contemplated.

Loughton and District RS, in addition to being busy with NFD, is preparing for the Mobile Rally to be held at Loughton Hall on June 26. Leading manufacturers will be exhibiting equipment and many attractions are being planned for visitors. (*G3JBS*).

Magnus RS had a three minute spot in the BBC programme *Regional Extra* on April 9 when G3JNK, G3TBM and G3TBK talked about the way in which the club started and the contribution which it makes to school life. Although so short, it is understood that this was a very good effort by those involved. (*G3JNK*).

Manchester and District ARS has meetings planned for June 2, 9, 16, 23 and 30. New members and visitors are always assured of a hearty welcome. (*G3RTU*).

Medway ARS's publication *Marts Newsletter* contains a mathematical appraisal of the Gascoigne Antenna. After struggling for four years with the contraption, the inventor is now back on the air again—even though his Council has been disolved. (*G3OHP*).

Midland ARS believes in planning well ahead, having meetings scheduled right up to the end of the year. Again looking to the future, the members have been fortunate in securing better premises into which they will be moving after the meeting on September 21. (*G3JDJ*).

Mid-Warwickshire ARS had its new premises opened by the Mayor of Leamington on May 10. In addition, it has been issued with the call G3UDN for the club station. (*G3EHA*).

Newark SWC is also housed in new premises. With a membership standing at 35, and meetings held on Mondays and Thursdays, visitors and intending members are sure of a hearty welcome. (*G3TWV*).

Newbury and District ARS found the April meeting under the banner of " Any Questions?" a rip roaring success, even though, in the end, the panel of experts included practically every member present. Subjects ranged from pre-war operation to current techniques including v.h.f./u.h.f. and s.s.b. (*G3TEK*).

Northern Heights ARS has its fourth AGM behind it and a very full programme of events organized for the forthcoming 12 months. Especially laudable are its intentions to run demonstration stations at various events. (*G3MDW*).

Peterborough and District ARS heard all about Radio Astronomy from W. A. Granger, F.R.A.S., on May 7, a lecture which was thoroughly enjoyed by all. Meetings are held each Friday evening in the club shack at the Old Mill, London Road. Visitors welcome. (*G3KPO*).

Plymouth RC has risen in half a decade to a thriving centre of activity of which all their members can be justifiably proud. At the recent AGM, the new President, G5ZT, conjectured in plausible terms on Amateur Radio in 30 years time, and the coming of the first DXpedition to the Moon. Farfetched? We had better wait and see. (*G3SVZ*).

Port Talbot Club. The annual Social was held on April 6 and attracted contingents from Cardiff, Swansea, Rhondda, Llanelly, Carmarthen and Pembroke such is the popularity of the event. Full credit must be given to GW4CG who was the wizard behind the organization and smooth running of the function.

Radio Amateur Invalid and Bedfast Club now has 278 subscribers, and while some of these are well wishers, this surely shows the strength of the club. One of their biggest headaches is the transportation of equipment from A to B. Right now they have receivers at Oxford and Stoke-on-Trent which need to find their way to Saxilby. Obviously they cannot grow legs and get there under their own steam, so perhaps some Good Samaritan who realizes his good fortune in not being handicapped, and who can help out in this way, will get in touch with Frances (G3LWY). Assistance like this is worth its weight in gold.

Roding Boys' Society recently held a very formal meeting with the object of sorting out, and finding solutions to, some of the problems which face the club. One difficulty was solved by the efforts of G3JIX, G3TAJ and G3UAJ in that they produced an ex-GPO van for club transport. (*G3JIX*).

Reading ARS is holding its next indoor meeting on June 26 when the subject will be the design and construction of v.h.f. and u.h.f. equipment. Visitors from neighbouring clubs will be especially welcome. Prior to this, the first Mobile Picnic will be held at Childe Beale Trust pavilion, Lower Basildon on June 20. Talk-in will be on 160 and 2. For further information apply to the Secretary. (*G3TOQ*).

Reigate ATS made over 80 contacts at the " Get Pleasure from Leisure " exhibition organized by the Redhill Rotary Club, despite wicked QRN which, as they say, seems to be the prevailing difficulty when sites are in the centre of towns. An excellent publicity handout was available to interested sightseers. At the meeting to be held on June 19, Green and Davis Ltd will be featuring their equipment. (*G3NKT*).

Saltash and District ARC have issued a Public Warning that G9BO fully intends to go mobile. So that his path shall not be interrupted we have heard via the grape vine that he intends to use a Sherman Tank. Thus he can concentrate on the operating without worrying about what is going on outside. Over hill and dale you'll find his trail—of destruction. Last touches are being put to the club's mobile rally arrangements at Calstock on Whit Monday, June 7.

Slade RS held on May 2 what is believed to be the first 160/2 D/F test in the UK. Three Slade and three Rugby teams competed. The Royal Observer Corps gave their full co-operation to the event by providing the site for the transmitter: all grateful thanks are due to them. All teams were home and dry in time for the fry-up of hot dogs.

South Dorset RS had a joint meeting with Yeovil ARC in May, for a talk on colour TV by G5UH.

South London Mobile Club is holding meetings on June 5 and June 19; the former will be a slide show, and the latter a discussion on club affairs.

South Shields and District ARC holds its meetings on Fridays of each week. The club's transmitter is operational on all bands from 160 to 10. Morse and theory instruction is available to SWL members at the weekly meetings. A number of outings are being arranged for the coming months. Preparations are well in hand for the Mobile Rally to be held on June 11 at Bents Park Recreation Ground, South Shields. (*G3KZZ*).

Southgate, Finchley and District Group has a meeting planned for June 10 which should be of interest to every member without exception. The subject? TVI. A member of the GPO staff will be giving the gen. Visitors will be particularly welcome. For further details apply to G3TXA.

Surrey Radio Contact Club is holding its annual Treasure Hunt on Wednesday, June 23, which this year promises to be a Hunt with a difference. The club is particularly pleased with the efforts of stalwarts G3BFP and G3EUE who upheld the club's standing in the Affiliated Societies' Contest which resulted in the club station G3SRC being placed third. (*G3KGA*).

The annual dinner and dance of the Thanet Radio Society. From left to right in the picture are G3BKT, G3DNR, N. R. Cramp, Ald. E. G. Butcher, G2MI, G2IC, G2JF, G3MDO G2AIW and G3BAC

Sutton and Cheam RS has a high proportion of transmitting members, but nevertheless a nucleus of keen SWLs is growing. Having only just cleared the AGM, the Committee is now at work planning future events. (*G3HQT*).

Stoke-on-Trent ARS will be operating two stations during NFD, one under the call G3GBU and the other under the call G3UD. Once this event is over, it seems as though a do-it-yourself brigade is going to be busy as there is talk of redecorating the clubroom front entrance. The club meets every Thursday evening at 8 p.m. (*G3GBU*).

Verulam ARC members turned out in force for the Texas Mobile Rally and had a jolly good time. They particularly like the personal QSOs which such meetings make possible, and comment that those who do not take part are missing quite a lot. On the subject of NFD, the club proposes to enter two stations for the first time. (*G3EKU*).

Wirral ARS was given an excellent demonstration of Amateur TV gear by GW6JGA/T with practical examples of closed circuit working. They comment that his shack must have been very bare that evening.

Wimbledon and District RS now has an average attendance figure of 30 which must indicate that it has arrived at a formula for meetings which holds a little bit of interest for everybody. Late in April members went in force to the Kingston club's " Bangers and Mash " supper and had a thoroughly good time. At the Wimbledon Hobbies Exhibition they put on a demonstration station. (*G3RZN*).

Yeovil ARC is giving thought to operating from an exhibition to be held in the town in July. Members are taking full advantage of the club's new s.s.b. equipment which is being given a good airing. Visiting amateurs are assured of a hearty welcome. (*G3CMH*).

HELP US TO HELP YOU

Even if the club secretary does not hold a call-sign, when forwarding information for this feature, *please do* include the call-sign of a member to whom interested persons can apply for details of events and membership. It is essential that reports reach us by the deadline dates given, otherwise, regrettably, they cannot be included. This feature can help to increase your membership, so supply as much information as possible, particularly concerning plans for future meetings.

* * *

Deadline for the **July** issue is **June 11.**
Deadline for the **August** issue will be **July 9.**

CHANGES OF ADDRESS

Four weeks' notice is required to effect changes of address. When notifying Headquarters, please give the old as well as the new address. Advise changes promptly so that you receive every issue of the BULLETIN without interruption.

PUBLICATIONS MORSE COURSES

PANEL LETTERING TIES BADGES

RSGB PUBLICATIONS

The Amateur Radio Handbook (Third Edition)	36/6
Radio Data Reference Book	14/–
Amateur Radio Circuits Book	8/6
Amateur Radio Call Book, 1965	5/9
Service Valve Equivalents (Fifth Edition)	3/6
S.S.B. Equipment	3/–
Communication Receivers (Second Edition)	3/–
The Morse Code for Radio Amateurs (Third Edition)	2/–

ARRL PUBLICATIONS

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

CQ PUBLICATIONS

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

EDITORS AND ENGINEERS PUBLICATIONS

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

AMERICAN MAGAZINE SUBSCRIPTIONS

CQ (*Cowan*) Monthly (p.a.)	44/–
QST (*ARRL*) Monthly (p.a.)	43/6
Institutions, groups, etc. (p.a.)	50/–
73 Magazine Monthly (p.a.)	30/–

BRITISH PUBLICATIONS

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

MISCELLANEOUS

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