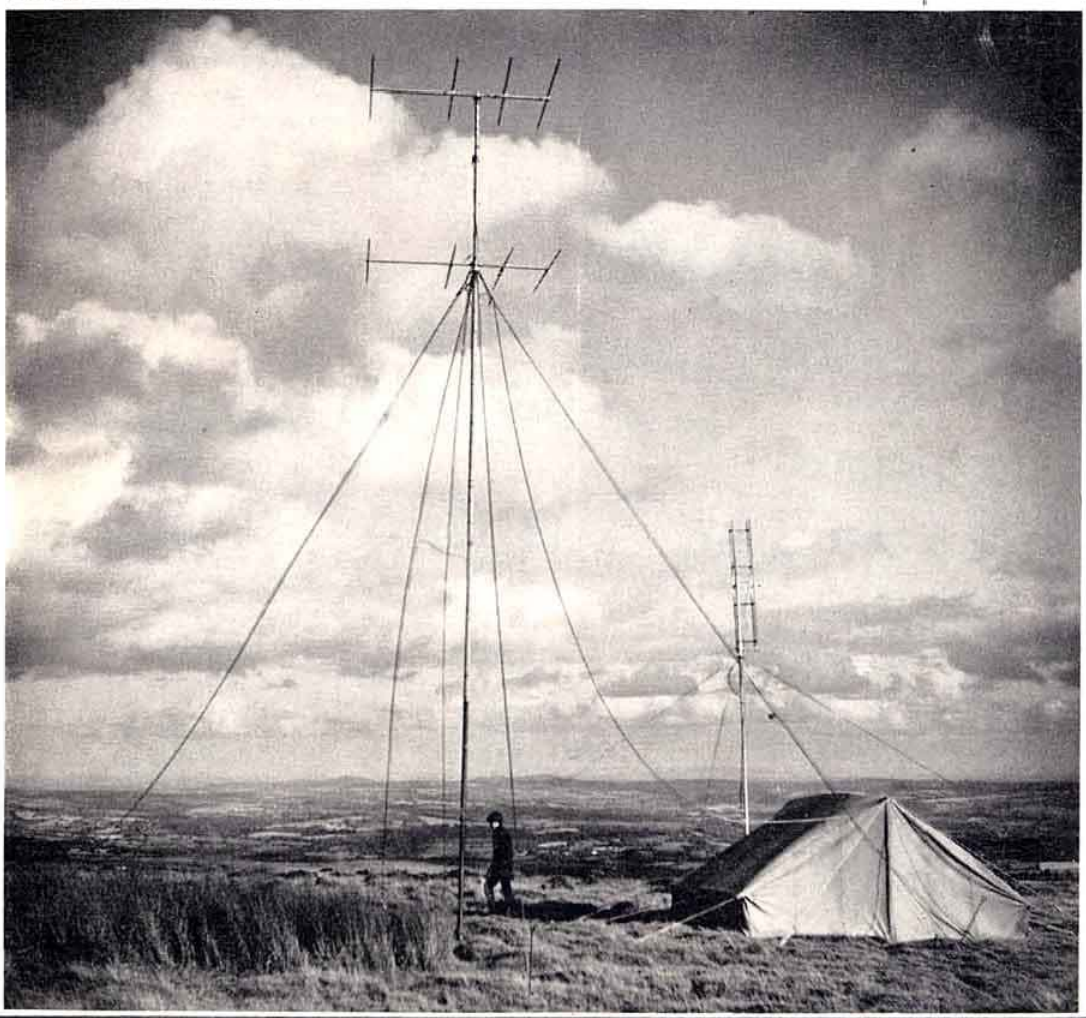
RSGB

BULLETIN

DECEMBER 1966
VOL 42, No. 12

Severn Valley ARS at Titterstone Clee



VHF NFD RESULTS

APPEAR ON PAGE 809

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

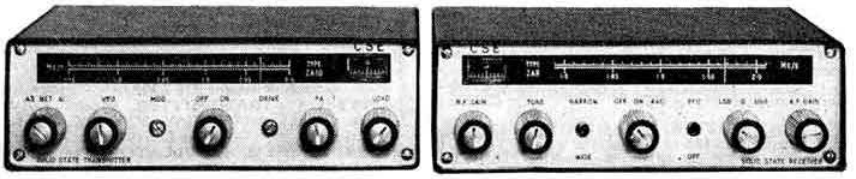
Photo by Eric M. K. Kirk

SILICON SOLID STATE 12 volt 2 megacycle TRANSMITTER & RECEIVER

MOBILE — PORTABLE — FIXED — Full U.K. top band input from car or dry battery

WINS FIRST AWARD 1966

MANUFACTURERS EQUIPMENT R.S.G.B. COMMUNICATIONS EXHIBITION



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Type 2A10—£43.7.0 U.K.

* Direct 12 volt operation
* Supply + or — earthed
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* High efficiency
* Silicon transistors
* Wide temp. range
* Clean A3 and A1 operation
* Pi-tuned output
* 1 Amp. nominal
* Economical
* Designed reliability
* Light and compact

SOLID STATE RECEIVER
Type 2AR—£44.0.0 U.K.

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* Selectivity switched
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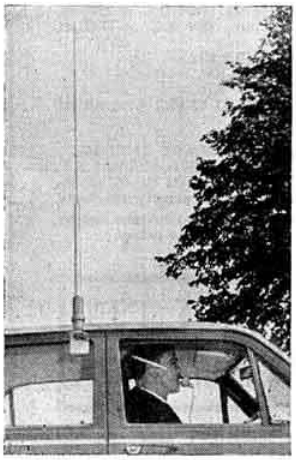
* AVC selection. A.M. S.S.B. & C.W.
* BFO. switched resonator
* A.M. S.S.B. C.W. level indicator
* Audio 1.5w. to 3 ohms
* Light and compact
* Silicon transistors



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Volume 42 No. 12

December 1966

4/- Monthly

RSGB BULLETIN

CONTENTS

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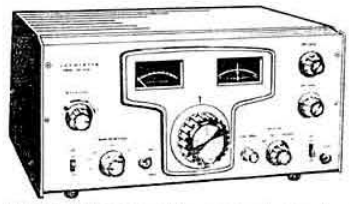
Front Cover: Second in this year's National Field Day was the Severn Valley Amateur Radio Society whose 4m, 70cm and 23cm station G3SVR/P operated from a 1750ft. a.s.l. site at Titterstone Clee, Shropshire. Seen in the photograph is the 4m 4-over-4 aerial and the remains of a 64 element 70cm aerial.

The RSGB Bulletin is published on the first Wednesday in each month by the Radio Society of Great Britain as its official journal and sent to all members.
The closing date for copy for the January issue is 2 December.

LAFAYETTE 10-80 Metre SSB/AM/CW Amateur Receiver



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- 100 kc/s Crystal Calibrator and Crystal BFO
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MODEL HA.350 Lafayette's newest and most advanced communications receiver. Dual conversion circuitry features an image and IF rejection of more than 40 db. A product detector, providing selectable upper or lower sideband, solves the problems in SSB reception. Tuneable preselector circuit gives sensitivity of less than 1 microvolt for 10 db signal-to-noise ratio. Selectivity: Bandwidth of 2 kc/s at 6 db down and 6 kc/s at 60 db down using mechanical filter. Front panel 100 kc/s crystal calibrator reset control used in conjunction with the 15 Mc/s WWV station assures accurate calibration. CHECK THESE SPECIFICATIONS. Audio output: 1-watt maximum. Speaker impedance: 8; 500 ohms (speaker not supplied). Front panel controls: Preselector; Cal—On/off: Band Selector; Receive/Send; Tuning Cal Reset; Function—Off/AM/SSB1-CW/SSB2; RF gain; AF gain; ANL; Phone Jack. Valves: 6BZ6—RF amp; 6BL8—Xtal controlled 1st mixer; 6BE6—2nd mixer; 6BA6—VFO, 6BA6—1M amp.; 6BA6—1F amp; 6AL5—AVC rectifier and AM noise limiter; 6AQ8—product detector and crystal calibrator; 6AV6—1st audio amplifier; 6AQ5—audio output; 6BA6—BFO; OB2—regulator. Silicon Full Wave rectifier. Size: 15in. wide by 7¼in. high by 10in. deep. For 230v. 50/60 cps AC. Wt., 25 lb. Less Calibrator Crystal.

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500mA	22/6	500V DC	22/6
750mA	22/6	15V AC	22/6
1-0-1mA	22/6	50V AC	22/6
1A DC	22/6	150V AC	22/6
2A DC	22/6	300V AC	22/6
5A DC	22/6	500V AC	22/6
3V DC	22/6	"S" Meter	
10V DC	22/6	1mA	29/6

"S" Meter	29/6	500-0-500μA	29/6
50μA	32/6	1mA	22/6
100μA	29/6	2mA	22/6
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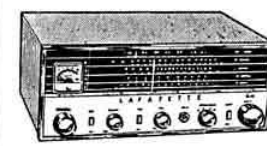
100-0-100μA	27/6	50mA	22/6

POST EXTRA Larger sizes available—send for lists.



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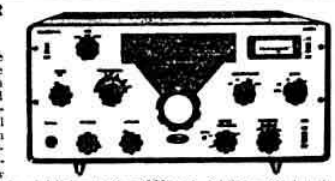

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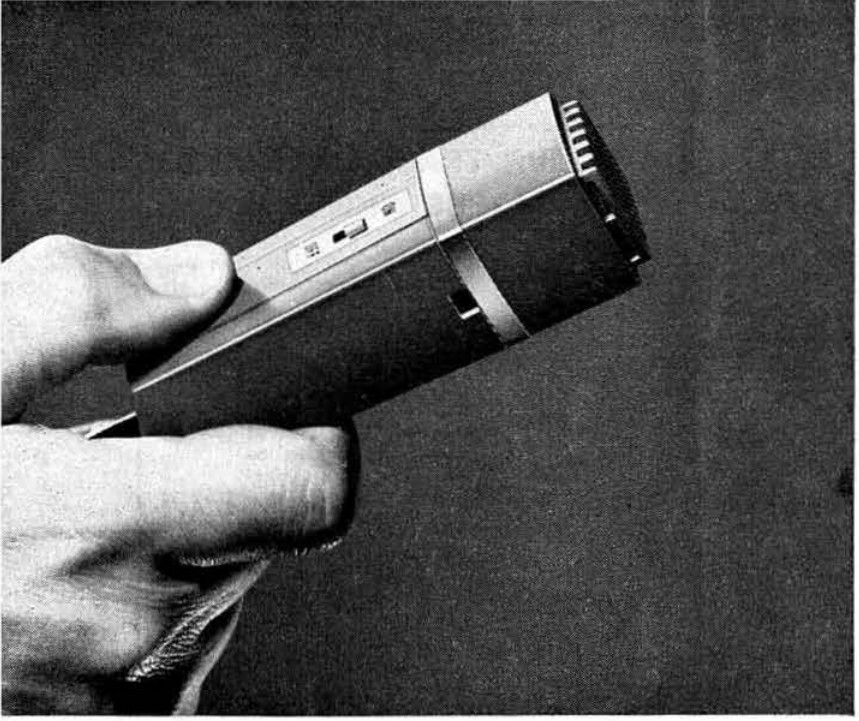

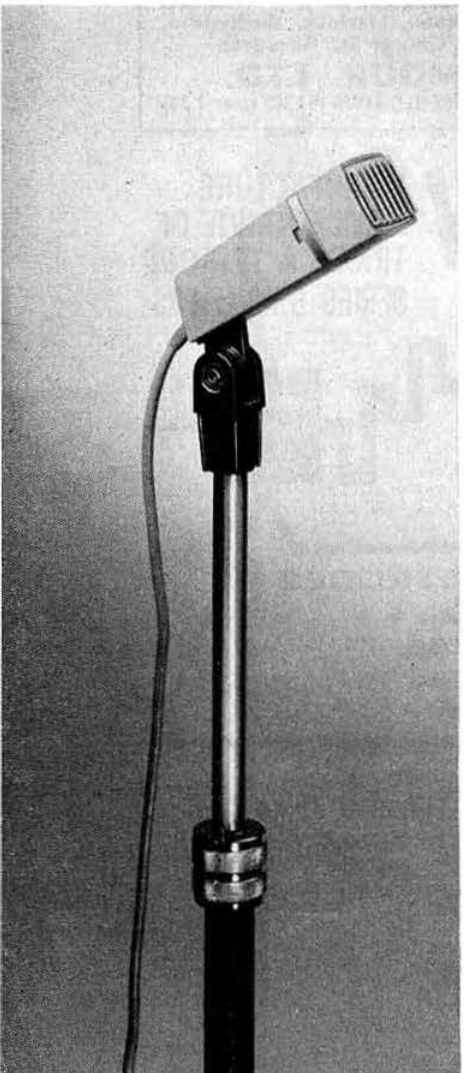

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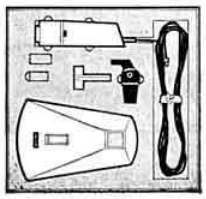
from one quality kit



The kit is as well engineered as the microphone. Components are located in an attractive, shaped moulding — and the box is designed for simple modification into a permanent storage case after the microphone has been assembled.

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RECEIVERS

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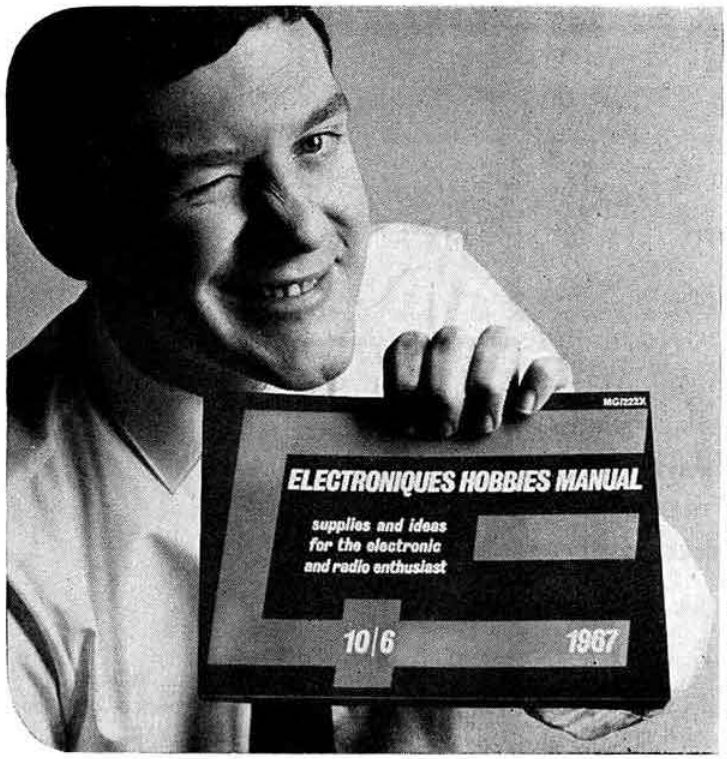
Region 11.—North Wales.	M. Williams, GW3LCQ, "Dwyros," 12 Penrhos Avenue West, Llandudno Junction, Caerns.
Region 12.—North-East Scotland.	J. MacIntosh, GM3IAA, Broom Park, Cradlehall, Inverness.
Region 13.—South-East Scotland.	G. P. Millar, GM3UM, 8 Plewlands Gardens, Edinburgh 10.
Region 14.—West Scotland.	A. F. Hunter, GM3LTW, 4-5 Cassillis Road, Maybole, Ayrshire.
Region 15.—Northern Ireland.	L. M. Lyske, GI3CDF, 63 Church Street, Portadown, Co Armagh.
Region 16.—East Anglia.	P. J. Naish, G3EIX, 6 Mildmays, Danbury, Chelmsford, Essex.
Region 17.—Southern.	L. Southwell, G3JLS, 15 Hollybank Road, Hythe, Southampton, Hants.

QSL BUREAU MANAGER

A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent



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Current Comment

discusses topics of the day

And the Best of Luck in the Contest

MANY and various are the reasons for entering a contest: for some, it is the innate competitive spirit which impels them to devote a complete weekend to operating; for others, it is the wish to assist competitors with additional contacts; or it may be the opportunity for testing new aerial systems, or for working rare prefixes.

A contest over, the entrant forwards his log to Society Headquarters where it is perused by a volunteer committee of RSGB members. The Committee itself shows a remarkable cross-section of the membership—in age, its members range from the twenties to the late-middle-aged (we will not be more precise than that); similarly, the call-signs held range from those in the two-letter sequence, to those issued in the early sixties; and in occupations, some members have spent their lives in the world of electronics whilst others have truly amateur status. But there is at least one common factor between them: they all give of their spare time to peruse, discuss, check, analyse, and assess the logs submitted. Their own experience of operating, and operating conditions, is of no small assistance in these tasks.

From its examination of contest logs, the Committee can obtain a comprehensive picture of the conditions prevailing at the time of a contest; in particular does it become apparent which areas, which stations, and which bands, were workable at specific times. Occasionally, however, it does become clear that one entrant is working an exceptional number of rare stations, or stations which no one else contacted. When this occurs, the Committee makes further cross-checks with other entrants' logs, and then writes to the rare stations requesting an extract from the logs at certain specific times. Rare stations have proved most co-operative in this respect.

It is sad to record that, following a recent contest, the Committee's suspicions were aroused by a certain log, and that these suspicions were justified when the procedure outlined above was carried out. Following long and objective discussion, the Contests Committee has decided that no entry from this Member will be accepted during the coming year, nor will an entry from any club or group for whom he operates in a contest be acceptable during the same period. The member has, of course, been advised of these decisions.

Let it be said that in contests, as in all facets of life, honesty is not the best policy—it is the only policy.

R.J.H.

The Amateur Radio Handbook

BEFORE the Third Edition of the Society's *Handbook* was published in November 1961 considerable doubts were expressed amongst those most concerned with its production that the print order of 5000 copies would be sold. How wrong we were is now clear, for just before this issue of the RSGB BULLETIN went to press the *Handbook* finally went out of print. Headquarters can quite definitely not supply anyone with a copy—not even for love or money! And for this success we are quite unrepentant: on behalf of all those who worked so hard to make the Third Edition so good (see page 6) we express our thanks to the 32,500 people who parted, so gladly it appears, with their 34s. Total sales of all editions now exceeds 220,000.

During the five years of its life, the Third Edition has been sold in large quantities all over the world and there can hardly be a country in which Amateur Radio is practised that the *Handbook* is not consulted and used. Some of the reviews and compliments were indeed embarrassing in their praise. Nevertheless, there is always plenty of room for improvement and a major revision commenced many months ago. The work is proving far more extensive than expected—it is surprising the extent of development in so short a time—and a firm date for publication cannot yet be given. As soon as it is, an announcement will appear in the BULLETIN, together with details of the special pre-publication price for members.

Other new editions of Society publications in the pipeline at the present time are *The Morse Code for Radio Amateurs* (later this month), *The Amateur Radio Circuits Book* (Spring 1967) and *Service Valve Equivalents*.

Installation of President

Mr A. D. Patterson, G13KYP, will be installed as the thirty-third President of the Society during the course of a General Meeting and Social Evening to be held at

Kingsley Hotel,
Bloomsbury Way, London, WC1

on

Tuesday, 17 January, 1967

Commencing at 7 p.m.

Admission will be by ticket, available on request (with s.a.e.) from Headquarters. (Tickets restricted to two per member.)

THE 1966 RSGB INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

26—29 October, 1966

Opened by HRH The Prince Philip, Duke of Edinburgh, KG

THE news that His Royal Highness had consented to open the Exhibition was very well received in Amateur Radio circles, with proof in the gratifying attendance at noon on 26 October. Few could have foreseen the informality which the Royal visitor brought to the occasion, however. Today there are many old timers and youngsters who will cherish personal memories of the occasion because His Royal Highness, in a manner special to the members of the British Royal Family, found opportunity to speak to them and enquire about their particular interests. Kenneth Alford, G2DX, a member of the London Wireless Club in 1913, was one.

Although not a newcomer to Amateur Radio, having seen stations in operation while on visits to overseas societies, this was the first occasion the Society's Royal Patron has been able to obtain first hand information about the Amateur Radio movement, nationally and internationally. In his tour of the stands, Prince Philip showed a lively interest in all that he saw, asking numerous questions to reveal his own intimate knowledge of modern radio and electronics. He was especially interested in a display of equipment—arranged by the Society's Education Committee—capable of easy reproduction by the beginner.

Introducing His Royal Highness, the President, Mr R. F. Stevens, G2BVN, said, " It is with very great pleasure that, on behalf of the Society, I welcome you to this the 1966 International Radio Communications Exhibition. This Exhibition, under other titles and at different venues has, with one exception, taken place every year since 1947. This is indicative of the continuing interest in the Amateur Radio movement and this year's event will, it is hoped, attract visitors whose number will total well into the five figure region. There have been several milestones in the history of the Society since its inception, and in the latter connection it is our pleasure to see here today Dr Smith-Rose and Mr Alford who were active amateurs in 1913 when the Radio Society of Great Britain developed from the Wireless Society of London.

" The Society was greatly honoured when, in 1952, your Royal Highness consented to become our Patron, and it is certain that the year 1966 will be a memorable date in our history. Your presence here today and your interest in our affairs will be noted, not only in the United Kingdom, but throughout the world where Amateur Radio exists. In view of your recent return from South America, I feel that it is opportune to bring to your notice the action of the President of Peru who is a radio amateur and who has made it an offence, punishable by imprisonment, to reduce the size of the bands available for our use. It is probably too much to ask for a similar enactment in this country!

"Amateurs who are very talkative over their own stations say little when faced with a live audience and I hope, Sir, that you will find this a desirable fault in myself. I now have the honour to ask you, Sir, formally to open this Exhibition."

His Royal Highness in reply said, "In a world which seems to demand more professionals, more specialists and more expert qualifications, activities by amateurs are inclined to get pushed into the background. This is a great pity because the things which people choose to do as amateurs in their spare time are those things which give them the greatest amount of personal pleasure and satisfaction. No matter how fascinating working for a living may be it is never quite the same as the freedom and relaxation of a hobby.

"Amateur Radio is almost unique among hobbies in that it is very much a part of one of the major modern technologies and in the early days it played a significant part in the development of radio communications. However, I suspect that while there is a great attraction in messing about with the equipment, the real enjoyment comes from making contact with other enthusiasts all over the world.

"Not least among the enjoyments must be this chance to browse about among the tantalizing displays in this Exhibition. The only trouble is that on the way home you're either kicking yourself for not having bought something or you get that terrible sinking feeling when you know you've been rather extravagant and you wonder how you're going to explain it away."

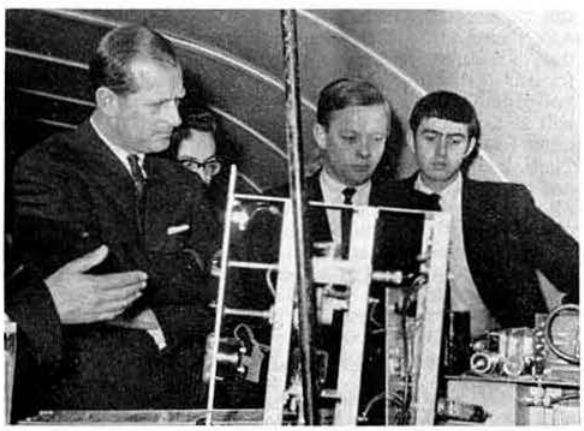
Just before formally declaring the Exhibition open His Royal Highness made humourous references to the hall looking more like a laundry than the scene of a radio exhibition. He was referring to the formidable array of beam aerials which faced him!

Following the opening ceremony Prince Philip, in company with the President, the Chairman of the Exhibition Committee (Mr E. W. Yeomanson, G3IIR), the General Manager (Mr John A. Rouse, G2AHL), and the Exhibition Organizer (Mr P. A. Thorogood, G4KD), continued a tour of the Exhibition, after which members of the Council and representatives of IARU Member Societies had the honour of being presented to His Royal Highness. Among those presented were Mr Robert Denniston, W0NWX (President of the ARRL and IARU) and Mr Noel Eaton, VE3CJ (Canadian Director of the ARRL), both of whom had flown to England specially, at the invitation of the RSGB, to be present at the opening of the Exhibition. Also presented to His Royal Highness were Dr Lothar Woerner, DJ1BZ, representing DARC and Mr H. L. Wilson, EI2W, representing IRTS.

Among the many distinguished guests present at the opening of the Exhibition and at a complimentary luncheon that followed were Dr R. L. Smith-Rose, C.B.E. (Past President, RSGB), Major-General E. S. Cole, C.B., C.B.E. (Past President, RSGB), Sir Albert Mumford, K.B.E. (formerly Engineer-in-Chief of the GPO), Mr A. W. G. Rylands, C.B. (Deputy Director-General of the GPO), Dr

Prince Philip making his opening speech at noon on Wednesday, 26 October. Seated, from left to right, are Mr John A. Rouse, G2AHL, General Manager of RSGB, Mr P. A. Thorogood, G4KD, Exhibition Organizer, Mr R. F. Stevens, G2BVN, President of RSGB, Mr E. W. Yeomanson, G3IIR, Chairman of the Exhibition Committee (hidden from view) and Mr James Orr, Private Secretary to Prince Philip.

(Photo by C. R. Cooper)



Prince Philip examines the home-constructed equipment during his tour of the stands.

(Photo by Keystone Press Agency)

"No, Sir, Canada is not part of the States," Noel Eaton, VE3CJ/G3SDA (Canadian Director of ARRL), assures Prince Philip! Bob Denniston, W0NWX/G5ADH, in the background, obviously appreciates the joke.

(Photo by Tella Photography)

Harry Wilson, EI2W, representing IRTS, Capt. C. Dorian, W3JPT, Chief of Communications, US Coastguard, and Dr Lothar Woerner, DJ1BZ, being presented to Prince Philip, after the opening ceremony. *(Photo by Tella Photography)*

John Saxton (Director, Radio and Space Research Station, Slough), Mr F. C. McLean, C.B.E. (Director of Engineering, BBC), Mr H. Stanesby (Assistant Engineer-in-Chief, GPO), Mr W. J. Bray (Director of Research, GPO), Mr H. G. Lillicrap (Director of Radio Services, GPO) and Mr G. D. Wallace, M.P. The President of the RSGB extended a welcome to the guests, which also included representatives of the Services and the radio Press.

A feature of the Exhibition was an informal reception for overseas amateurs held during the evening of Friday, 28 October. Among the visitors from 21 countries was a party of 14 from Belgium which included ON4DF, ON4JL, ON4OJ, ON4UM, ON4ZA, ON4ZP, ON5CR, ON5DS, ON5FG, ON5LV, ON5OO, ON5PW and OLN-495. Others who signed the Visitors' Book were DL2CT, F8TH, I1DP, I1SWX, K4BXO, K6GFH/G5AAJ, LA7RE, LA8IF, OH2MQ, PA0CKV, PA0DZV, PA0IA, PA0JNH, PA0VGT, PA0XW, PA0YZ, PA0ZAN, VE3CJ, VQ8AM, VS7AGL, VS9AAA, W6DLX/G5AAD, W8AV, W0NWX/G5ADH, WA6ZIQ, WA0OEE/G5ABM, YU2JY, ZE1AC, ZL3RW, ZS6AHX, 4X4AC, 4X4CJ, 4X4FU, 6Y5RG, 9M2AN, 9M8RM, 9V1MB, 9V1MK, 9V1NU.

Five of those present at the overseas visitors' reception on the Friday evening; from the left are 4S7IW (G3UZI), ZE1AC, VK6MU, together with ZL3RW and ZL3VP who have been touring the UK for several months. *(Photo by G3NMR)*

During the evening of Saturday, 29 October, the President, accompanied by the President of the ARRL (Mr Robert Denniston) and a Past President of UBA (Mr Rene Vanmuysen, ON4VY) attended the annual dinner of the First Class Operators' Club. During the course of the evening the President accepted from the Club the L. H. Thomas Trophy donated to the Society in memory of the late Laurence Howard Thomas, G6QB, Past President of FOC.

Review of the Stands

Touring the stands at the exhibition was particularly fascinating this year, with many new products on show. New techniques were evident too—especially the adoption of field-effect transistors in equipment. Their vastly superior cross-modulation characteristics have obviously provided a simple solution to the problems of producing miniature receivers and converters that compare favourably with valved counterparts.

The judges had a difficult task to decide which firm should be awarded the manufacturers' plaque, but finally selected **Contactor Switchgear (Electronics) Ltd.**, a new exhibitor. The equipment which earned the honour was a combination: the 2A10/2AR completely solid-state Top Band mobile transmitter and receiver which can run at the full 10 watts input, and receive a.m., c.w. and s.s.b. satisfactorily. The units are matched in appearance and electrically so that

The CSE 2AR silicon transistor Top Band receiver which, together with the 2A10, won the 1966 manufacturers' plaque. This is awarded annually for the most interesting item of commercially-built equipment for the amateur. *(Photo by courtesy of CSE Ltd.)*

they can be used with common switching, or individually, on positive or negative earth supplies. The transmitter puts a drain on the battery of only 1 amp; the receiver also has a low power consumption—a maximum of 280 mA. The latter has a sensitivity of 1 μV for 10db signal-to-noise ratio, an i.f. shape factor of 2·5 : 1 from 3db to 50db and stability suitable for good sideband reception. Image rejection is stated to be better than 50db. Two bandwidths can be selected with a panel control: 8 kc/s for a.m. and 4 kc/s for s.s.b. Other variable functions to facilitate reception of s.s.b. are two speed a.g.c. delay, and a switched b.f.o. for u.s.b. or l.s.b. The S meter functions on all modes. Audio power of 1½ watts into 3 ohms is available, and the receiver will also match into any impedance between 1 and 10,000 ohms for driving earpieces. Both units measure 8 in. wide × 2½ in. high × 6 in. deep. The aerial impedance is 75 ohms, and this is matched by the ATMA type 2 tunable whip aerial, also manufactured by CSE, which can easily be mounted on a car window without modifications to either the aerial or car. A readily accessible tuning ring is incorporated close to the mounting. As safety is an important consideration when operating mobile, this was taken into account in the design of a lip microphone assembly produced by CSE. The headband is quite flexible, so if there is any strain on the cable, the microphone and headband will fly off the operator's head immediately.

An obviously good example of the new thinking which has gone into development is the Davco DR-30—a remarkable little receiver with almost every conceivable facility.

The DR-30, manufactured by **Davco Electronics Inc.**, is a

Another group of visitors at the Overseas Reception including W0NWX/G5ADJ, W2EYR/G5ACL and 9M8QM.
(Photo by G3NMR)

completely modern equipment: in 7⅛ in. × 4 in. × × 6 in. is a 38 semiconductor tunable first i.f. amateur band receiver (see September issue, p. 582, for photo). Twelve bandswitch positions cover 80m, 40m, 20m, 15m, 10m and 6m, plus 10 Mc/s (for WWV) and two spare 550 kc/s segments. The manufacturers are particularly proud of its good cross-modulation performance, which is a characteristic of the field-effect transistors used in the two r.f. input stages, and the selectivity curves, obtained with combinations of a mechanical filter, crystal filter, ceramic transfilters and standard transformers. The i.f. switching does not, incidentally, mean r.f.-live leads to a panel switch, routing of the signal being achieved with d.c. operated diode gates. Bandwidths obtainable are 500 c/s, 2·1 kc/s and 5 kc/s. It is mechanically novel, plug-in glass-epoxy printed circuit modules being used exclusively, sliding into slots in screening members of a single aluminium extrusion. Great care seems to have been taken in the design and construction, exemplified by p.t.f.e. wiring and a diecast v.f.o. drive gearing housing. The maximum audio output is 1 watt, matching into any impedance from 8 ohms to 45 ohms, plus a 600 ohm earpiece output. The DR30 costs $398.50 in the USA.

Green Electronic and Communication Equipment Ltd. introduced a range of v.h.f./u.h.f. converters employing FETs.

Electroniques (Felixstowe) Ltd. have combined with STC Electronic Services to provide a by-return mail order service for all types of radio components and certain equipment. A very imposing stand displayed a proportion of the stocks interesting to amateurs, such as an aerial rotator, Japanese transmitter and receiver, circuit modules, filters, equipment housings, microphones and valves. The aerial rotator, made in the USA by Channel Master, is notable for the claimed accuracy to which the aerial may be set—Selsyn control permits rotation by 1° increments. An all-steel thrust bearing is incorporated in the motor housing, and this should accommodate most v.h.f. arrays, although for very windy locations and a considerable length of mast above the rotator, the user may wish to add an alignment bearing to relieve the side thrust. The price of the rotator, the Tenn-a-Liner model 9528, is £17 17s for the fully automatic version, and £12 12s. for the compass type. Specimen models of the Star SR700 receiver and the ST700 s.s.b. transmitter were on show—delivery to customers should be possible early in 1967. The transmitter covers the complete bands 80m, 40m, 20m, 15m, and 10m, running a maximum of 200 watts p.e.p. The s.s.b. is filter derived (mechanical filter), and amongst the facilities are automatic sidetone, a.l.c. grid block keying for c.w., PTT, VOX, and, of course, manual operation. The companion receiver is a crystal-controlled front-end type, with three i.f. passbands of 500 c/s, 1·2 kc/s and 2·4 kc/s. Facilities include a 100 kc/s crystal calibrator, tunable notch filter, switched sideband selection and a means of connecting the receiver to the ST700 so that the pair can be operated as a transceiver. The simpler SR150 and SR550 receivers were also on show. For amateurs and enthusiasts who prefer to assemble their own equipment, but who do not have much time to wire up components, Electroniques displayed the first four units of a new line of transistorized modules. These four devices were i.f. amplifier/filters to cater for different requirements: (i) a commercial grade module with a 7·5 kc/s 6db bandwidth at 470 kc/s, incorporating an a.m. detector and a.g.c. output, for 37s. 6d.; (ii) a 455 kc/s professional grade unit using a Brush-Clevite ladder filter providing a bandwidth of 8 kc/s at 6db; (iii) a professional unit using a half-lattice crystal filter with a bandwidth of 2 kc/s; and (iv) another professional module using a half-lattice crystal filter with a bandwidth of 2 kc/s, but for an i.f. of 1·6 Mc/s. The price of each professional module is the same: £8 17s. 6d. Five new diecast boxes have guides on the internal walls to retain printed circuits or Veroboard. The boxes are cast in aluminium alloy, and are available in sizes of 4¾ in. × 3¾ in. × 1¼ in. to 10¾ in. × 6¾ in. × 2¼ in., at prices ranging from 7s. 6d. to 22s. 6d.

Also on Electroniques' stand were products from another comparatively new firm, **Light Electro Developments Ltd.** LED's showpiece was the Anglian 650, an exceptionally comprehensive sideband transceiver with a built-in linear to deliver the UK licensed maximum power from 80m to 10m. A particularly interesting feature was its twin dial mechanism: one scale is used, but with twin drives, pointers and v.f.o. tuned circuits, which are switched into the oscillator valve as required. Thus the Anglian can operate as a normal transceiver, or as separate transmitter-receivers. It is sizeable, but this appears to be justified by the comprehensive circuit. Companion equipment on show, included a transverter, the Anglian 20-2-2. This delivers 40 watts at 2m from a QQV06-40A, and incorporates a converter to reduce received signals from 2m to 14-14·5 Mc/s. The Anglian 80/20 is a 3·5 and 14 Mc/s mobile transceiver with an output of 200 watts p.e.p. at the modest price of £65.

KW Electronics Ltd. exhibited a new receiver, the KW201, which, sitting beside the Vespa sideband transmitter, makes an attractive pair. Special attention has been paid to external appearance, as it bears a new style of dial, illuminated coloured legends to indicate the selected sideband, and a new pattern S meter. The slide rule dial is calibrated for a 200 kc/s segment, and 11 bandswitch positions (a tunable first i.f. is used) enable it to cover all the amateur bands up to 28·8 Mc/s. The quoted sensitivity is 1 μV for a 20db signal-to-noise ratio. The other important criterion, selectivity, is 3·1 kc/s, produced by a mechanical filter; for the c.w. devotee, this can be sharpened up with an

The KW201, a new amateur bands receiver developed by KW Electronics Ltd. The method of interpolation employed with the compact dial allows the frequency to be read to within 1 kc/s.
(Photo by courtesy of KW Electronics Ltd)

optional outboard *Q* multiplier (£8 10s.). There is also an extra unit for frequency measurement, a 100 kc/s crystal calibrator (£6). An interesting mechanical change can be found in the KW201, incidentally, the traditional chassis having been replaced by a large printed circuit. The price of the receiver is £105. Another instrument making its debut was a low voltage stabilized power supply which can provide a constant voltage at any setting between zero and 24 volts, with a maximum current of 500 mA. The latter parameter is continuously monitored by a large, clear plastic, panel meter. Use of the supply is not restricted to positive or negative earth applications, as both terminals are completely isolated. The case measures approximately 6 in. × 4 in. × 4 in., and the price is £12 10s. Electrosil tubular resistors, suitable for use as dummy loads were displayed, as well as a complete dummy load unit manufactured by KW. If used in conjunction with the established E-Z match (a versatile high power aerial matching unit) and the KW match (an s.w.r. meter which can now, incidentally, be used with 50 ohm cable as well as 75 ohms) a complete transmitter matching system results. The KW2000A transceiver, and the commercial-use version were on show, as well as other manufacturers' complete equipments from the USA, Japan and Italy.

Putting a sideband transmitter or transceiver on 2m is now catered for by **TW Electronics** who exhibited a prototype transverter which should be in full production by March 1967. It is driven by the 28-30 Mc/s output of an s.s.b. transmitter, which matches into an internal oil filled dummy load. The 10m signals are filtered and heterodyne converted to 144-146 Mc/s to drive the QQV06-40A linear p.a., capable of delivering 150 watts p.e.p. On receive, a Nuvistor converter produces a 28-30 Mc/s i.f. The price of the transverter is £69, and a companion power unit £30. The rest of the TW range was available for inspection, including the single band 4m or 2m Communicator (which uses a QQV03-10 p.a. and transistor receiver), a v.h.f. mobile receiver, and the seven-valve v.h.f. transmitters.

J-Beam Engineering displayed a new aerial, a four element Yagi for 10m, which dwarfed the other arrays on the stand. This is a departure for the firm which has hitherto specialized in v.h.f. and u.h.f. aerials. The 10m beam, priced at £18, consists of four dual section elements fitted to an aluminium alloy boom, which itself is supported by a steel tube, on the lines of the 6m export series. A twin matching system incorporates a coaxial balun for 52 ohm feeder. Three other new aerials were announced, though were not on show: six, eight and ten element Yagis for 4m. The latter model is 21 ft. 2 in. long! A 70cm Parabeam was also displayed.

Microphones were the principal feature of the **Grampian** stand, and in particular two new ribbon microphones, the GR2, which has the usual figure of eight pattern, and the GR1, a cardioid model capable of 10db suppression of the higher frequencies at the rear. Both versions, however, are the same basic price: £10 10s. Another new product was a low cost four channel active mixer, type 18/4. It is transistorized, operating from a 9 volt battery, and its performance is 100 c/s-10 kc/s, ±3db, with less than 1·5 per cent distortion.

A typical RAEN base station was in operation during the exhibition on the 4m band to demonstrate the activities and facilities of the Radio Amateur Emergency Network.
(Photo by C. R. Cooper)

Perhaps the colour schemes were flamboyant for amateur shacks, but the actual designs of the professional cabinets on the **Alfred Imhof** stand could suit practically every requirement. Less expensive and rather more versatile methods of housing equipment were also demonstrated—Imlok and the Cubical Construction System—which could be categorised as do-it-yourself. This Uxbridge company shared the stand with **Imhof's (Retail) Ltd.**, of New Oxford Street, London, who are Eddystone agents. The amateur band EA12, the transistorized EC10 and the 940 receivers were on show, accompanied by the EB35, a new transistorized broadcast receiver, similar in appearance to the EC10, but covering the h.f. and v.h.f. broadcast bands.

British and American Heathkits were well represented on the **Daystrom** stand, especially amateur band and test equipment. There were, however, some fascinating kits not connected with the subject of the exhibition, such as a working analogue computer (American Heathkit). There was news of a new import to accompany the SB100 series of transmitters, receivers and amplifiers: the SB610. This is a cathode ray signal monitor—for use with transmitters and receivers—which can display a transmitted signal pattern, r.f. envelope, trapezoid, an RTTY cross pattern, and signals from any receiver having an i.f. below 6 Mc/s. The frequency coverage when used with a transmitter is 160m to 10m, and it will operate at power levels of 15 watts to 1 kW into 50-75 ohms. To facilitate p.e.p. measurements with s.s.b. transmitters, two audio oscillators are provided, the frequencies being 1500 c/s and 1950 c/s; thus within the range of all standard filters. The price of the kit is £42.

Constructors who are tired of fiddling with pieces of wire may have found their needs suited in Cir-Kit, a simplified method of fabricating printed circuits, manufactured by Peak Sound Ltd., and demonstrated by **Enthoven Solders Ltd.** The unconventional approach lies in the fact that the circuit is not etched, but strips of copper are affixed to a plain prepared laminate board with an impact adhesive coating on the foil. When the circuit is complete, the joints are just soldered and necessary holes drilled. Enthoven's own products were also continually demonstrated, special attention being paid to proper preparation of the surface to be soldered; a task for the variety of soldering fluxes offered.

The adjacent stand, **Salford Electrical Instruments Ltd.**, displayed a comprehensive range of quartz crystals, capacitors, metal rectifiers, and the Selectest and Minitest multirange meters. Special prominence was given to ferrite toroidal cores, which are gaining increasing popularity in amateur equipment.

The Swan 350 was the most familiar equipment on **Peter Seymour's** stand, but there was also a newer range, the Sommerkamp equipment units on show being the FR100B receiver and the FL200B transmitter. The FR100B's principal features include two mechanical filters in the i.f. chain, one providing a bandwidth of 4 kc/s for a.m. reception, and the other 2·1 kc/s wide for s.s.b. C.w. is also catered for with a crystal in series with the narrow mechanical filter. The frequency coverage is 3·5 to 29·5 Mc/s (amateur bands), plus a position for WWV and space for three additional bands. The tuning ranges are 600 kc/s wide. Sensitivity is claimed to be better than 0·5 μV for 10db signal-to-noise ratio. The price of this 10 valve, 15 semiconductor receiver is £120. The companion s.s.b./c.w. transmitter, the FL200B, covers the same bands as the FR100B receiver, but only up to 29·1 Mc/s. The pair of 6JS6 linear p.a. valves can run up to 240 watts p.e.p. The transmitter contains 12 valves, 10 semiconductors, including a solid-state

The array of exhibits on the RSGB home-construction stand continually attracted an enthusiastic crowd. The units conspicuously displayed on the front of the stand form a range of "Novisets" designed by G2DZT to enable the newcomer with a modicum of knowledge to successfully assemble a small station.
(Photo by C. R. Cooper)

power supply, and costs £140. The Swan 400 was also on the stand; this is a transceiver basically similar to the 350, but possessing a remote full coverage v.f.o.

Ad Auriema, importers of American National equipment, displayed the NCX-5 transceiver, its companion linear amplifier the NCL2000 and the HRO-500 transistor receiver.

An interesting display, was provided by **Multitone Ltd.,** manufacturers of paging systems. These are normally associated with inductive loops, where a wire connected to a v.l.f. transmitter encircles the area to be served, but short range v.h.f. systems are also employed, generally for outdoor applications. Simpler equipments of both types consist of personal receivers which emit a series of bleeps when selected by an encoder at the transmitter, but Multitone also produce equipment for transmitting speech to the receiver, and talk-back devices.

A new soldering iron was shown by **Weller Electric Corporation:** the Marksman, a lightweight 25 watt iron. It can be purchased on its own, for 29s., or as part of a kit comprising spare nickle-plated copper bits, solder and a soldering aid. The price complete is 38s. The larger soldering guns were also displayed; the Expert, a 100/140 watt dual heat model, and the Heavy-Duty, a 275 watt quick heating version.

Four stands concentrated on the sale of books this year: the **RSGB Bookstall** (stands 5 and 6), ***Wireless World*** (stand 8), who also displayed two equipments described in the publication, ***Short Wave Magazine*** (stand 19) and ***Amateur Tape Recording Magazine*** (stand 26). There were also three popular stands selling components and equipment: **L.S.T. Components Ltd.** (stand 1), **P. F. Ralfe Radio Ltd.** (stand 27, in the rear hall) and **Brian J. Ayres** (stand 33).

The Amateur Stands

The RSGB's contribution consisted of home-constructed equipment, where, although the exhibits were perhaps rather more limited by the rules this year, paradoxically, greater support was the outcome. To be acceptable, the equipment must either have been described in the RSGB BULLETIN, or the author must be prepared to write an article if required. The stand displayed a wealth of exotic v.h.f./u.h.f. devices, in particular Sven Weber's (G8ACC) 7 watt 70cm transmitter employing an overlay transistor in the output stage, which gained him the Silver Plaque. M. H. Emmerson, G3OQD, justifiably earned the Horace Freeman Trophy for a transistorized s.s.b./a.m./c.w. transceiver for 160 to 10m. Other award winners were D. R. Bowman, G3LUB, for a transistorized receiver based on the G2DAF design; M. J. Griffin, G3IIN, for an electronic multimeter, with Braille calibrations for use by blind persons; E. St. B. Sydenham, G3LOK, for a transistorized voltmeter and r.f. probe; A. L. Mynett, G3HBW, for an FET converter for 432 Mc/s†; H. C. Hopkins, G3NRI, for a 144 Mc/s transverter; and W. L. Kinchen, G2DZT, for his "Novisets," a range of simple equipments in matching visor-fronted cabinets, entirely home-constructed. The units on display were: an 80/160m phone/c.w. valve transmitter, a transmitter power supply plus a.t.u., an 80/160m receiver, a receiver power supply plus speaker, and a 2m phone transmitter.

The transistorized version of the G2DAF receiver aroused much comment and enthusiasm as did G3HBW's FET converters for 2m and 70cm. E. W. Yeomanson, G3IIR, exhibited an attractive small 4m transmitter v.f.o. intended for mounting on the dashboard of a car. The highest frequency equipment was a 1300 Mc/s tripler designed and built by G3HWR. Perhaps one of the newest approaches to u.h.f. transmission was the varactor tripler for 432 Mc/s by G6JP, described in the November BULLETIN. Other interesting designs were a 2m transverter by G3NRI, a high power 2m transmitter by GW3FSP, a 250 mW transistor transmitter by G8ACC, the G3JJG transistor s.s.b. exciter, a 432 Mc/s cascode transistor converter by G8ACC, the "2N4" 2m/4m transmitter by G8PD, the G3HBW transistor dip oscillator, J. R. Gazeley's 432 Mc/s Converter, an experimenter's a.c. power supply by G. P. Goulunski (aged 16), and an 80/160m a.t.u. by G3VQN.

The Society's Special Activity stations, GB3RS and GB2VHF, were again in operation from one of the RSGB stands at the Seymour Hall. Over 700 contacts were made during the show, mainly on 80, 4 and 2m, although a few scheduled QSOs were made on 20, notably with ZD9BE on Tristan da Cunha. The RSGB call-sign GB2RS was activated for special News Bulletin broadcasts on the Wednesday and Saturday of the Show, when, with special GPO permission, a recording of the Exhibition opening ceremony was radiated simultaneously 80, 4 and 2m.

GB3RS on 80 and 20m was running 125 watts p.e.p. input to paralleled 6146s in a G2DAF-type transmitter, and a companion receiver and monitoring oscilloscope completed the station. The aerial was a G8KW trap dipole.

GB2VHF on 4m ran 25 watts to a 6146 p.a., with a four element Yagi aerial. The 2m transmitter ran 120 watts to a QQV06-40A, with a 10 element long Yagi.

Equipment for the two stations was loaned by G3FRV, G3IIR, G3PHG, and G3SGA.

† To be described in the BULLETIN early in 1967.

GB3RS was the call-sign of the h.f. exhibition station, which was continuously in contact with local and DX stations. GB2VHF, to the right, operated on the 4m and 2m bands.
(Photo by C. R. Cooper)

The Station Manager was Ron Vaughan, G3FRV, and the operators were G2DP, G3LFM, G3LHZ, G3NKS, G3PHG, G3SGA, G3SGN, G3TIR, G3UNF, G3VEU and GW3PSM. The Exhibition Committee is also grateful to Bruce Sutherland, G3IES, J-Beam Engineering Ltd., Grampian Ltd. and S.V.S. Masts for their assistance in connection with the Station; and to the " Aerial Gang " with G3COX for their hard work on the roof before and after the exhibition.

The **British Amateur Television Club** demonstrated the abilities of its members by displaying several items of home constructed equipment including two vidicon cameras. One member of BATC had even managed to acquire an old colour monitor television of vast proportions.

The **British Amateur Radio Teleprinter Group** endeavoured to maintain a continuous supply of " live " copy to demonstrate the speed and accuracy which can be achieved with this mode. Some fascinating " picture tapes " were printed out at intervals; but it was a moment of disappointment when a sketch of Brigitte Bardot was mutilated by the automatic tape reader! Sales of a new booklet produced by G2FUD, editor of the BARTG Newsletter, were encouraging, and helped to enrol several new members.

The Service Stands

The stage comprised a display by the **Royal Signals**; the latest equipment, including test equipment, an active RTTY station and an RTTY receiving station monitoring press services were available for inspection. For comparison, examples of wartime communications equipment and the latest transmitters and receivers were situated side-by-side; the latter understandably still possesses an ugly " rugged " external appearance, but the solid internal construction was eyed with envy by the visitors. An example of the quality was a 350 watt (1 kW?) p.a. stage in which the output circuit inductor was made continuously variable by winding plated copper tape off a metal drum on to a suitably ribber former; obviously a perfect way of avoiding unwanted spurious resonances in unused sections of the tank circuit. Another display consisted of typical examples of test equipment, and some of this was put to good use during the exhibition by measuring the exact frequencies of amateurs' quartz crystals. During periods of RTTY activity, a Siemens teleprinter was used to remotely control, via a land-line, the Royal Signals club station at Bampton, under the call GB3RCS. A rather unusual RTTY QSO occurred on the Friday morning, when this station contacted GB3RS (the Society's exhibition station), QSLs being exchanged while the QSO was still in progress, thanks to the assistance of Ceri Taylor, G3SGN, who acted as runner!

The **Royal Naval Amateur Radio Society's** stand staff were keen to describe the society's activities and achievements. In an effort to help clean up some of the poor c.w. signals heard on the amateur bands, an automatic Morse sender was in constant use. Amateurs were invited to test their ability by listening to special test tapes.

An adjacent stand, the **Amateur Radio Mobile Society**, contained an assortment of equipment, particularly aerial mounts and a remotely controlled a.t.u., suitable for mobile installations. Visitors were referred to *Mobile News* for details of designs and information on the Society's activities.

The **GPO's** main stand concentrated on tracking interference, the principal display consisting of typical equipment housed in detector vans. The PAL colour TV transmission system was also demonstrated.

Visitors who took the trouble to visit the balcony discovered some interesting developments by **Post Office Research** in the field of v.h.f./u.h.f./s.h.f. amplification with semiconductors. The microwave parametric amplifiers and tunnel diode amplifier were perhaps somewhat remote from amateur applications if only due to considerations of finance and facilities, but the 432 Mc/s varactor multiplier and high power v.h.f. transistor transmitters are likely to be immediate forerunners of equipment shortly to be found on the amateur bands in numbers. In view of this the potential interference capabilities of semiconductors applied to transmission were given preferential treatment in the stand literature.

Interrupted during their meal on the Friday evening were 4S7IW, 9V1MB, 9M2AN, 9V1NU, 9V1MK and 9M8RM.
(Photo by G3NMR)

Exhibition Raffle

The Eddystone EA12 amateur bands receiver raffled at the exhibition was won by S. Conti, of West London.

Quiz held at Communications Exhibition

Visitors to the RSGB Communications Exhibition on the closing Friday and Saturday may remember a Quiz run by Mrs Chris Kiddell, a member of the Radio Amateurs' Invalid and Bedfast Club. Mrs Kiddell would like to express her thanks to the many Amateurs and Short Wave Listeners from throughout the world who participated in the Quiz. A total of £3 10s. was collected.

THE RSGB INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

1967

will be held at the

NEW HORTICULTURAL HALL

VINCENT SQUARE
LONDON
SW1

27—30 SEPTEMBER

Applications for stand space should be addressed to the Society's Exhibition Organizer:

P. A. THOROGOOD, G4KD, 35 GIBBS GREEN, EDGWARE, MIDDLESEX.

Part 2

The Society's IGY Aurora Programme

By CHARLES NEWTON, G2FKZ*

The Time Patterns—Magnetic Midnight—Auroral types—Who Worked What?—Plan Field Orientation—Tropo effects—Ionization Movements—The Problems of the South Coast—Forward scatter?—Gee—H.F. Effects—Conclusions

THE previous article† on the IGY Aurora Programme reviewed the basic principle of geomagnetic field orientation necessary for auroral radio wave bi-static reflection and its relation to the Earth's magnetic field angle of dip. We will now examine in detail some individual observers' experiences in relation to the geomagnetic and geophysical disturbances which took place during and just after the IGY period.

It is an undeniable fact that radio amateurs are, in the main, DX hunters, but what is DX for one is not necessarily DX for the other, and this overriding desire to work the difficult or almost impossible has contributed significantly to a better understanding of bi-static radio aurora. This applies not only to the lucky fellows with their impressive logs of stations worked, but also to those at the other extreme, who, despite all their efforts, could not work anyone, but still played their part in helping to fit the jigsaw together. Special habits, like DX hunting, produce a bias which shows itself in the analysing of results, and people go to bed, or to work, even during auroral openings (which on 2m are fairly rare). The geographical locations of stations worked does not always bear relation to the immense difficulties involved in making some of these contacts.

Daily Time Periods

The first point established by statistical analysis was the daily time periods when aurorae actually occur. This is fairly straightforward and fits a standard two-period pattern. Fig. 1(a) applies to the UK and Fig. 1(b) to Sweden for two typical auroral openings. If we compare any one opening with another we will always find slight differences, both in time and character, for any one area. Some aurorae are very intense during the afternoon phase, with little or no midnight phase, or are reversed with intense midnight activity and little afternoon. Occasionally they are very intense during both the afternoon and midnight phases. Some show a gradual build-up of activity, whereas others start very suddenly, and some last only a short period—say half an hour—while others go on for three hours at a phase.

Superimposed on the general picture is a seasonal variation which results in small time changes of the individual phases, e.g., in summer the afternoon phase tends to be slightly earlier and the midnight slightly later than at the equinoctial times, but for all practical purposes this effect can be ignored, as it has no real effect on general amateur operating.

Magnetic Midnight

As we proceed easterly across Europe, the aurora occurs earlier in relation to GMT, and so the time patterns for the UK during any one particular opening are consequently later than farther east. The differences in time between different geographical locations and the time of auroral occurrence are often referred to as differences in 'magnetic midnight.' This is the time when an observer looking at the Earth's magnetic axis could, if it were possible, see the Sun's central meridian, i.e., they are in line. It is just the same principle as normal midnight, i.e., the observer looks at the *rotational* axis to the Sun's central meridian, but as the magnetic and rotational axes are offset (see Fig. 1 (Northern Hemisphere), Part 1†) the actual differences between GMT midnight and magnetic midnight are a direct function of geographical location. The UK is at a point of large difference, whereas Eastern Canada and the USA experience negligible time difference between local and magnetic midnight.

As we travel east across Europe magnetic midnight occurs earlier than at London, where it is just after 23.00 hours GMT, Malmo (Sweden) or Poznan (Poland) being about one hour earlier. The times of minimum radio aurora tend to be about 1½ hours before magnetic midnight.

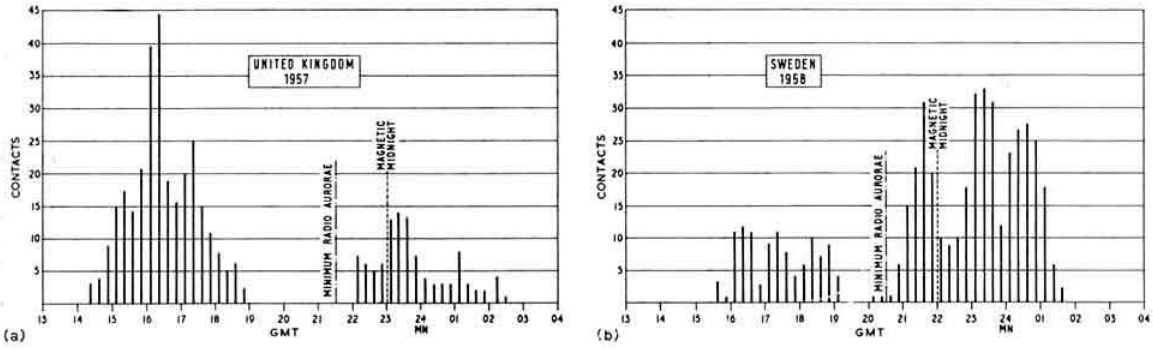


Fig. 1. (a) This chart shows the time against number of contacts (2m) for all UK locations during 1957. The two-period pattern is very obvious. (b) Time against number of contacts (2m) for a number of Swedish stations during one opening in 1958. Note the wax and wane effect.

* 61 Merriman Road, Blackheath, London, SE3.
† Part 1, RSGB BULLETIN, May 1966, p. 289.

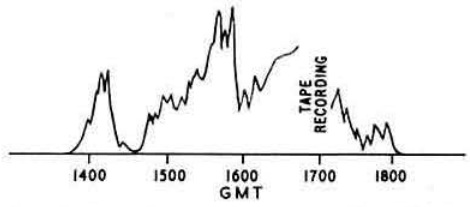


Fig. 2. A tracing from the Thurso Technical College 29 Mc/s receiving station pen recorder monitoring GB3LER. It shows an auroral opening on 19.10.64. Note the wax and wane effect.

Auroral Types

The second point which emerges from the daily time patterns is what the writer terms " wax and wane effect." This is a phenomenon apparently common to all stations in a given area. There appear to be times, for instance, when hardly anyone makes a contact, yet just prior to or later than these times contacts are plentiful. It is only with the pen recordings of IQSY aurorae that this phenomenon has been shown to be very real (Fig. 2). The difficulty is that only a small minority of aurorae are like this, the others being just the opposite: a steady build-up of signals to a peak, then a steady decline. Some last a lot longer than others, so it is true to say that there appear to be different types of radio aurora, just as there are different types of visual displays.

The wax and wane effect is rather important, as many observers have been caught out by thinking that a decline in conditions was the end of an opening, when in fact it was simply a wane. An example of this is Fig. 3(a), which tends to indicate that G4LX went to bed too early! The other observation of interest is the pattern of stations worked. There appears to be a definite relationship between the opening of some aurorae and the appearance of DX. In fact, Dresden TV on its old frequency was known as the 2m man's guide to aurorae, and was usually the first signal to appear. In other words, an aurora tends to open with the real long range DX contacts, of up to 1200 km, to Eastern or South-Eastern Europe. It then declines to the more local DX, i.e., GM or near continent, PA, OZ, ON, etc., from London, and closes with a flourish of the long range DX. The operating patterns of Figs. 3(a, b, c), and 4(a) are typical examples.

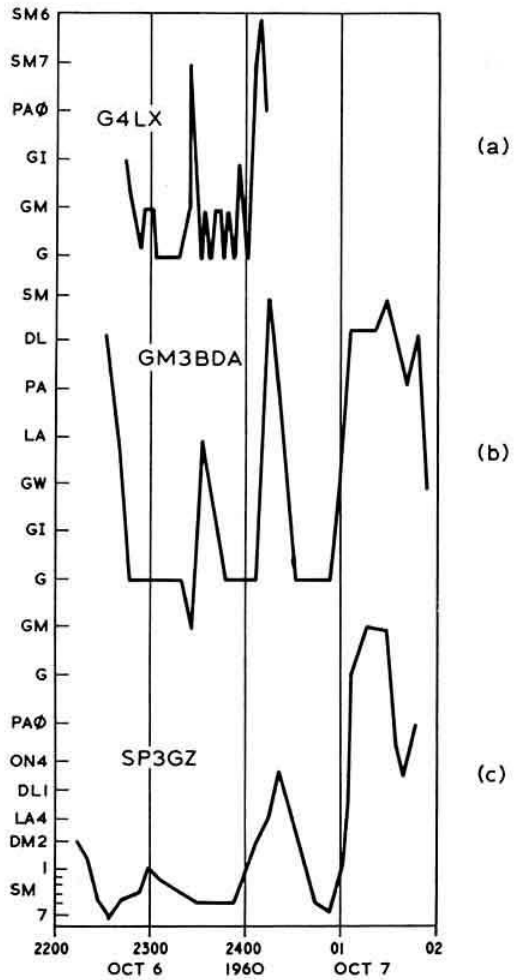


Fig. 3 (a, b, c). Some DX patterns of the midnight phase opening of 6-7 October, 1960.

In Fig. 4(b) are shown the hourly means of magnetic *H* force both for Lerwick and Eskdalemuir on 6-7 October, 1960. This was a very good auroral opening, and although the hourly mean variations are large compared to the quiet day, 13 October, the individual peaks (right off the graph) reached well over the K9 levels which required a lower limit of 1000-750 gamma for the respective stations. It is of interest to note that the times of the large variations coincide with the radio auroral opening. This tends to prove the point that the incoming particles are responsible for ionization. These cause an electric current which creates a magnetic field and this, in turn, is measured by the magnetometer.

Who Can Do What?

An analysis of all the results over the period 1957-1961 brings out several salient points. For the UK, the farther north you are the more aurorae you will experience. This is just what you would expect. But if it is long range DX (1000 km plus) that is required, then the best locations in the UK seem to be Southern Scotland and Northern Ireland. The possible reason for this is that as the very big aurorae mainly occur at sunspot maximum, when the aurora tends to be farther South anyway, and the most intense storms appear to spill out more southerly than northerly, the combined effect is to produce very intense ionization more southerly than normal. This possibly explains the Southern Scotland and Northern England DX potential—it is well placed for the most intense storms.

The extent of southerly penetration is linked with the *Kp* figure. This is the " Planetary *K* Index", an average figure from the individual *K's* of selected observatories throughout the hemisphere. As *Kp* figures climb higher, so the ionization areas move more south, and there comes a time when the best conditions are south of Northern Scotland altogether. However, these conditions do not last very long, so what Northern Scotland loses in DX potential it gets back in a higher occurrence frequency. But Northern England and even points farther south, though lacking in frequency of occurrences, have the advantage of good DX potential. This can be seen clearly by reference to the maps in Fig. 5.

Plan Field Orientation

The previous article dealt with the basic geometry necessary for bi-static auroral reflection which showed how large strictly north/south distances are propagationally difficult,

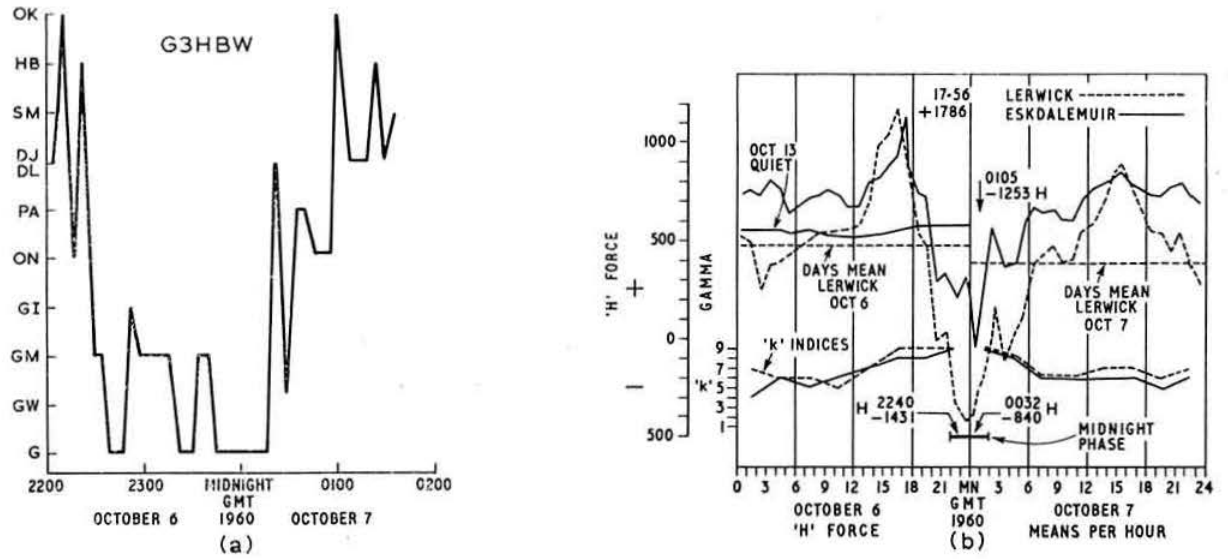


Fig. 4 (a, b). The histogram of stations heard or worked by G3HBW is interesting if it is compared with the *H* force magnetic recordings of Lerwick and Eskalemuir. This shows that the very strong magnetic disturbances occur at the same times as radio aurorae. The high reading at 01.05 —1253 for Eskdalemuir was about the time when G3HBW contacted South Eastern Europe. The " 0 " gamma line is the datum from which Lerwick and Eskdalemuir measure their variations and is 14,000 and 16,000 gamma respectively.

but if we consider the plan component, then the picture is much more hopeful.

Fig. 6 shows the plan field orientation pattern to signal wave front angle for a single station. The shaded area is where the best signal wave front to magnetic field orientation angles are, at the 110 km height. The line where the transmitter or receiver wavefront meets the Earth's magnetic field angle of dip at right angles (the specular angle) is shown as 0° with plus and minus variations to this. In practice, the strongest signals will be received from the shaded area, the optimum being along the specular angle. However, we are not concerned with just our own position but with that of the other station as well. This modifies the picture somewhat in relation to those two stations. The transmitted plan pattern has, in effect, been moved in relation to the received one, so the patterns are no longer superimposed, but rather overlap one another, the precise area of overlap being a function of each station's location. In other words, *bi-static radio auroral contacts can only occur if the plan field orientation pattern of one station suitably overlaps the plan field orientation pattern of the other, and if this area of sky is ionized.*

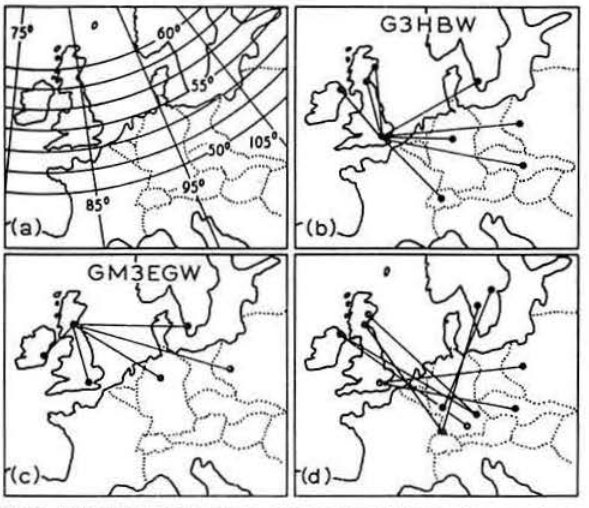


Fig. 5. This shows some of the outstanding DX reports or contacts, 750 miles plus, of GM3EGW, G3HBW, and European stations. The outstanding reports were of GI3GXP and GM2FHH to Southern Germany. The geo-magnetic co-ordinates for Western Europe are also shown.

Fig. 7(a) shows the overlap of the respective patterns for stations in London and Stuttgart. It is clear that contacts are possible, and if the London station beamed north-east the specular reflection line could be used over a considerable distance, thereby improving the chance of greater signal strength. The Stuttgart station's field pattern is such that it cannot better 3° to 6° off the specular line in the overlap area. The beam headings shown in Fig. 7(b) were those actually used by the respective operators, and are about the best compromise that can be made between the respective field lines with 30° beam widths. The importance of this contact is that it shows a typical " East of North " bias for the UK station's beam heading—a point referred to by very many UK operators who expected the best signals to come from north or even magnetic north.

This is not the case, however, as the optimum beam heading depends upon the location of the two stations and their respective plan field orientation overlap. If both stations can use an area of sky which is specular reflection to both of them then the greatest signal levels will result. But if either location is changed, then the best area of sky is that which is as near the specular as is possible, though with resultant deterioration of signal levels.

Of course, there are the odd contacts which do not quite conform, but under very strong auroral conditions it is possible to make contacts or hear stations whose field orientations are several degrees off the optimum, and this usually means that contacts can be made farther south than normal. The area cannot extend much north, east or west as the line of sight prevents this, but southerly penetration for the northerly station is, in practice, limited only by field orientation, so that if the ionization is very intense it is

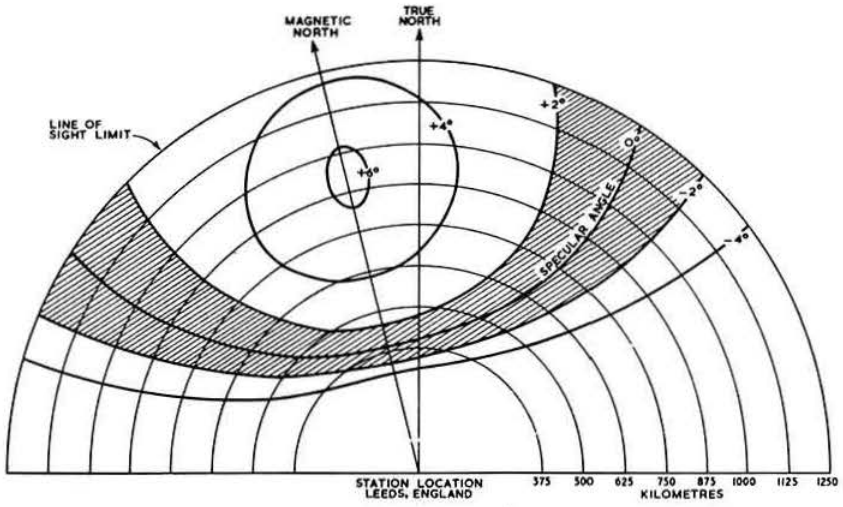


Fig. 6. This shows the plan field orientation pattern for a single station at 110km height. It can be considered as the transmitter and receiver orientation patterns overlapped or superimposed. The shaded area is where the best orientation angles are. The specular angle line is where the transmitter or receiver wave front meets the Earth's magnetic angle of dip at right angles at the 110km height, with the variations as plus and minus to this. In general practice it is not possible to use more than about plus or minus 5° from the specular angle, but it must be remembered that the ionized area extends about 20km in height which modifies the pattern somewhat.

possible to obtain reflections quite a few degrees off specular.

The reception of GM2FHH (Aberdeen) in Straubing (Southern Germany) (Fig. 8) is a good example of the limits of possibility as orientation angles up to about 6° must have been used to enable DJ7GK to hear his signals. However, tropospheric propagation can help in borderline cases such as this, as the effect would be low down, say in the first 2-3 km of height at the most, and this could have the effect of moving the entire field pattern in the beamed direction. For the southern station this could, in effect, lift the whole pattern farther north and so bridge the gap. Also, only one height pattern (110 km) is shown where as, in practice, there is a band of about 15 to 20 km over which the ionization occurs, and under very strong aurora it may well be more. This would also help to bridge the gap, but even so, contacts like this are not easy and signals are weak. It cannot be stressed too often that the opportunity to work any particular DX station, *when the strong ionization is in the right place*, does not last very long. If, say, a London station hears a Scottish station working into Poland, it does not follow that it is the best time for him to try as the very intense ionization necessary for these contacts appears to be small in area, and, owing to the Earth's rotation, will sweep over the back-scatter region.

It must be understood that the general auroral ionization

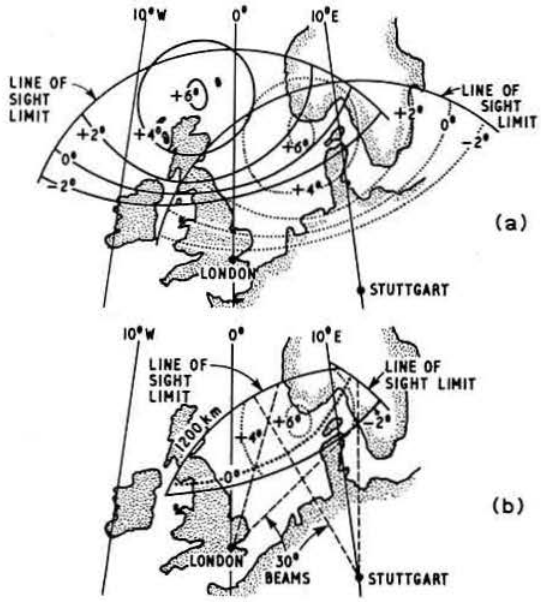


Fig. 7 (a, b). This shows the plan field orientation patterns for stations in London and Stuttgart, the overlap area, and the respective operators' beam headings at the times of contact. The line of sight limit is taken as 1200 km beams (2m) 30° wide. The dotted line is specular reflection for the London station.

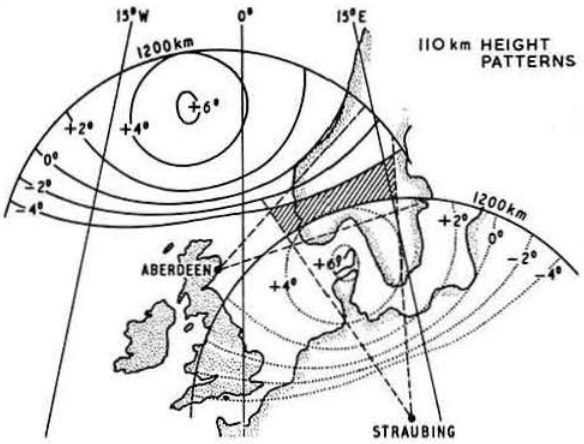


Fig. 8. This shows the plan field orientation patterns for Aberdeen to Straubing. Although signals were received under these conditions it takes the spur of choice DX to do.

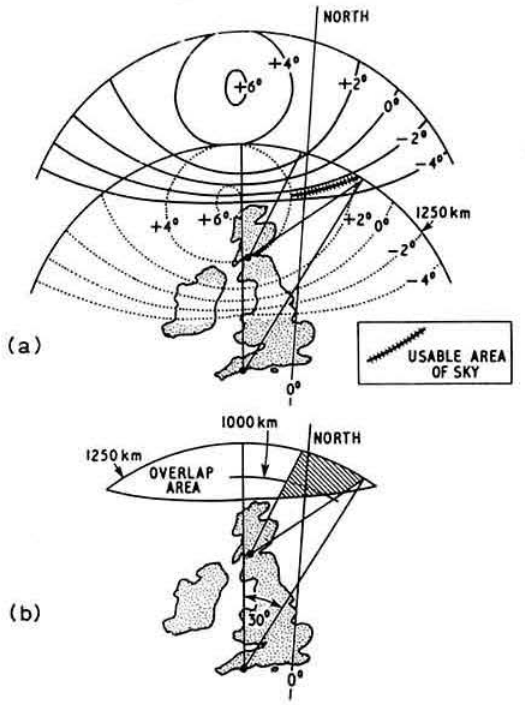


Fig. 9 (a, b). This shows the difficulties encountered by South Coast stations trying to work Scottish stations. The 1250 km line of sight limit is stretching everything to the utmost. In practice, about 1000 km is more practical as a limit. The example shown is based on Glasgow and Plympton.

region is very large in comparison with the area that can be used by any two stations owing to their field orientation requirements. Also, the Earth's rotational and magnetic axes do not coincide, which means that the ionization area is swept from east to west, and, to a lesser degree, north to south, as far as Europe is concerned. As the *Kp* planetary figures climb, the aurora spills out farther south anyway. This total effect therefore brings suitable reflection areas into view for any particular pairs of stations at only certain phases of the opening. This is about the only explanation which appears to fit the observed facts. However, opinions may well diverge on this point and further observations will be required before a more complete understanding of this phenomenon is possible.

The wax and wane effect could also be superimposed on this east/west, north/south drift, and tends to break up the DX pattern into geographically workable areas. Also the beam heading directions given by some observers seem to fit reasonably to what we would expect, although many reports are too vague for accurate assessment.

The Problems of the South Coast

Some operators on the South Coast believed that aurorae would offer them the chance to work Scottish stations. In very isolated instances, this proved true, but for many others it was frustration in the extreme. Scottish stations could be heard but not worked. Why was this? To take a typical case, G3JGJ (Plympton, South Devon) tried very hard without success to contact Scotland. He could hear them but could not raise them. First, the plan field orientation patterns of Fig. 9(a) show a long narrow overlap. Although specular reflection is possible for the Scottish station, the South Coast station is heavily penalised. To assume an aerial beam width of 30° at 145 Mc/s is reasonable for both stations, and this shows that even the South Coast station can only use about half the possible sky area (so signals will be weaker), and the Scottish station can only illuminate about half this area (so signals will be weaker still), therefore this rather small area of total overlap with very poor orientation angles is all that is available. Of course, we are assuming that the Scottish station is looking north-east (in practice, they tend to look north-east to just south-of-east), as the continental DX demands these beam headings. So the total overlap area is probably less than that shown, reducing signal levels still more. Although these contacts are theoretically possible, in practice they seldom occur, and those that succeeded could only do so at almost the end of any opening. The writer believes that this was because the Scottish station's DX was rapidly fading out, and the band conditions then enabled the very weak South Coast stations to be heard.

It is only just possible from, say, Brighton (South Coast) to work Glasgow or Edinburgh (Scotland), and from Jersey (Channel Isles) only the Midlands up to Leeds, could be worked, under average auroral conditions. Very recently, however, during the V.H.F. National Field Day on 3 and 4 September, 1966, Scotland was worked both on 2m and 4m. These contacts may well have been by a "forward scatter" mode, as the operator at GC3POI/P reported very high signal levels—S8—from GM3NHQ/P near Dundee, and it is very hard to see how this could happen under back scatter conditions as the plan field orientation overlap is so small with very poor angles—4° off specular at the best. Also, the Scottish station would have had to look about 30° West

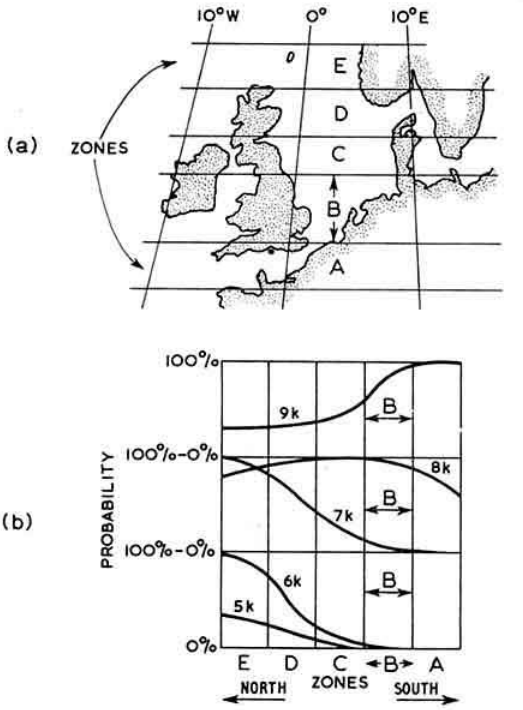


Fig. 10. This shows the probability of stations in Zone B working stations in other zones in relation to the *Kp* indices. (After Lange-Hesse).

of North which is altogether a most unlikely set of conditions for an S8 signal. The many southern stations who failed to contact Scottish DX, like G3JGJ in Plympton, have contributed considerably to a better understanding of the possibilities of reflection by field aligned ionization.

Other Theories

The point of who can work whom has been taken up by Dr. Lange Hesse, and a statistical analysis showed that for stations situated in zones where the magnetic field angle of dip is almost equal, their ability to contact other zones is a direct function of the *Kp* factor. Fig. 10 shows Dr. Lange Hesse's zone map of Northern Europe, and the per cent (*Kp*) chance of stations in Zone B to contact other zones. Of course, there are weaknesses in all the theories expounded if they are applied to some particular contacts. However, at times it would appear as though some form of forward scatter or low angle refraction propagation mode has taken place.

The point has been made that the particles are spiralling in near-vertical columns, and it may be possible to refract as distinct from reflect signals at low angles. It has been suggested that, due to the Earth's magnetic field being severely distorted under strong auroral conditions, a form of ionized base may in fact occur—something like a sporadic *E* cloud, or inverted mushroom. The Scientific Studies Committee had hoped to arrange a full scale test of forward scatter aurora from Lerwick to Iceland, but, at the time of writing, this has not been possible. However, we believe that auroral forward scatter is possible.

The path from GM2FHH (Aberdeen) to Straubing is rather a difficult one, whereas that from GI3GXP (Kilkeel) to DJ7GK (München) although of greater distance, is, from the field orientation point of view, an easier path. Most people can work Sweden, which again is due to more favourable field orientation.

There are two matters which are of interest, although negative in both respects. The first was the idea of locating aurorae by using the GEE navigational equipment. This was a complete failure, first because the field orientation patterns were not understood at that time, and second because of the wide bandwidth of the system—the echoes, if any, were too weak to be seen. However, if the system is still working at the next sunspot maximum, it could be tried again, from a better

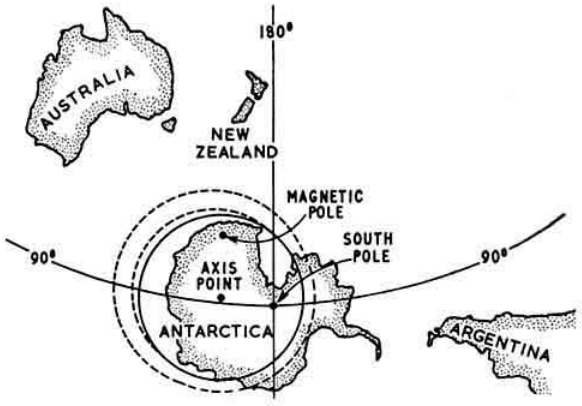


Fig. 11. Southern Hemisphere auroral zone. The dotted area is approximately the peak visual aurora. The magnetic distortion gives a pronounced auroral dip towards the Indian Ocean. The considerable distance from the auroral zone to Australia and New Zealand perhaps explains why no 2m aurora have ever been recorded there.

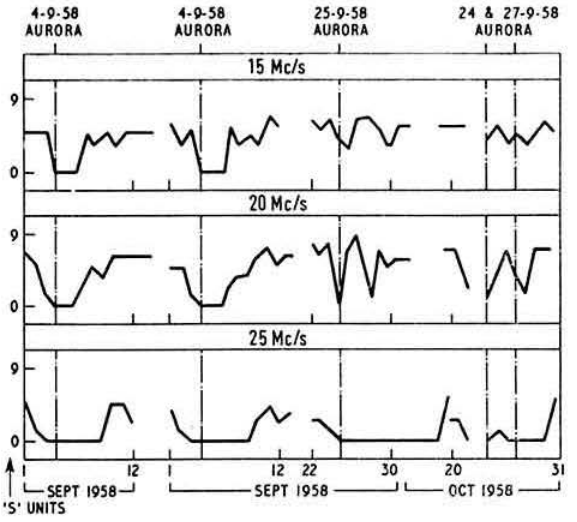


Fig. 12. Graphs of WWV Washington, USA, as received by different observers in the UK on 15, 20 and 25 Mc/s. The signals are recorded once per day.

location, with an improved receiver. The other point of interest was from the southern hemisphere. We asked the Australian and New Zealand Societies whether any aurorae had been reported at the times of the big European openings. The answer on 2m was NIL! One glance at the map, Fig. 11, shows that they are rather a long way away from the auroral zone so the field angle of dip would not be very favourable. However, in that sense it is good correlation.

H.F. Effects

During auroral activity the h.f. bands are affected, and, in fact, can be disturbed for many days. Solar flares cause fade-outs and large spot groups crossing the Sun's central meridian are responsible for the associated geophysical disturbances that follow. This is shown in Fig. 12 which illustrates the effects on WWV on 15, 20 and 25 Mc/s, over the Washington to UK path. The most salient feature is that the higher frequencies are disturbed for the longest periods—the examples shown are typical of many.

There are, of course, many aspects of radio aurorae we have not investigated, and still more that are very puzzling, but with the future co-operation of radio amateurs, as in the past, we hope that many of these points can be sorted out.

Conclusions

One could ask what are the most important points of the IGY auroral results. One fact is that many observers missed opportunities by not understanding the requirements of field orientation, and so spent most of their time trying for extremely difficult contacts. Many people, especially those in Southern England, just seemed to beam north and try for Scottish contacts, when they could perhaps have obtained better results if they had looked more to the east and tried for Southern Germany, Poland, Czechoslovakia, etc.

Annual and daily time patterns have now been established, and this should prevent people from wasting their time listening during unprofitable periods. It is hoped that the facts and theories expounded in these articles will help operators to understand the mechanism of auroral reflections a little more fully and thus derive greater benefit from any openings. The Scientific Studies Committee wishes to record its appreciation of the magnificent efforts of all

(continued on page 793)

QRM—The Cure

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

THIS is not an exhortation to go s.s.b., but a collection of simple (and cheap) anti-interference devices which, if adopted by all amateurs, would make contacts less of a chore. There seems to be a widely held idea that if amateurs are " close," interference is a certainty when operating on the same band. Having lived in peace with three other amateurs, all living within 200 yards, the writer feels it is on a par with the myth that TVI can never be cured. True, it may involve a little effort, but as with TVI the difficulty is liable to be social, not technical.

Experiences

As mentioned in a previous article [1], a simple speech clipper preventing over-modulation limited G3JGO's transmission to effectively 8 kc/s of the band at 180 yards away; there was no question of turning the clipper gain down to get a favourable report as the first he knew of the test was when G3HJK broke in to the QSO after doing his measurements!

One local station was found to be consistently splashing over 50 kc/s or so, even when received on a short wire which precluded overloading of the receiver. Not being too keen on closing down, or calling him into every contact, the

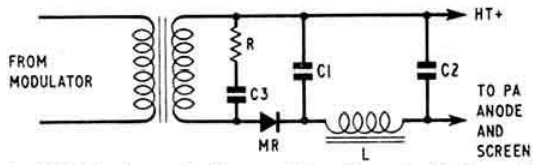


Fig. 1. High level speech clipper, with values suitable for a 10W transmitter. R and C3 are included to damp out transients which occur when the diode is cut off. Their omission may result in damage to the diode and/or the modulation transformer. C1, C2, 0·005 μF; C3, 0·05 μF; L, 1H, 50 mA; R, 100 K ohms; MR, ZS78, BY100 etc. (800 p.i.v. at 100 mA).

writer eventually decided to take the bull by the horns. On the next occasion when he was able to have a personal (and private) chat, with some trepidation he said, " I'm sorry to say, OM, that frankly you splatter a bit. Can I help you to do something about it?" The upshot was that they fixed up a simple high level clipper, Fig. 1, and splatter became a thing of the past. Subsequently, the amateur in question asked G3JGO for the source of the choke used (obtained surplus for the sum of 1s.).When G3JGO asked if he'd burned the old one out, he explained " Oh, it's not for me, but G4XYZ is inclined to splatter a bit! "

One further example. One Sunday morning G3JGO was doing some odd jobs in the shack with the receiver on, using a few yards of wire slung round the shack as aerial. He was interested to hear a nearby station, 250 yards away, on A1, and out of curiosity measured the width of his key clicks—about 300 kc/s! He raised this with him, again in person, and the reply was that in the amateur's opinion they were too close to expect any better. As the theoretical figure, even for high speed Morse, is less than 100 c/s, the writer felt some improvement could be made. Heedful of the proverb about shoemakers' children, he checked over his own transmitter, and deciding it could be better, incorporated the excellent system of differential keying described by G3FLP [3], Fig. 2, which allows one to eliminate clicks and chirps simultaneously. Thus prepared, he made contact the next Sunday, and asked for a report on the width of his key

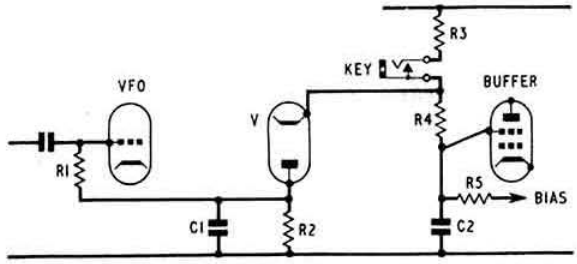


Fig. 2. G3FLP keying system. The values are suitable for EF91 type valves, with h.t. of 300V and bias −45V. C1, 0·001 μF, ± 10%, mica; C2, 27 pF, ± 10%; C3, 0·1 μF, 350V wkg, paper; R1, R2, 100 K ohms, ± 5%, ½ W; R3, 470 K ohms, ½W; R4, 3·3 K ohms, ½W; R5, 56 K ohms, ½ W.

clicks, to the point of inaudability. The report was gratifying: 5 kc/s, which, in view of the absence of precautions against receiver overload, and the effective receiver bandwidth, represents a very narrow signal.

Add-on Compressor

Note that in all the above instances, a marked improvement was obtained very simply; indeed such precautions are legally required by our licences. However, some of us are in the position of having commercial rigs which we are not disposed to modify, or, as in the case of G3JGO's DX100, there just isn't room. For this reason the little unit shown in Fig. 3 was developed. It consists of a simple transistor preamplifier which can be inserted in the crystal microphone lead. Non-linear feedback is provided by the parallel silicon diodes so that heavy feedback occurs on peaks, which are thus compressed. If used with care, it is possible to prevent peaks overmodulating and hence eliminate splatter, but it should not be treated as a normal speech clipper unless the following stages have adequate l.f. response and a sharp h.f. cut off at about 3 kc/s, i.e., don't bellow like a trawler skipper and expect not to splatter! The device is also suitable for use with a tape recorder.

The home-constructed rig is, of course, much more adaptable, and it is suggested that some sort of filter is also incorporated. The reason for this is that all microphones have some response above the 2·5–3 kc/s limit of the receiver and so as this will only produce interference, it should be removed. However, the cut-off of plain CR filtering is much too gradual, producing either a " woolly " effect or insufficient removal of " splash." A decided improvement is the feedback type of CR filter [5]. A typical set up is shown in Fig. 4, and its response is compared with

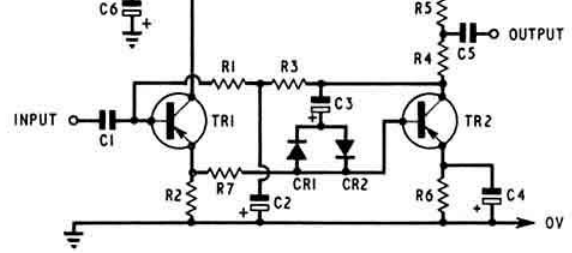


Fig. 3. Transistor preamplifier/compressor. If necessary alter R6 until TR2 draws a collector current of 1mA. R7 may be varied over the range 1 to 10 K to adjust the gain to suit the particular crystal microphone used. The output may be taken from the collector of TR2 if the full output of 1V peak to peak is desired. It is desirable to shield the unit and use coaxial input and output to prevent r.f. feedback. R1, 1 M ohm; R2, 10 K ohms; R3, 470 K ohms; R4, 5·6 K ohms; R5, 500 ohms; R6, R7, nominally 2·7 K ohms; C1, 0·04 μF paper; C2, 1 μF elect.; C3, C4, C6, 10 μF elect.; C5, 0·04 μF paper; CR1, CR2, ZS30, OA202 etc.; TR1, TR2, OC44 etc.

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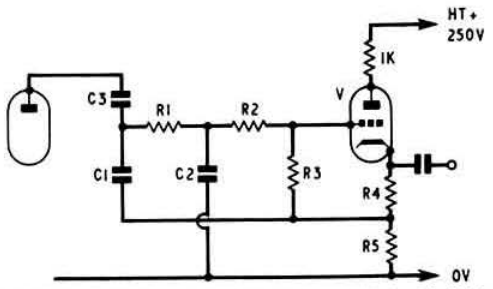

Fig. 4. An audio filter with values for a cut-off of 3 kc/s. R1, 47 K ohms, ½ W; R2, 100 K ohms, ½ W; R3, R4, 10 K ohms, ½ W; R5, 47 K ohms, 1W; C1, 500 pF; C2, 0·02 μF; V, EA50.

that of two CR sections in Fig. 5. A half 12AU7 is suggested as the other half may be used in place of a 6C4, often used as a phase splitter, so that no extra valves are required. For those interested in experimenting with this excellent circuit, and its high pass equivalent, the design equations are in the appendix.

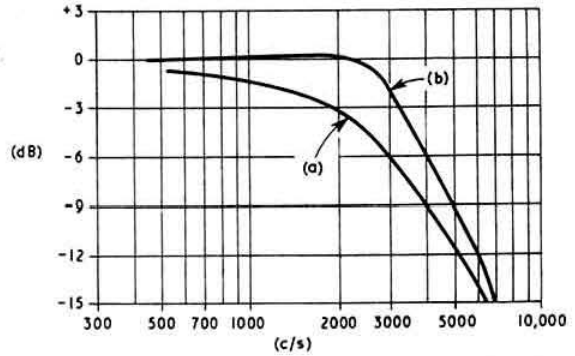

Fig. 5. Response of a two section CR filter (a) and a feedback filter (b) compared.

Receivers

Now what about receivers? One device which has been sadly neglected except by G6XN [6] and references in Technical Topics, whilst reams have been written about half lattice filters, is the Stenode. All that is necessary is one resistor, one capacitor, a switch (perhaps) and a *Q* multiplier. Normally, if the selectivity is sharpened up on a 'phone station, the result is so woolly that the intereference may be preferable! However, if the bass cut circuit shown in Fig. 6 is incorporated (with the switch to restore things to normal if wished) quite acceptable quality results, albeit with some loss in audio gain. Because the transmission is detected against an outsize carrier, similar to s.s.b., this carrier takes charge and prevents detector inter-modulation, the net result being that interference is lost, and is not restored by the audio correction circuits. Results are certainly amazing. The writer's old Command receiver that was literally picked off a junk heap, suddenly became needle sharp, " Oh, he's 1 kc/s off net is he, that explains why I didn't hear him," and even an AR88 shows a marked gain. If this sounds fantastic, try it, it won't take half an hour, and see if it doesn't give your old R1155, TCS or Command set a shot in the arm!

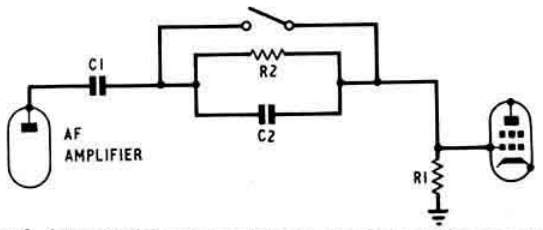

Fig. 6. Stenode correction circuit. C1, existing coupling capacitor and R1, existing grid resistor. R2 is R1 × 8, and C2= $\frac{400pF \times 10^6}{R2}$

Another aspect of receivers which is now receiving some overdue attention, is the susceptibility to strong adjacent channel signals. Unfortunately, many amateurs have considerably degraded their receivers performance by adding high gain valves at the front end, either as pre-selectors or by replacing the existing r.f. valves by high g_m television pentodes such as the 717A, 6AC7 and EF184. Sometimes the results are startling, as when one amateur discovered a background of the BBC Third Programme on every single station, but often the only result is that local stations seem to splatter, when in fact this may not be the case. The following experiment was made to see just how bad this effect can be. The writer was rather shaken by the results, and suggests anyone who doubts the above should repeat it.

The receiver was tuned to a quiet spot in the 28 Mc/s band, with a.g.c. on and the a.f. gain set so that the noise

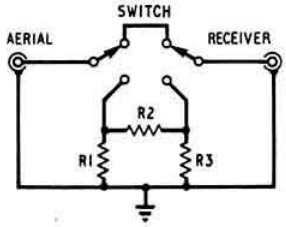

Fig. 7. Attenuator Circuit.

Z_o	R1/R3	R2	Atten.
75	100	330	19db
200	240	1000	20db
400	470	2000	20db

All resistors ± 5 per cent high stability, Sw, good quality toggle or rotary switch.

The above attenuations are practical approximations to a voltage loss A of 10 : 1, i.e., 20db. For other levels of attenuation and intermediate impedances the relevant formulae are

$$\text{Atten.} = 20 \log A$$

$$R1 = R3 = Z_o \cdot \frac{(A+1)}{(A-1)} \qquad R2 = Z_o \cdot \frac{(A^2-1)}{(2A)}$$

As in the examples, some compromise is necessary to comply with preferred resistor values.

could easily be heard. The exciter was switched on, not connected to the receiver, and tuned away from the receiver frequency till the rise and fall in noise level as the exciter was keyed was only just perceptible—this was at 200 kc/s off frequency in his case! Next the two 6SG7's in the receiver r.f. stages were replaced by 6AC7s, the trimmers readjusted to compensate for the change in valve capacitance, and the a.f. gain readjusted to give the same audible noise level. Now when the exciter was keyed the change in noise level, far from being just perceptible sounded like a very readable signal on the frequency, although the exciter was still tuned to a frequency 200 kc/s away! Since a local station running 150W into an aerial can put a comparable signal into his receiver, " souping up " the receiver with higher gain valves is suicidal, indeed the standard valves are none too good in this respect. A simple gadget to help out under conditions of strong local signals is the attenuator shown in Fig. 7. When switched in, this reduces all signals, but as cross modulation is a voltage dependant effect the cross modulation will be reduced very much more than the wanted signal, so that the signal/interference ratio will be improved. One byproduct is the ability to reduce an incoming

signal by a known number of db and see just how accurate the S-meter is!

Conclusion

None of the ideas above represent the ultimate, since the aim has been to keep expense to a minimum. Even so, if every amateur (yes you, not just the other fellow), were to set his own station in order in accordance with them, much of the QRM which plagues our bands would cease to exist. How about it OM?

References

The following articles give information on recognizing station defects responsible for interference, and explain the devices used in greater detail.

[1] " A Simple Speech Clipper," RSGB BULLETIN, Feb. 1964.
[2] " Speech Clipping and Volume Compression," RSGB *Amateur Radio Handbook*, p. 277.
[3] " Break-In Keying System," *Short Wave Magazine*, Nov. 1954.
[4] " Break-In with the Geloso Signal Shifter," RSGB BULLETIN, March 1960.
[5] " Low Cost Audio Filters," *Electronics*, 10 April, 1959.
[6] " The Stenode," *Wireless World*, July 1962.
[7] " Checking Signal Quality with the Receiver," *QST*, March 1963.
[8] " Criticising C.W. Signals," *QST*, June 1963.

Appendix

Theory of the Active Filter.

The response of a two time constant network is given by

$$A = \frac{{\omega_o}^2}{{\omega_o}^2 - \omega^2 + 2j\zeta\omega\omega_o}$$

where $\omega = 2\pi \times$ frequency

$\omega_o = 2\pi \times$ cut off frequency (f_o)

and ζ (zeta), the damping factor, determines the sharpness of cut off. Normally the minimum damping occurs when the two sections are separated by a valve, otherwise the second section shunts the first and the cut off is less sharp. By applying feedback the shunting can be neutralized, or by applying more feedback it can be over-compensated and a sharper cut off produced. A useful value of ζ is 0·6.

Referring to Fig. 4.

$$\gamma^1 = \frac{R1 + R2}{R1}$$ (a value of 2 is convenient for varying the frequency)

$$\text{and } \alpha = \frac{r_a + R5}{(\mu + 1)\,R5 + r_a}$$ (0·08 in this instance)

$$\omega 1 = \frac{1}{R1C1} \quad \omega 2 = \frac{1}{R2C2} \text{ and } {\omega_o}^2 = \omega 1 \omega 2.$$

i.e., $\omega 1 = k.\omega_o$ and $\omega 2 = \frac{\omega_o}{k}$

$$\text{and } k = \frac{\zeta + \sqrt{\zeta^2 - \alpha\gamma^1}}{\gamma^1}$$

thus in this case $k = 0{\cdot}524$

setting $\omega_o = 2\pi \times 3000$

$$C1R1 = \frac{1}{0{\cdot}524 \times 6\pi \times 10^3} \text{ and } R1 = 100 \text{ K ohms} = 10^5 \text{ ohms}$$

$$\therefore C1 = \frac{1}{0{\cdot}524 \times 6\pi \times 10^8} \quad F = 0{\cdot}00106\mu F.$$

$$C2R2 = \frac{0{\cdot}524}{6\pi \times 10^3} \quad R2 = 100 \text{ K ohms}$$

$$\therefore C2 = 0{\cdot}000278\mu F.$$

The Society's IGY Aurora Programme

(continued from page 790)

observers who contributed to the programme, especially those who worked for many hours to produce seemingly unspectacular results.

Forward Scatter Aurora

This is obviously something which needs more attention. At present, almost nothing is known of this mode of propagation by radio amateurs in Europe, but theoretically, 2000 km contacts ought to be possible, although perhaps the right opportunity has not yet occurred.

It is very difficult to isolate any particular observer's work as outstanding, but the monthly reports prepared for the BULLETIN by G4LX have proved of immense value as these are a complete chronicle of European auroral activity. Perhaps Olof Karlson, SM6PU, was one of the keenest and has reported more auroral occurrences than any observer, and these have been verified by reference to magnetic records.

Looking ahead, with the current sunspot minimum just behind us, it appears that the first requirement for the amateur seriously contemplating future auroral activity, is a special map of Europe on which plan field orientation patterns, computed correctly for various locations can be overlaid. These will show at a glance what per cent chance, and beam headings, one needs to effect a contact with these areas. The work involved in making this is very large, but it would be of great value to the amateur, in helping him to make DX contacts. It is therefore our intention to prepare such a map, but, owing to the problems involved, the end product is, at a very conservative estimate, two or three years away.

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High Latitude Particles and the Ionosphere. Abstract. " The Development of the Radio Aurora." D. Brooks and T. R. Kaiser.

Archiv Der Elektrischen Ubertragung. " V.H.F. Bi-static Aurora Backscatter Communications and the relation to the location of the Visual Aurora Displays." Dr. Günther Lange-Hesse and P. Czechokowsky.

Thirty Years of Television

The full story behind the question " Who really made television work?" was told in " The Discovery of Television " on BBC 1 on 3 November—30 years and one day after the world's first high-definition service started at Alexandra Palace. Produced for Mullard Ltd in association with the BBC, the film in essence records the struggle between John Logie Baird, who achieved the first television pictures, and the brilliant EMI research team whose system is in use today. The film attempts to put Baird's contribution in perspective and with detailed documentation describes how the EMI team, under Isaac Shoenberg, created the modern electronic system between 1931 and 1936.

Sir Noel Ashbridge and Douglas Birkenshaw, two of the BBC engineers deeply involved in television at the time take part in the production as do Professor J. D. McGee, whose team invented the camera tube, and Dr. V. K. Zworykin who invented the first electronic television camera. A fascinating story, for which the producers Messrs Jay, Baverstock and Milne, deserve full credit.

a little Flutter on V.H.F.

Part 2—Electronics to the Rescue

By P. W. Sollom, O.S.B., B.Sc.(Eng.), Ph.D., G3BGL*

The first part† of this article described a type of fading which may be caused on reception of v.h.f. signals and which sounds like the chuffing of a steam train owing to the way in which the background noise surges as the signal fades. Two elaborate experiments were made at Douai Abbey to determine the position and flight path of an aircraft causing a particular steam train fade, and the measurement techniques employed and results obtained are described in this part of the article.

THE geometry of the radio path from Lille to Douai Abbey is shown in Fig. 1. An aircraft 150 km from Douai Abbey and 5 km off the path would have a bearing 2° different from the direction of Lille, and the bounce-path via the reflection from the aircraft would be 100 wavelengths longer than the direct path. At 70 km distance, a movement to 4 km off the path would lengthen the bounce-path by 100 wavelengths but the bearing would be 3½° off that of Lille. These figures are obtained from the Path Length Data Chart described in Part 1 of this article. On that Chart the aircraft positions that would give a particular value of path lengthening were shown to lie on an ellipse, and a number of typical *curves* were given, each being a portion of an ellipse. A number of *straight lines* on the chart showed the directions along which the bearing of the aircraft from the direction of Lille would have certain values. Since a position in space can be accurately specified by the point of intersection of two lines (straight or curved), all that is necessary to find the position of the aircraft which causes a steam train fade is to find *which* two lines and note their point of intersection. Two measurements are required: one of the angular position of the aircraft, and the other of the number of wavelengths by which the bounce-path has been lengthened. This was the idea behind the first experiment.

The Plot Thickens

It is a simple matter to count the number of fading cycles from the zero-beat position on a steam train recording, but it is difficult to measure angular position to an accuracy of one degree at a wavelength of 2m: a really enormous aerial would be required. But just as a slot aerial still works when the metal sheet in which it was cut is removed leaving only the skeleton edge of the slot, so an aerial will still have a very sharp beam if all the middle of the system is omitted and only the edges are left active, the edges being as far apart as possible. The arrangement is called an " interferometer." The only point is that there is then not just *one* very sharp beam, but a whole " bunch of bananas " for its polar diagram. However, in the present case this is useful.

The arrangement actually used is shown in Fig. 1. Two five-element Yagis were mounted on separate masts some 15 wavelengths apart and their separate coaxial feeders were brought into the shack. A height of 10 wavelengths above ground was chosen to get a good signal from Lille. The important thing in an interferometer is that *both* aerials must feed *equal* signals into *one* receiver—a detail that requires careful attention to balancing and matching. Some adjustment is also required to ensure that the two contributions to the receiver input add up to the best advantage, so a movable connection was provided on a length of open wire twin line. In practice, the tapping point was adjusted for a cancellation of the direct signal from Lille (20db cancellation was achieved). This was found to make steam trains show up more clearly on the recordings. Movement of the tapping point is the electrical method of " turning the beam " of the interferometer to align a maximum or null of its pattern with a given direction, without putting the whole aerial system on a circular railway track like Jodrell Bank.

Up the Pole

An aircraft crossing the Lille-Douai Abbey path would have to fly through the " bunch of bananas," and therefore the fading depth (amplitude of the ripple) caused by the plane-bounce signal would be " modulated " by the interferometer pattern. A second receiver and separate aerial would be needed to check that the bounce signal was not varying for some other reason (aircraft attitude, etc.), both receiver outputs being recorded simultaneously by separate pens. A theoretical recording is shown diagrammatically in Fig. 1. It would correspond to an aircraft moving across the radio path at a distance of 6 km; the bounce-path would then be seven wavelengths longer at the position where the bearing was 4° off that of the direction of Lille. The aircraft speed of 120 km/hr is calculated from the time scale of the recording and the known positions of the aircraft.

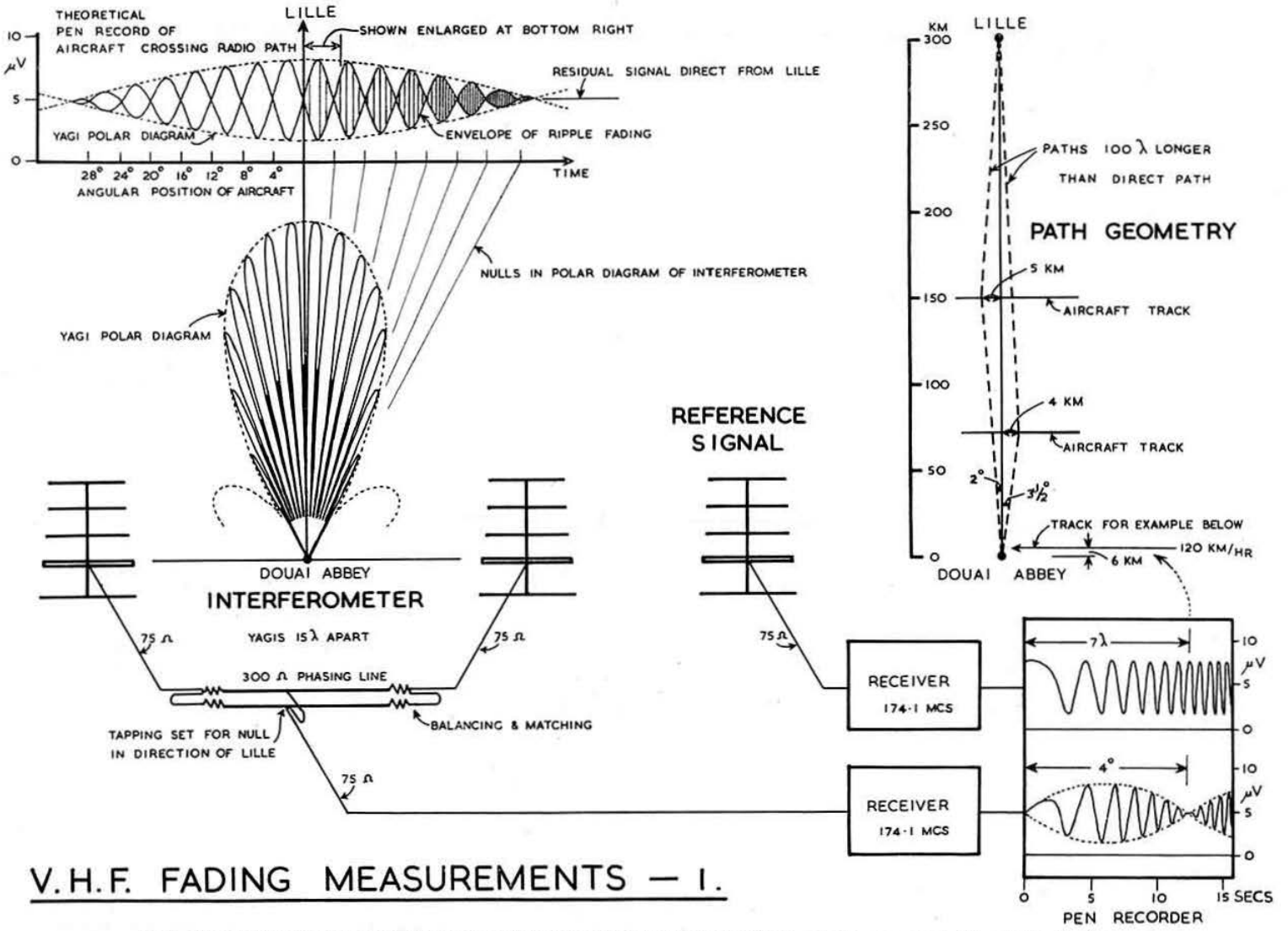
Days became weeks, and weeks became months and still the steam trains refused to be modulated! Surely some aircraft cross the path near enough to the receiver for their angular positions to be become evident on the recordings! At last a solitary recording was obtained showing " modulation," but it did not have the nice regular pattern of the " bunch of bananas"; it was vague and there were spurious nulls too. Clearly something was wrong with the experiment!

Making it Worse

A golden rule when chasing harmonics, TVI, or steam trains is: can one find some adjustment of the apparatus that makes the trouble worse—if so, do the opposite adjustment, unless you really want the steam trains! It was noted that the steam trains were bigger when a null of the interferometer was steered towards Lille, thereby reducing the strength of the direct signal. Evidently this did not simultaneously reduce the strength of the bounce-signal by the same amount, and so the bounce-signal must have been arriving from some quite different direction.

Some rapid tests followed this deduction. Steam train fades were found to be much bigger on the reference aerial, which was at half the height of the interferometer, than on either of the interferometer Yagis alone. A piece of wire in the shack was tried as an aerial: Lille was almost inaudible, but the steam trains were very much in evidence. Next, the

* Douai Abbey, Woolhampton, Reading, Berkshire.
† Part 1, RSGB BULLETIN, November 1966, p. 709.



V.H.F. FADING MEASUREMENTS — I.

Fig. 1. The arrangement for the first experiment to find the position of an aircraft causing a particular steam train fade. All the details are discussed in the text. The two Yagis of the interferometer were at a height of 10 wavelengths, 55 ft.

V.H.F. FADING MEASUREMENTS — 2.

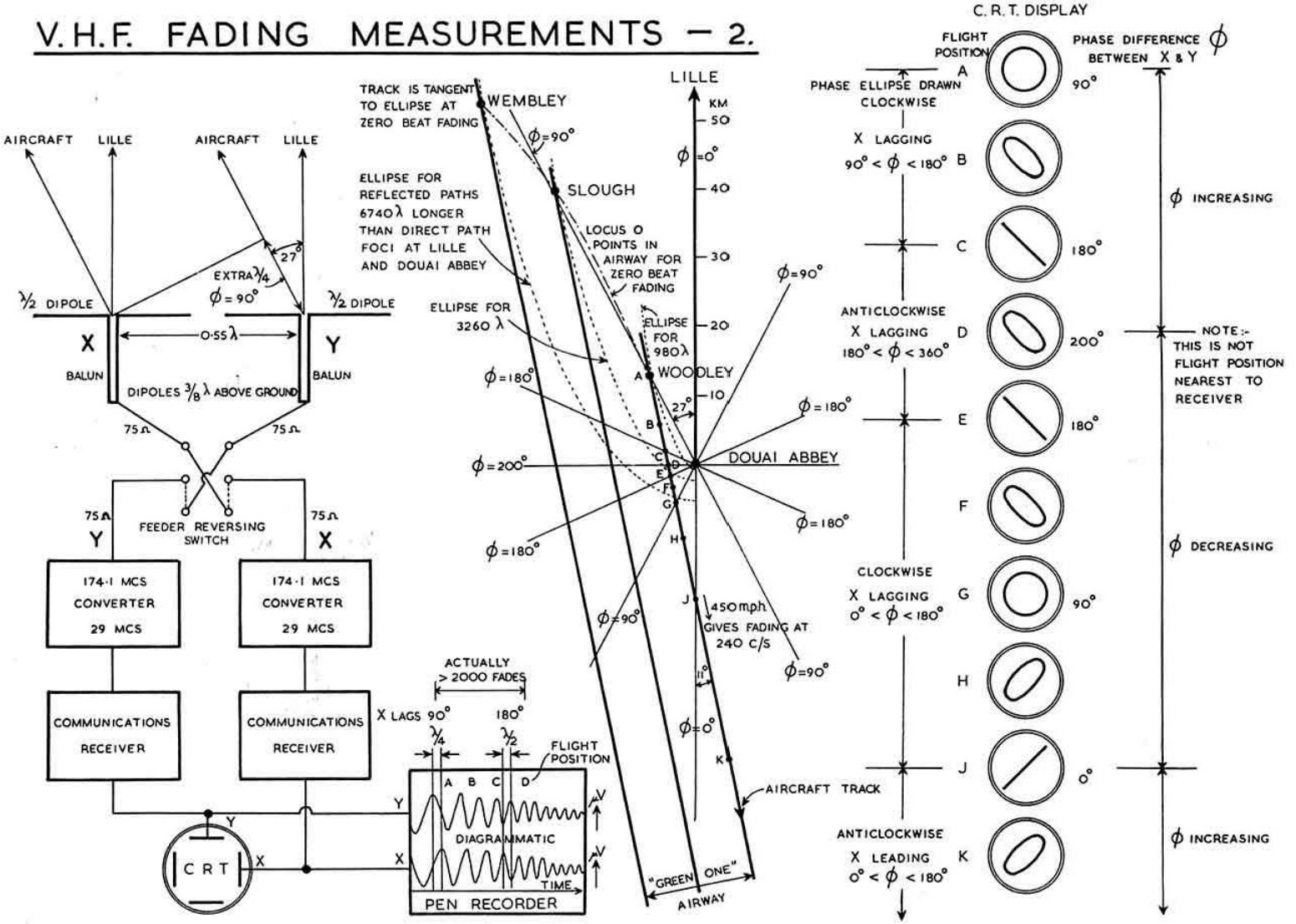


Fig. 2. The arrangement of the second experiment described in the text with explanatory diagrams of the results obtained. The phase relationships are shown in more detail in Fig. 4 (a) in which the labelled flight positions A-K correspond to this diagram.

two Yagis of the interferometer were connected separately to two receivers and their outputs were recorded simultaneously. It was noted that when drawing steam train ripples, the pens did not move in the same way at the same time. At one time they would be together (fading ripple in-phase), then drift apart until perhaps exactly out of step, then maybe drift together again. It seemed that the interferometer nulls might be recognizable as successive phase changes between the two recordings—but this idea proved too difficult to follow up, and would have involved considerable guess work.

The Fallacy

With the rugger ball and a stick for inspiration the problem was re-examined. Need an aircraft cross the radio path *between* receiver and transmitter to produce a steam train fade—as had been assumed in the first experiment? No! It might be making circles. Yet recordings like No. 86 (shown in Fig. 2 in Part I) suggest a very steady motion of the aircraft. Then how about aircraft whose tracks cross the transmitter-receiver line *beyond* either terminal? How about the " Green One " airway passing about five miles north of Douai Abbey and intersecting the radio path some 25 miles to the west, towards Lyneham? The airway is about 10 miles wide, and its direction makes an angle of 11° with the Lille-Douai Abbey path. In Fig. 2 three tracks along the airway are considered, one at each edge and one in the centre. Theory is given in the Appendix for finding the points in the airway at which zero-beat fading occurs. For the three tracks these points are: Woodley, Slough, and Wembley; they are the points at which the aircraft track is a *tangent* to some particular size of ellipse which has foci at Douai Abbey and Lille. The direct path between the foci is about 175,000 wavelengths long; the bounce path via Woodley is 980 wavelengths longer than this; via Slough it is 3260 wavelengths longer, and via Wembley 6740 wavelengths longer. These figures are approximate but give an idea of the scale of the problem.

So the fallacy in the first experiment was the assumption that steam train fading is caused by an aircraft *crossing* the path somewhere *between* transmitter and receiver. Obviously this *can* be a correct assumption, but if the bounce-signal is too weak it may not be possible to observe the steam train. According to the text books the bounce signal depends (among many other things) on a factor $\left(\frac{1}{d_1^2 . d_2^2}\right)$ where d_1 is the transmitter-aircraft distance, and d_2 the receiver-aircraft distance. So the aircraft must be near one of the terminals of the radio path for the biggest effect.

Focus on " Green One "

The positions of Woodley, Slough, and Wembley lie roughly in the same direction from Douai Abbey, 27° off the direction of Lille. Fig. 2 illustrates the situation. Two dipoles, broadside to Lille, spaced 0·55 wavelengths apart centre to centre, receive in-phase signals from Lille, but 90° out-of-phase signals from the direction 27° off. This arrangement forms the basis of the second experiment to locate the aircraft causing a particular steam train fade. The dipoles were sited " in the clear " on the Douai School playing fields, at a height of 3/8 wavelength for omnidirectional reception of the bounce signals (see photograph, Fig. 3). The direct signal from Lille was, of course, very weak but a Nuvistor converter and AR88 receiver was now used for reception. It must be emphasized that *each* dipole has its own converter, AR88, and recording pen; the directional properties of two spaced dipoles are *not* being used here: each dipole is omnidirectional and is separately recorded. Upon setting up the equipment, the following points were soon noted:

(i) The steam train fading on the two channels was very rarely in-phase.

Fig. 3. The dipoles employed to locate the aircraft causing a "steam train" fade.

(ii) Reversal of the feeders to the converters by a switch confirmed that the phase difference was due to the signals fed into the receivers.

(iii) The bounce-signal often remained evident far beyond the steam train flutter, through a sub-audible growl, and on into the audible spectrum as an appreciable heterodyne.

(iv) It was impossible for the pen-recorder to respond to the flutter at all adequately.

Clearly, the steam trains had now been enhanced enormously, and it was a case of " electronics to the rescue " to see what was happening. It was necessary to construct two very low frequency deflection amplifiers before an oscilloscope could be focussed on the Green One airway.

Westbound Clipper

A typical westbound flight from London Airport will now be followed. The bounce signal is too weak to be detected until the aircraft has reached a certain altitude at which it becomes fully illuminated by the transmitter at Lille. In the case of a high-flying jet, the rate of climb is so steep that the bounce-signal builds up very rapidly and usually does so well before the aircraft reaches the zero-beat position on its track. Consider a track along the southern edge of the airway: the zero-beat will be at Woodley, position A in Fig. 2 and Fig. 4(a). Before Woodley, the fading waveform in receiver X will " lead " on that in receiver Y by an angle a little less than 90°, and a near-circle will be drawn on the cathode ray tube in an anticlockwise direction (for the normal connection of the plates of a c.r.t.). Fig. 5 shows an actual photograph of the c.r.t. as an aircraft climbed into the illumination from Lille; the spiral shows the build up of the bounce signal, its generally circular shape shows the phase angle between the fading in the two receivers, and the Lissajous figure on the lower trace against a 50 c/s reference shows that the flutter rate was about 17 c/s at the time of the photograph. The spiral is drawn clockwise because the Y_2 plate of the c.r.t. is in use for this display. As Woodley is approached the rate of drawing the circle slows down to zero-beat after which the circle is immediately drawn again *clockwise*: the bounce-path which has been shortening up to Woodley is now lengthening.

C

V.H.F. FADING PHASE ANGLE & FLIGHT POSITION

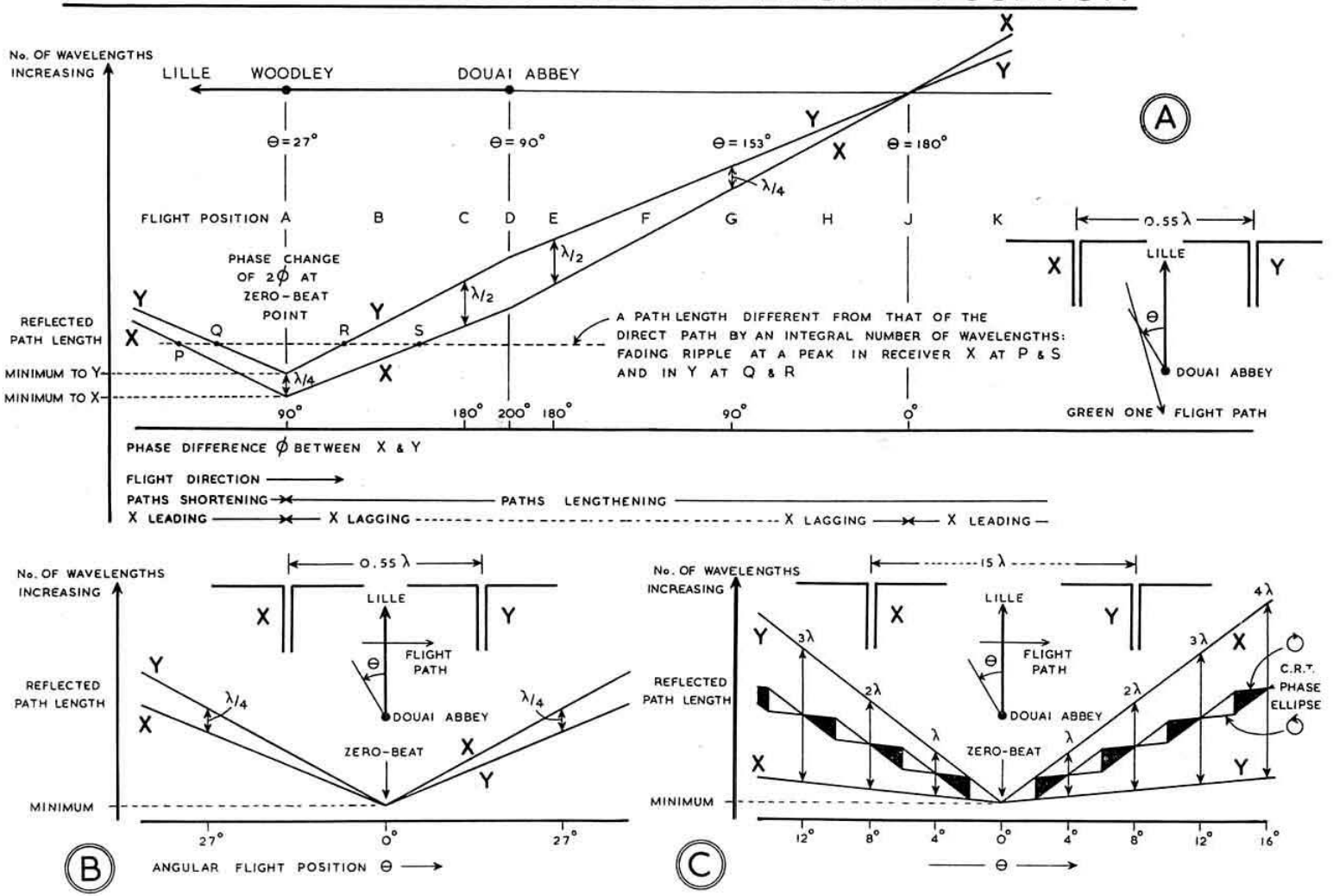


Fig. 4. (a) Diagram showing in detail how the movement of an aircraft along "Green One" causes the fading in one receiver to differ in phase from that in a second receiver using the aerial arrangement shown. The flight positions A-K correspond to those marked in Fig. 2.
(b) Detail diagrams showing the phase changes which occur as an aircraft crosses the radio path between receiver and transmitter when close spaced dipoles are used;
(c) when the interferometer Yagis are used as separate aerials.

At *B*, *C*, *D*, west of Woodley, the bearing θ of the aircraft from the Lille direction will be increased, and the phase delay ϕ of fading in *X* relative to *Y* is also increased, so the c.r.t. pattern becomes elliptical. If the aircraft is flying high and is passing near to the receiver, the maximum value of ϕ, 200°, will not be reached; the figures are drawn only for the horizontal plane for simplicity, but the real effect is taking place in three dimensions. At *D*, the position end-on to the line of the two dipoles (not the flight position nearest to the receiver) the phase angle ϕ starts decreasing progressively on through positions *E*, *F*, *G*, where it is again 90° and the c.r.t. pattern is again a circle. The whole movement takes about two minutes and as the aircraft is observed from the shack window to be passing positions *D* and *E* the c.r.t. pattern is being drawn at about 100 c/s.

By position *J*, the heterodyne has reached about 240 c/s: the total bounce path is lengthening at almost twice the speed of the aircraft—actually at twice the component of velocity along the radio path. Usually high flying aircraft will pass out of the illumination from Lille some way beyond position *J* and the bounce-signal will disappear. It is necessary to decouple the programme modulation of the signal heavily for these observations or it obscures the c.r.t. trace, but there is no difficulty in eliminating the 1000 c/s tuning signal which is radiated during much of the test transmission time. Measurement of the heterodyne frequency is most easily done by aural comparison: a tape recording of the note was compared with an audio signal generator to confirm the frequency of 240 c/s mentioned above.

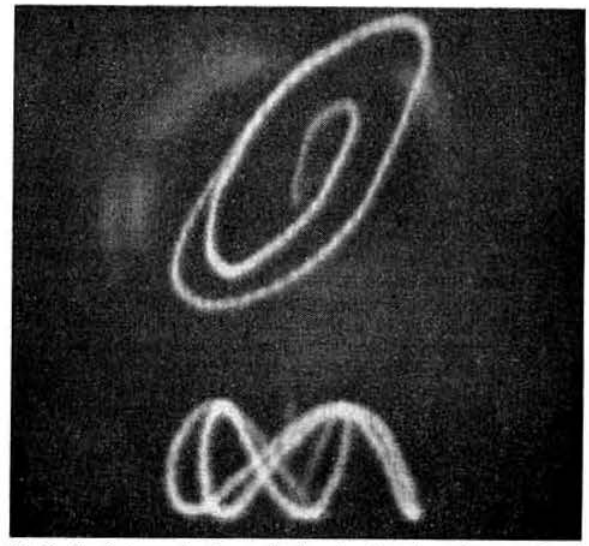


Fig. 5. A photograph of c.r.t display showing about three cycles of fading ripple with rapidly increasing amplitude (spiral trace) as an aircraft climbed into the illumination from Lille. The lower trace is a Lissajous figure showing the fading rate to be about 17 c/s.

Other Pebbles on the Beach

A short spell of observation of the c.r.t. display showed that aircraft on the Green One airway were not the only ones providing large bounce signals on the Lille-Douai Abbey path. An aircraft crossing the path *between* the transmitter and receiver gives a zero beat at a flight position for which the phase difference between the fading in *X* and *Y* is zero; the situation is shown in Figs. 4(b) and 4(c). An ellipse drawn anticlockwise on the c.r.t. just before zero-beat passes through a straight line at zero-beat to become an ellipse, *again* drawn anticlockwise, after it. There is a double reversal at the zero-beat point: (i) as the aircraft crosses the broadside axis of the aerials; (ii) as the shortening of the bounce-path changes to lengthening. As is shown by the Figs. 4(b) and 4(c), the spacing of the aerials has no effect on the crossover conditions, but wide spacing causes the phase ellipse to pass through rapid and confusing gyrations which defy detailed explanation.

There is an ambiguity in any simple display system such as has been described. For example, an aircraft on a track making an angle of 11° south of the direction of Lille would produce the same effects as an aircraft in the Green One airway. It is only when one can be certain of the continuity of the same bounce-signal all the way from zero-beat to an appreciable heterodyne and include somewhere a visual identification of an aircraft at a suitable height and flying an appropriate track that one can be reasonably sure of a full explanation of a particular steam train fade. This can be done at Douai Abbey with the aircraft on the Green One airway, but it explains only a relatively small proportion of the fading of this type that may be observed on the Lille signal.

Another approach to the problem is to predict theoretically when a steam train fade should occur, and listen to verify that it does occur. This has been done by W. A. Brady, ex-W2ABP, at Selsey in Sussex using the RSGB Beacon GB3CTC at Redruth as a source of signal. It was calculated that an aircraft above 18,000 ft., flying along Green One would be visible at Redruth and at Selsey when over the zero-beat position between Brecon and Lyneham. The beam at Selsey was directed towards the aircraft to give the optimum ratio of direct to bounce signal, and the direct signal remained just detectable. In a number of observations it was confirmed that steam train fading occurred in accordance with the predictions.

Steam Train of the Future

Evidently the bounce-signals from aircraft are effective, certainly as sources of interference, over a very wide radius. Steam train fading is a particular kind of interference where a signal interferes with itself owing to its reception by two or more paths, at least one of which is continually changing in length. There is good reason to think that an aircraft often provides a bounce-signal *stronger* than the normal signal direct from Lille at Douai Abbey, especially around the zero-beat position. Geometrically the directions of transmitter and receiver from the aircraft at this position, measured from the aircraft *track* are equal. This is the condition for a mirror-like reflection from the aircraft, and it may prove important in planning plane-bounce communications. In the event of cross winds, the aircraft course will differ appreciably from its track, and optimum reflection may occur elsewhere along the track. The wind direction plays another important role: it determines which runway is in use at an aerodrome, and hence controls the whole pattern of approach and departure manoeuvres. Under bad weather conditions, air traffic congestion may occur in the London area and the holding stacks at Epsom and Garston (Watford) might then contain several aircraft doing circuits while waiting for clearance to land. The potential duration of a plane-bounce contact is, therefore, not necessarily limited to a few minutes while an aircraft traverses a suitable section of airway. As air traffic is likely to increase in the future, such congestions would provide many opportunities for plane-bounce contacts. Who will be the first to exploit the steam train as a mode of communication? Any bets?

Acknowledgments

The author wishes to thank especially three people who have made this research possible: first, the Director of the Radio and Space Research Station, Slough, for making available equipment for use at Douai Abbey, and for permission

(continued on page 824)

A Power Supply for a Table Top Transmitter

By G. W. McDONALD, G2OX*

THE purpose of this article is to encourage the reader to incorporate new components when planning future constructional projects and at the same time to show how the semiconductor silicon diode can be used to improve the efficiency of an existing power supply.

It may be a sad thought to those who have spent years in Amateur Radio to realize that the valve is on the way out, and that semiconductors are taking over. But such is progress and the amateur in the past has never been slow to appreciate progress. The sooner we use semiconductors as much as possible the sooner we will learn that they are every bit as good as valves.

Early attempts to replace valves directly by silicon diode rectifiers led to disappointing results, but these failures led to publication of information showing how the problems could be overcome, and the result at present is a ready supply of usable circuits which do work.

A theoretical knowledge of the silicon diode is not necessary to follow this article which is concerned with the practical application of the diode, but certain important technical points will be dealt with as they arise in the course of the article.

Design and Component Selection

The idea for this article came from a short paragraph in " Technical Topics " in the BULLETIN dated August 1963. Under the title " Hybrid Power Supplies " there appeared a circuit which offered possibilities towards solving the writer's problem of getting more out of a table-top transmitter without using bulky components for which there was no room. Tests were carried out on the transmitter which already used the standard type of power supply shown in Fig. 1(a). Modifying this to the circuit in Fig. 1(b) was a very simple step as room under the chassis was easily found for the rectifier units and the additional smoothing capacitors. The type of silicon diode chosen for the rectifier was the popular Mullard BY100.

In order to test the BY100 under various operating conditions a receiver and several pieces of mains driven test equipment were converted from valve operation, including the a.c./d.c. power supply of the family television receiver. Apart from fitting series resistors of 10 to 20 ohms in the rectifier circuit no special precautions were taken to prevent high voltage surges due to switching. Results have been satisfactory in all units modified over about 30 months' usage. It is a case of fit them, and forget them.

Do not let us forget the important characteristic called peak inverse voltage when we are dealing with silicon rectifiers. The peak inverse voltage of rectifiers working in various commonly used circuits are given as follows.

Half-wave rectification 2·83 V_{in}.
Full-wave rectification 2·83 V_{in}.
Bridge rectification 1·41 V_{in}.

where V_{in} is the a.c. input voltage to the rectifier unit. These figures, and further useful information on power rectifiers, can be found in the RSGB *Radio Data Reference Book*.

Apart from giving the subject of peak inverse voltage careful consideration and using two or more silicon units in series if the voltage requirement makes that necessary, the silicon unit can be an almost direct replacement to a valve, Not only does one save the rectifier heating power but the general efficiency of the power supply is improved owing to the practically negligible voltage drop across a silicon rectifier.

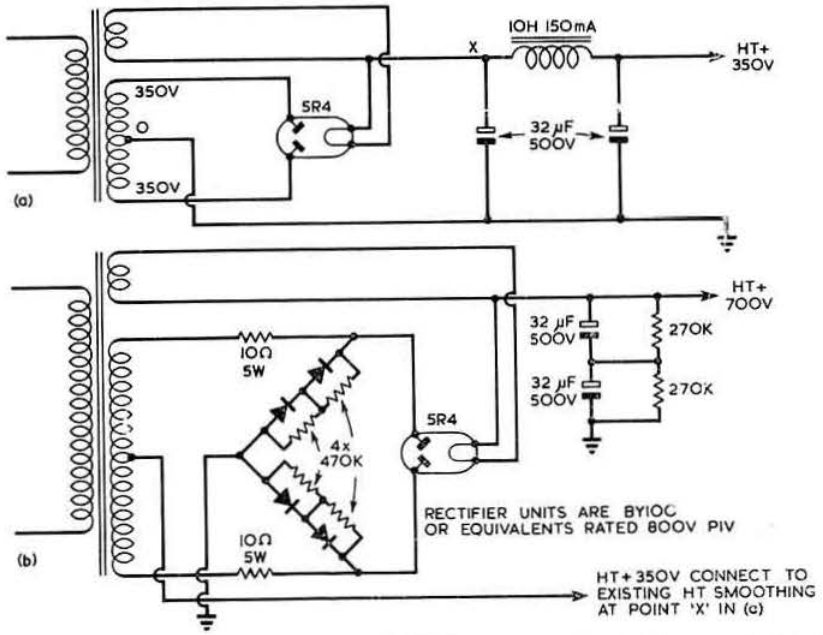


Fig. 1. (a) A conventional 350 volt power supply. (b) The power supply modified to provide 700 volts in addition to the 350 volt supply. The 470 K ohm resistors connected in parallel with the silicon diodes must not be omitted.

Mechanical Considerations

During the time the hybrid supply was on test in the transmitter thought was given to completing the modification and disposing of the valve by substituting BY100 rectifiers. The circuit in Fig. 3 was decided on, but before proceeding with the actual modification a method had to be found to house the eight rectifiers and the necessary voltage balancing resistors. A unit comprising an octal valve base was found simple to make and at the same time it could be plugged into the existing 5R4G valve position so solving the problem of space.

Detail drawings of the rectifier unit are given in Fig. 2. Constructors will almost certainly find it necessary to alter the sizes of the discs and holes according to the material available. It is advisable to buy the rectifiers before boring the discs so that a tight push fit is obtained when fitting into

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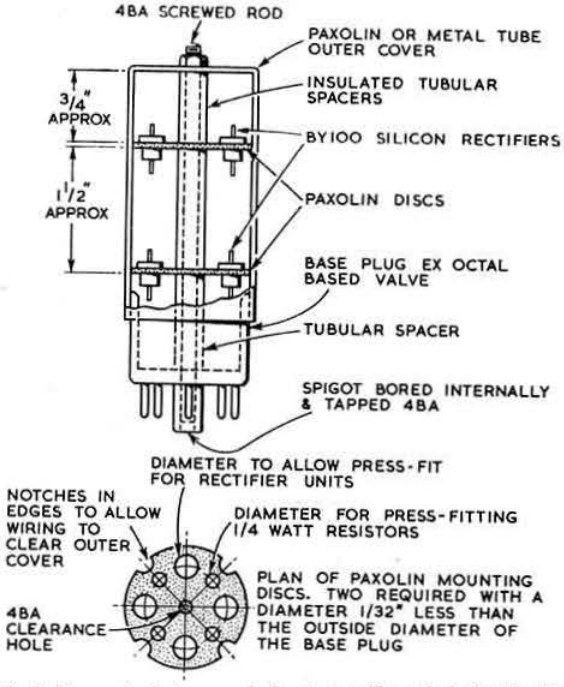


Fig. 2. The method of encapsulating the rectifier unit devised by the writer.

the holes. Any looseness of fit can be made good by fixing the rectifiers with a spot of Durofix or similar cement. Care should be taken when soldering the rectifiers to avoid heat from the soldering iron damaging the junction just as it does in transistors. Use a pair of pliers as a heat shunt when soldering. The units are connected together with plastic covered connecting wire and the output leads taken to any convenient pins on the octal base, not necessarily those given in the circuit. The metal cover for the unit was made by removing the " innards " from an old electrolytic capacitor which happened to have a case of suitable diameter. A length of paxolin tube would serve the purpose just as well. If a metal cover is used it is advisable to earth it to a suitable pin on the base as a precaution against it becoming " live " owing to accidental contact with some of the internal wiring. There are around 800 volts at 0·5 mA available from this power supply, and this sort of output must be treated with respect.

The circuit in Fig. 3 is that used at G2OX at the time of writing this article and it has been given a good hard test. It has had its share of overloads and surges both on the a.c. and d.c. sides. The circuit may appear to have resistors which do not appear to be necessary. Do not be misled into believing that the supply will work just as well without the parallel resistors across the rectifiers. These resistors must be used when running rectifiers, and electrolytic capacitors, series connected, as they help to equalize the voltage across each component.

Fusing is something of a problem as in all power supply units, but a 250 mA fuse on each of the d.c. supplies will give pretty fair protection to the rectifiers in case of a short circuit occurring on the load side. The primary circuit fuse should be set at a value sufficiently high not to blow during the current surge which will occur when the power supply is switched on.

An ex-Service transformer manufactured by Parmeko was used in the prototype; the windings were 350-0-350 volts at 150 mA, plus 5 volt and 6·3 volt windings. The on-test output voltages are as follows:

	350 volt supply	700 volt supply
No load voltage across smoothing capacitor	470	860
loaded to 60mA	460	850
loaded to 100 mA	440	810
loaded to 160mA	400	780

According to the specified ratings, the load current figures would appear to overload the transformer, but no noticeable heating of the winding or core was noticeable even over prolonged periods of use. This was not the case with a similarly rated replacement-type transformer which exhibited a dangerous rise in temperature.

Conclusions

This power supply is an attractive proposition to the constructor or owner of a table-top transmitter who wants a little more power output but lacks space for extra components. There must be many commercial table-top transmitters in amateur service which could be given a new lease of life if treated as the writer suggests in this article.

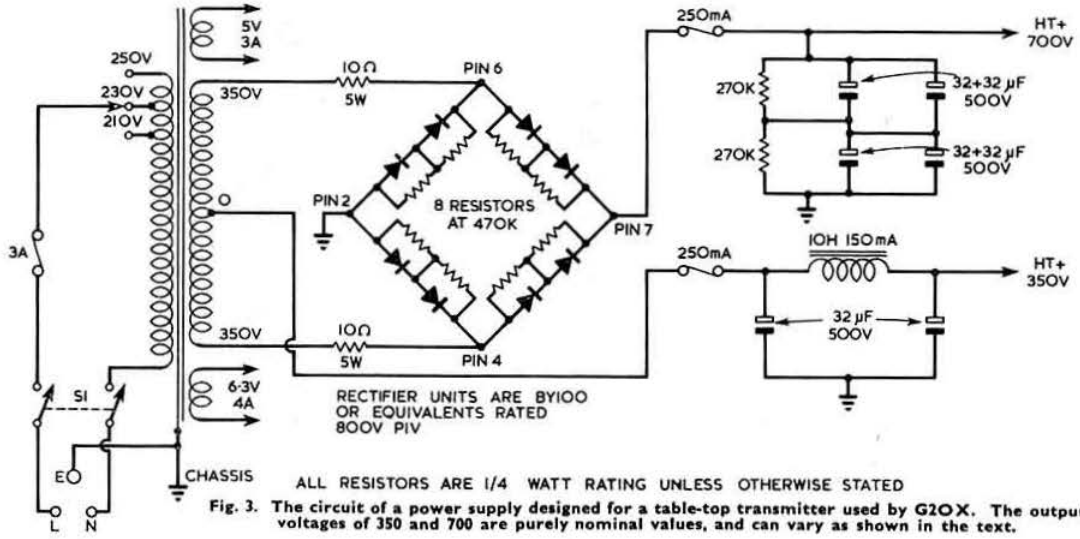


Fig. 3. The circuit of a power supply designed for a table-top transmitter used by G2OX. The output voltages of 350 and 700 are purely nominal values, and can vary as shown in the text.

Bookbinding for the Amateur

By P. W. WATERS, G3OJV *

OVER the years, the writer, like many other members, has accumulated a large number of BULLETINS and similar publications, but all too often, unfortunately, considerable time seems to be wasted tracing that elusive back issue which somehow always manages to find itself a place at the bottom of the pile. Several excellent self-binders are now available enabling each issue to be filed as and when it is received, and this is all very well for the current volumes, but what about the remaining dozen or so back volumes? The whole business then becomes rather expensive for the average person and the writer therefore turned his thoughts to carrying out the job of binding the issues himself, although without any previous experience, or indeed knowledge, of

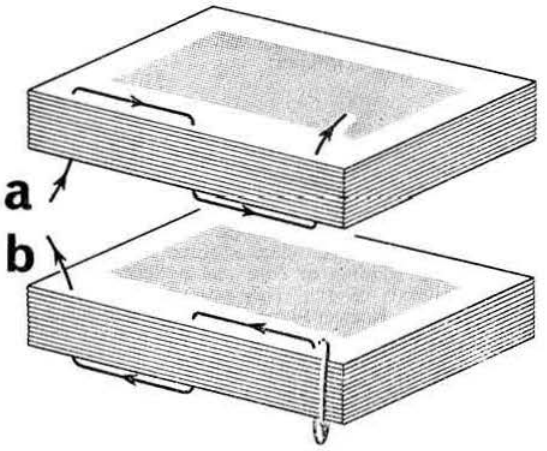


Fig. 1. After holes have been punched near the spine of each magazine the issues can be stitched together as shown. When the thread has been passed through the holes in both directions the ends are knotted tightly together.

bookbinding. The results have been extremely satisfactory, each volume having its own index and the whole forming a much more compact and speedier source of information than before, in addition to being much neater.

After sorting the issues into their respective volumes, the front and back covers are removed from each copy, leaving the numbered pages still held together by their metal staples. Three holes are then made in the first issue of one of the volumes by means of a sharp pointed tool such as a metal scriber or punch. The holes should be about $\frac{1}{4}$ in. from the spine of each issue, one being positioned in the middle and one each approximately $\frac{3}{4}$ in. from top and bottom respectively. This copy is then used as a template for the remaining 11 issues, the holes being made in a similar manner.

The next stage is to bind all 12 issues together into one volume. For this operation a strong thread obtainable from any drapers or a co-operative XYL should be acquired. Either a darning needle (obtainable from the same source) or a piece of wire bent into a suitable shape, can be used to pass the thread through the paper. Fig. 1 shows the way in which the issues are threaded together. It will be found easier if the needle is passed through only one issue at a time rather than through the whole volume at once. Enough free thread should be left at the beginning *A* to allow for knotting together with other end *B*. Before tying the ends of the thread together, however, the issues should be pulled firmly together by means of the two ends of the thread, thus getting rid of any slackness. This stage completed, all the issues should form one firmly held volume. If an index is available this can be attached to the front of the volume by applying a thin line of glue along the rear edge and sticking it to the left hand edge of the first page.

The final stage is to attach a cover, and this can easily be stuck to the spine with one of the many adhesives now available. The writer used " Copydex ". Any stiff card can be used for the cover; for instance the stiff card folders used in offices for filing systems. The card should be cut out, marked and bent into shape so that it wraps round and squarely hugs the spine. A coating of adhesive is then applied to the centre of the cover which is then firmly pressed into place against the spine and allowed to dry.

Lettering and volume numbering can be added as desired. The writer obtained a very pleasing result by using a felt pen in conjunction with a lettering stencil, both of which are obtainable from stationers and craft stores.

The finished product is quite durable, and the volumes form a very attractive display. What is more important, however, they cost virtually nothing.

* 16 Hill Crescent, Hornchurch, Essex.

RTTY—the easy way

This is the title of a 14 page booklet prepared and published by Arthur W. Owen, G2FUD, the Editor of the British Amateur Radio Teleprinter Group. It deals with the problems confronting the newcomer to RTTY by short articles and accompanying circuitry, and may be obtained from G2FUD at 184 Hale Road, Hale, Cheshire for the modest price of 3s. post paid.

The Spirit of Amateur Radio

In response to numerous enquiries from members wishing to learn the identity of the American amateur " M " in the article on page 365 of the June issue, the writer, G3GNM, has decided to reveal his name. He is Morton Waters, W2JDL.

FET Converters for 4m and 2m

The first article in the series on v.h.f. receivers by G3HBW published last month contained an error in the i.f. and crystal table. The correct crystal frequency for a 2m converter with an i.f. 28-30 Mc/s is 38·67 Mc/s.

Constructors who wish to use tuners with rather poor noise performance may avoid the necessity of an extra amplifying stage by simply reducing the values of the 10 K ohms r.f. stage and mixer source feed resistors, thus increasing the gain of the converter. The minimum advisable resistances are 500 ohms for the r.f. stage and 1 K ohm for the mixer.

The writer has received many enquiries from constructors who have been unable to locate sources of some of the components. The 2N3819 FET (price £1) and the 2N3826 silicon planar transistor (price 3s. 11d.) may be obtained from Texas Instruments Supplies Division, 12 Wellcroft Road, Slough, Bucks. The 2N3819 is also available from Henry's Radio Ltd., 303 Edgware Road, London, W2. The pot core and former may be also obtained from Henry's Radio Ltd., and is catalogued as a type D assembly (3s. 6d.). The same firm stocks some suitable HC-6/U crystals. The Lektrokit board (Type LK141, 3s. each) and the wiring pins (Type LK3011, 5s. per 100) may be obtained from Home Radio (Mitcham) Ltd., 187 London Road, Mitcham, Surrey.

THE MONTH ON THE AIR

By JOHN ALLAWAY G3FKM

ONE of the most unpleasant features of life in the 'sixties is the very marked deterioration in manners generally and in the degree of tolerance extended to the other person. This attitude to life would now appear to be spreading to some of the individuals who are privileged to hold Amateur Radio transmitting licences. The writer was sickened and disgusted early one morning recently when listening on the s.s.b. section of the 80m band. A UK amateur was heard telling a station in the Netherlands to " go out to the nearest junk shop " and buy himself a better receiver than the one he was using, as he was apparently unable to hear someone who was supposed to be calling him. All this was said in the most objectionable manner possible, and must have damaged the image of British amateurs very considerably in the eyes of the PA station, and also in the eyes of any casual listener. It should surely be the responsibility of all of us to realize that mistakes can be made by any one of us, and that in the case of overseas amateurs they may be due to an imperfect mastery of our language. Unfortunately this is not the only example of boorishness heard on the air recently, and quite a number of correspondents have mentioned similar instances on 40m and 80m. There are certain to be times when patience is sorely tried, but bad manners and rudeness on the air are inexcusable.

G3VIZ, a New Zealander by birth, will be returning to ZL for a few months stay between 20 January and 10 April. He is anxious to meet some ZL amateurs while there and may be reached by contacting J. R. McKellar, c/o 168 Moana Avenue, Nelson, NZ.

GM3VRR (see *QTH Corner*), who used to be 5N2JM/ZD2JM, is now back in Scotland. He still has some QSL cards for his Nigerian call-sign and would be pleased to QSL to anyone still needing his card. Similarly, G3HSG, who used to be ZB2AJ, offers to supply Gibraltar cards to those still needing them.

Would anyone knowing the whereabouts of " Colin " who operated from VS9MB in July, 1963, please contact G3FKM?

As this is the last *MOTA* in 1966 the writer would like to take this opportunity to thank all those who have helped him to write the column throughout the year. Particular gratitude is expressed to those who have written in regularly with news items and lists of DX heard and worked, also to the editors of all the publications—home and overseas—whose names appear regularly in the monthly list of acknowledgements and from whom so much useful information is obtained. Last, but not by any means least, thanks are due to Dr G. Lange-Hesse, DJ2BC, of the Max Planck Ionospheric Institute, who so kindly supplies the Society with the monthly propagation predictions. Finally your scribe would like to wish all readers, wherever they may be, seasons greetings and Christmas stockings packed with new gear!

News from Overseas

VK4SS reports that **VK8HA**, Harry Anderson (Box 1418, Darwin) is now active on 7, 14 and 21 Mc/s c.w., s.s.b., and a.m. He has been working into Europe on 7 Mc/s at around 07.00, and at about 06.00 on 14 Mc/s. He runs an NCX5 transceiver to dipole aerial. There is very little other activity from the VK8 area. Other items mentioned by AL include **FW8RC** (Wallis Is.) who is now on 14 Mc/s s.s.b., and **WA7EZW/KH6** who has been heard on 14 Mc/s s.s.b. around 08.00 and who is on Kure Is. Juicy DX worked down under on 7 Mc/s recently includes FB8YY, 5R8AL, ZL4CH, and ZL5AD.

Bob Snyder, 9V1LP, alias W0GTA/8F4, is now officially permitted to contact US stations, and QSL cards can be submitted from him for DXCC credit if for contacts between 18 October and 31 December, 1966. He has a very fine set-up in Pekanbaru, Sumatra, and will be active from there at least until the end of this year.

Readers will be very sorry to learn that VP8IP, whose UK call was GW3SZI, was one of two men who lost their lives at Stonington Island on 10 June this year. John Noel's logs will be returned home with his belongings, but it is not known whether QSLs will be dealt with later.

Bill Metcalf, now G3TIF, who was until very recently ZB2AR/MM, reports that G3SGQ is now on the air from HMS *Fearless* with the call-sign **ZB2AV/MM**, and should be around the bands for some time to come.

Dick Halls, 9V1LK (G3EIW), complains of the apparent lack of activity by UK stations on 14 Mc/s as heard in Singapore. He says that during the last four and a half years he has operated from various DX locations in the East, and has found that the Gs are the rarest stations. He is on 7010 $\pm$ 3 kc/s or 7020 $\pm$ 3 kc/s most days between 16.00 and 17.00.

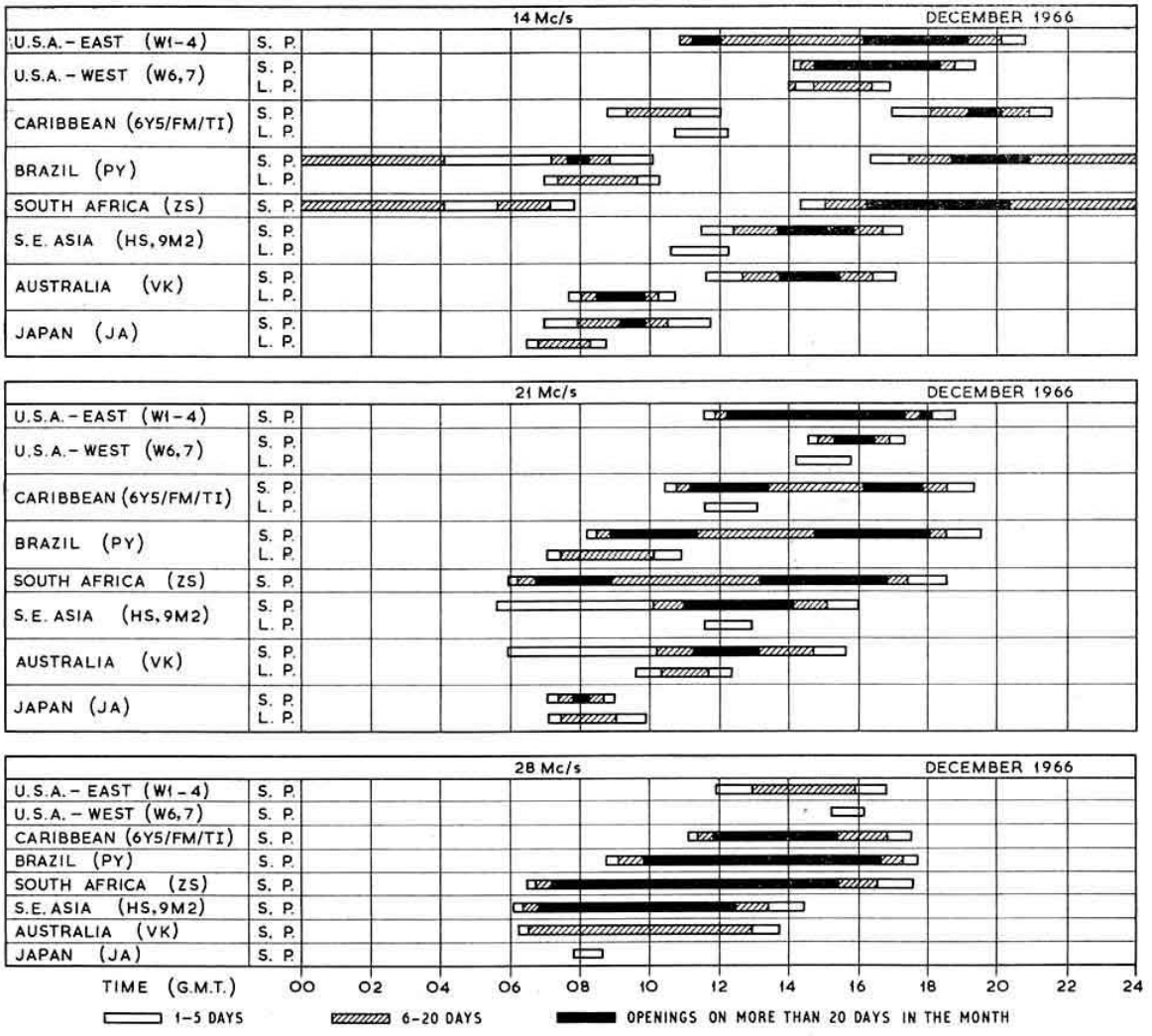
Due to popular demand the Aden QSL Bureau has returned to the Amateur Radio Club, RAF Khormaksar, BFPO 69, London, with effect from 1 November.

Bob Snyder, W0GTA/8F4 (centre), with (left to right) Sjamsu (his assistant), Capt. Moeljono (head of military communications for the province of Riau), Amran (Sjamsu's assistant), and Lt. Soemartono (Capt. Moeljono's assistant). These two officers were very co-operative in helping to obtain permission for Bob to come on the air from Pekanbaru, Sumatra.

(Photo from W0GTA/8F4)

* 10 Knightlow Road, Birmingham 17. Please send all reports to arrive by **11 January** for the **February** issue, **8 February** for the **March** issue and **15 March** for the **April** issue.

PROPAGATION PREDICTIONS



Seasonal variations in propagation conditions bring about a slight worsening in December compared with the two preceding months. This is because the short midwinter days cause a significant reduction in the periods for DX, particularly on the h.f. bands (21 and 28 Mc/s). On 28 Mc/s the East coast of North America will still not be workable with certainty. Only in very exceptional cases will Western North America and Japan be heard. In the main, conditions will be better in Southern Europe than farther North, especially for traffic with North America and East Asia. On 21 Mc/s all continents will still be workable. In midwinter on this band there are frequent opportunities for working various DX zones via the long path. This applies especially to South America and Japan. On 14 Mc/s also, under favourable conditions, certain DX regions may be worked via the long path. As well as South America and Japan, this applies particularly to North America. In the latter half of the night this band will only remain open on favourable days for traffic with South America and Africa. The two lower bands, 7 and 3·5 Mc/s will, however, offer DX possibilities during the long winter nights, so far as the QRM situation permits. On 3·5 Mc/s during darkness and especially in the hours before sunrise the dead zone may interrupt local contacts.

The mean provisional sunspot number for October 1966 was 55·3 with activity peaking around the 21st of the month. The predicted smoothed sunspot numbers for February, March and April are 64, 67 and 69 respectively.

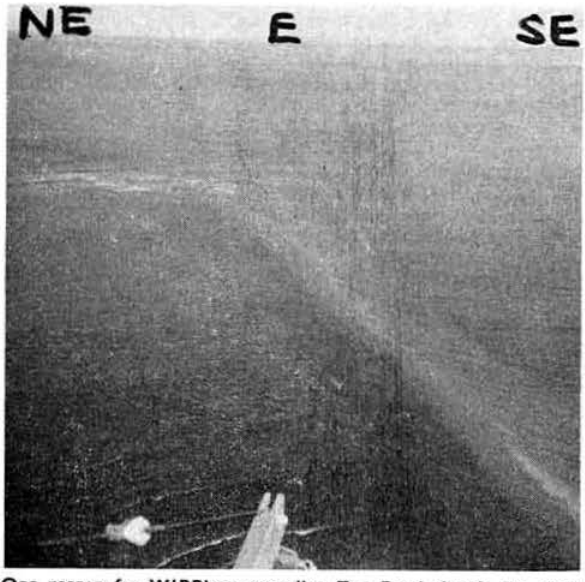
Top Band News

A most interesting letter from Les, 9H1AE, gives information on forthcoming activity from Malta on 160m this winter. Since firing up on the band last January he has worked nine countries—including a number of UK stations and GC2LU/P and EI9J. Les points out that he is at present the only 9H1 station on the band and that he would be happy to make skeds with anyone who would care to drop him a letter. The weekends when he will be free to be on the air are as follows: 9-10 December, 25 December, 6-7 January, 14-15 January, 22 January. Please write to 9H1AE, 3 Mayflower Mansions, Bisazza Street, Sliema, Malta.

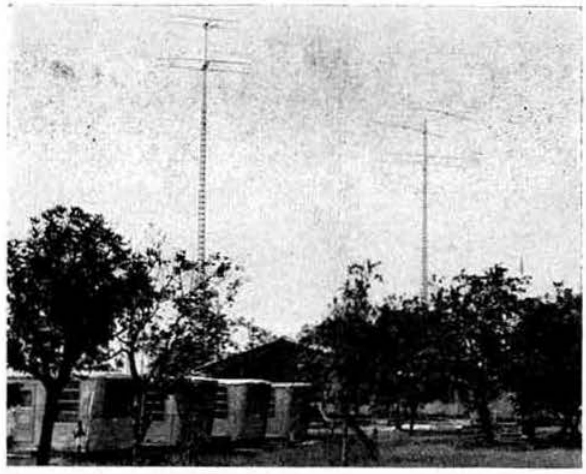
Comprehensive coverage of the VK-G tests carried out recently by VK5KO in the form of letters from VK5KO, G3IGW, and A4776, shows that in fact no QSOs between Europe and Australia were effected. The period of the experiment covered 1 September to 16 October, and G3IGW and G3NEO listened nightly for VK. At the same time VK5KO and SWL George Allen in Perth listened for European signals. On 20 September VK5KO's signals were positively identified by G3IGW and G3NEO, and this happened again on 10 October. On the first of these occasions G3IGW's signals were identified by George Allen, but were unfortunately inaudible in South Australia. VK5KO's signals were also heard weakly on 21 and 26 September, and 2, 5, 12, and 15 October. Daily observations of DHJ by VK5KO indicated that conditions were very much poorer than when similar tests were carried out in 1963. At that time DHJ used to be S6 at sunrise, and QSOs were made with G3PU and DL1FF. As John points out, VK to Europe on 160 is just about as far as you can go DX-wise! He finds that the path to the East coast of the USA is much easier, and has about 50 contacts every year with that area. In four years of listening the only G heard has been G3PU.

A4776, who has access to a Racal RA17 receiver and a 160m dipole offers to listen specifically for anyone desiring reports on Top Band signals. He may be reached at: V. A. Lindgren, " B " Block, Training Wing, RAF North Luffenham, Oakham, Rutland.

GM3SVK reports that both GM3CCK and GM3MTS have promised to operate on 160m on Saturday evenings in order to give the county chasers an opportunity to make contact with Orkney. GM3SVK's own expedition there has therefore been cancelled.



One reason for WIBB's outstanding Top Band signal; the view towards Europe from the top of his inverted V, 270 ft. a.s.l.
(WIBB print)



The aerial farm of W0GTA/8F4. The tower on the left is 70 ft. high and carries beams for 10 and 15m. The other is 90 ft. high and carries 40 and 20m beams. The 144 ft. vertical for 80m is not shown!
(Photo from WOGTA/8F4)

Finally a reminder that the second of this season's **Transatlantic DX Tests** will be held on 18 December and the next on 1 January—see page 661, October *MOTA*. Details of the **CQ WW 160 metre** contest will be given next month.

DXCC News

It is believed that Bob White, W1WPO, recently announced that contacts with HC8E (Ebon Atoll) and TI9C (Comoran Reef) will count as those with KX6 and KC6 respectively. Another question of disputed ownership apparently.

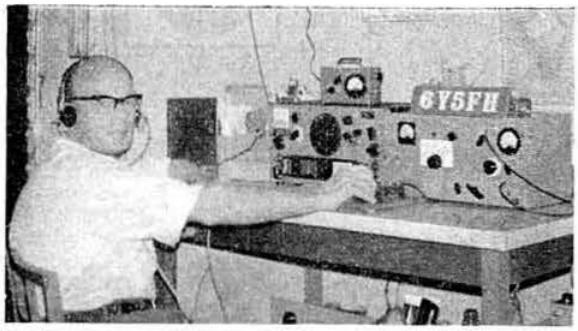
Awards

The DARC has a special award for SWLs—the **" DLD-H " Award.** This is awarded to applicants who can provide proof of having heard stations in a sufficient number of German DOK areas and DM districts. This number may be 50, 100, 200, or 300 which represent diploma classes black, green, silver and gold respectively. Intending applicants should write to Hermann Gerls, DL6ME, 34 Goettingen, Schillerstrasse 18, Germany, and ask for the application form for the DLD-H Diploma. Names of new diploma holders are published regularly in the DARC publication " *DL-QTC*."

The **Michigan Counties Award** is available to those who can submit proof of contact with 23, 53, or all 83 of Michigan's counties. There are no limitations as to date, band or mode. GCR application, certified by two other amateurs that QSLs for the requisite number of QSOs have been seen, should be sent together with an alphabetical list by county showing station, band, mode and date, and five IRC's to: Awards Manager, K8CIR, 15426 Comstock, Grand Haven, Mich., USA.

An award to celebrate St. Louis' 200th anniversary—the **STL-BC Award**—is being issued to those who have proof of contacting 10 stations in St. Louis city or county, since 1 January, 1965. Log data, signed by another amateur to the effect that he has checked the QSL cards, should be sent with five IRC's to: Paul Haefner, 1939A E. Warne Avenue, St. Louis. Mo., USA.

The **HMA (HM Award)** is given by KARL to amateurs and SWLs who have completed QSOs and received QSLs from at least five HM stations. Higher levels of the award are for contacting 10, 20, 30 or 50 Korean national stations.



The station of well known Jamaican DX operator Dr Frank Hattemore, 6Y5FH.

The ASA **(All Seoul Award)** likewise is issued for contacting all nine districts of Seoul (Korean Districts No. 11-19). For either award applicants should send their QSLs or GCR list, log extract, and 10 IRCs to the Award Manager, KARL, Central Box 162, Seoul, Korea.

Contests

Details of more United States " QSO Parties " have now been received. **The New Hampshire QSO Party** will be held between 00.00 and 04.00 on 11 December, 12.00 and 16.00 the same day, and 00.00 to 04.00 12 December. Stations exchange QSO number, report, and QTH. Frequencies: 3530, 7030, 14,100, 14,250, 21,100, 21,350, 28,100 and 28,800 kc/s. Each QSO counts two points, each N.H. county worked as a multiplier (maximum ten). Logs to Nashua Mike and Key Club, PO Box 94, Nashua, N.H., USA, no later than 25 January. The **Zero District QSO Party** is on the same weekend—02.00 to 05.00 10 December, and 23.00 10 December to 03.00 on the 12th. Each QSO counts one point, and the multiplier is the sum of states plus counties worked. Stations may be worked once per band and mode, and frequencies used around 3573, 7075, 14,075, 14,300, 21,075, 21,290 and 28,600 kc/s. Logs to: Roosevelt High School ARC, c/o Cliff Davidson, 5200 Shriver Avenue, Des Moines, Iowa, 50312, USA. The **Ohio QSO Party** starts on 17 December at 21.00 and finishes at 03.00 19 December. Each QSO counts one point and the same station may be worked on both phone and c.w. on each band. Logs must be sent to: WA8GYT, 2614 Brandon Road, Upper Arlington, Ohio, 43221, USA before 20 January. QRGs to watch will be 3560, 7060, 14,060, 14,290, 21,060, 21,390 and 21,125 kc/s.

More information is now to hand concerning the **Canary Islands Contest** mentioned last month. As reported before this will extend from 00.00 21 December to 24.00 20 March. A certificate—the Tenerife Eterna Primavera Award—will be awarded to those who submit proof of ten contacts with EA8 stations during this period. Your QSL must show that at the time of the contact details of the previous day's maximum and minimum temperatures were exchanged! QSLs should be sent to: Tenerife Eterna Primavera Award, PO Box 215, Tenerife, Canary Islands. It is rumoured that there may be a draw to select winners for prizes including possibly a paid trip to EA8!

Full results of the **Seventh Scandinavian Activity Contest** (1965) have now been received. Entries from the UK were as follows: C.w. section **G3LHJ 3168 points,** G3ESF 2430 points. G3JFY 240 points, G3RJB 105 points, **GM3JDR 96 points.** Phone section **GW3OCD 726 points,** GW3SFC 266 points. **GM3NQB 176 points,** and GM3JDR 3 points. A check log was also received from G3MWZ. Congratulations to **G3LHJ** who was world wide fifth in the single operator section.

The **Tops C.W. Club** contest will be held between 12.00 10 December and 12.00 11 December between 3·5 and 3·6 Mc/s (c.w. only). Participants should call " CQ TAC." Contact points are one for contacts with stations in one's own country, two for those with other European stations, and three for all others. Prefixes worked serve as a multiplier. Logs should be sent before 14 January to: Peter Lumb, G3IRM, 22 Hervey Road, Bury St. Edmunds, Suffolk.

QRP News

The opening of the 10m and 15m bands seems to have been the signal for an upsurge of interest in the section. Reports have been received from a number of sources, including G3s DOP, LXO, MBL, TFX, TIR, TWG, UAA, URX and VMY. G3DOP reports great success with a transistor transmitter similar to that described in " Technical

QTH Corner

FH8GF	via W4ECI.
FR7ZP	via W4ECI.
I0RB/4U	via DOTM.
KG6IG	(Op. Lee) via K6ZDL, 17204 Eastwood Av, Torrance, Calif, USA.
TJ1QQ	via W4DQS, 928 Trinidad Street, Cocoa Beach, Fla, USA.
TR8AG	Guy Vallier, BP157, Libreville, Gabon.
VK5XK/VK2	(Stn. on Lord Howe Is.) Arch Hewitt, 15 Semaphore Rd, Semaphore, S. Australia.
VP2AP	PO Box 93, Antigua, BWI.
VQ8BG	via 5A3TT, PO Box 372, Tripoli, Libya.
VQ9AA/A **VQ9AA/D** **VQ9AA/F**	via W4ECI.
VQ9BC/D **VQ9TC/D**	PO Box 191, Mahe, Seychelles Is.
WB2VJD/CE0	(Stn. on Easter Is.) via K5GOT, 106 N. Munn Street, Warren, Ark, USA.
XT1AC	via K9HOL, 226 West St, Lake Geneva, Wisconsin, USA.
ZA1RB	via DOTM.
ZB2AJ	G3HSG, RAF Watton, Norfolk.
ZB2AP	via WA8QJK, 2145 Chesaning Dr. SE, Grand Rapids, Mich, USA. 49506.
ZD8CX	via G8KG, F. M. Smith, 4 Brook Court, The Park, Cheltenham, Glos.
ex-5N2JM	John Macintyre, " Tingha," The Glebe, Aberdour, Fife.
6O1KH	via DARC only.
7Q7PH	via W1MRQ, Kenn Smith, 85 Main St, Groveland, Mass, USA. 01834.

QSL Managers

DOTM	Stu Meyer, PO Box 7388, Newark, NJ, USA. 07107.
W2CTN	159 Ketcham Avenue, Amityville, NY, USA. 11701.
W4ECI	3101 Fourth Av. South, Birmingham 5, Alabama, USA.

* * *

RSGB QSL Bureau: G2MI, Bromley, Kent.

Remember . . .

Section 9(2) of the Amateur (Sound) Licence states:

" The call-sign, which may be sent either by Morse telegraphy at a speed not greater than 12 words per minute or by telephony, shall be sent for identification purposes at the beginning and at the end of each period of sending, and whenever the frequency is changed. When the period of use exceeds 15 minutes the call-sign shall be repeated (in the same manner) at the commencement of each succeeding period of 15 minutes."

. . . to identify

Topics " in the May BULLETIN. With an input of 400 mW or less on 80m he has had over 350 contacts in nine countries, with a report of RST 589 from F5IE. G3TWG, with 10 watts to dipoles, has worked JA, UA0, VS9, and all W districts this year. On 10m G3TFX contacted W8BIQ who gave his a.m. signal a 5 by 4 report—his output at the time being 1·5 watts! UA3APT was heard running 100 mW of s.s.b., he was S7 and only increased by about 4 " S " points when he increased his input to 40 watts. G3LXO has a crystal controlled a.m. transmitter on 28·4 Mc/s, and a three element beam at 40 ft. with which he has obtained an S9 report from ZS6RO, and has also had many contacts with the USA, VE, CX, LU, XE, etc. G3MBL runs 25 watts (the upper limit of QRP?) and has raised SU1IM, ST2SA, ZL1CA and other interesting DX with his home built a.m. transmitter and two-element beam. G3TMB reports that he has continued to enjoy himself with many W QSOs on 20m and with 9J2 and ZE contacts on 10m. All these reports suggest to your scribe that DX, or long distance, QSOs may be enjoyed by all who have the patience to listen, and who go to the trouble to make sure that their aerials are properly tuned and matched to the transmitter. Who will be the first to report a WAC achieved with less than 1 watt input?

DXpeditions

A letter received from Kirk, K0GZN, says that Virginia, K0GZO, and he will be making a return visit to Bonaire Is. in the Netherlands Antilles very soon. They hope to be leaving New York on 12 January and to be on the air with their PJ5BC/PJ5BD calls by about the 20th. They will have Swans 240 and 350 with them, and expect to be there for about three weeks. They will operate on 10, 15, and 20m mostly as 40m is such a mess.

The long promised trip by Paul, I1RB, to Albania seems likely to materialise before Christmas, but no definite information is available. This event should prove to be very popular to say the least!

QSL cards are now being received from VQ9BC/D and VQ9TC/D who recently operated from Desroches Is. It seems that in 68 hours of operating they managed to have 2800 contacts. Equipment used consisted of NCX-3 and T4X transmitters, and SX117 and R4 receivers. The aerials used were ground planes.

This is the method for me. No QRM, rock-like stability, perfect VOX, no QRM, armchair copy . . .

VK5XK was planning to make a trip to Lord Howe Island around 24 November, and hoped to stay there until 8 December. Operation was expected to be on c.w. only on 14 and 7 Mc/s.

Iris and Lloyd Colvin left the Azores on 14 November for their home in California. They are reported to have had over 7000 QSOs from their previous stop—CT3AU—and will return to the African area early in the New Year.

WB4EDD is making a trip to British Honduras, and expects to be VP1DX between 17 and 31 December. He will be on all bands 160 to 10m, and will be looking for UK contacts.

The latest bulletin from DOTM gives the information that DJ6QT/LX will be on from Luxembourg during the *CQ* WW DX Contest. QSL cards for GC2LU/P are now out, but there is some delay over the logs from VQ9G and I0RB/4U. The DXCC status of the latter is still under consideration. Readers may find it worthwhile to send a large s.a.e. with a few IRCs to the address in " QTH Corner," asking for the latest issue of the *News Sheet*. This is published at frequent intervals, and gives full details of past and future plans for stations for which DOTM acts as QSL Manager.

The Royal Signals expedition to Kuria Maria unfortunately ran into bad weather at sea, and nearly all the equipment was lost. It is understood that their boat was making for Bahrein in the hope of securing more gear.

Don Miller's marathon trail continues with recent operations from Desroches Is., Farquhar Is., and Aldabra. At the time of writing Don was about to leave Aldabra after a five day stay, and was hoping to travel to Glorieuse and Tromelin Islands, together with Jose, CR7GF. There seems to be a great deal of frustration these days amongst those who fail to make contact with a rare DXpedition. One thing is certain—some of the stations who complain bitterly about the behaviour of the station who they cannot raise do not exactly conform to the rules themselves!

Yet again it is rumoured that a Brazilian group is about to visit St. Peter and Paul Rocks. This time PY1BYK/7 and PY7ZS are reported to be going to be there on 7 and 8 December using the call-sign PY0MB.

Band Reports

With the sunspot count rising rapidly, and with the autumn contest season bringing all bands to life, the last month has seen considerable activity on all bands, with DX signals coming through at some time during the day on all of them. The path to ZL on 80m appears to have been open for some weeks in the early mornings, and strong W signals have also been in evidence at the same time. Forty has produced quite a large amount of interesting signals, partly stimulated by the 7 Mc/s contest—the c.w. portion of which unfortunately clashed with the annual OK contest to the mutual benefit of neither. Autumn propagation conditions have meant that 20m has been closing earlier, and opening later, and has been good for long path DX signals. The star turns have been 15 and 10m where all continents are once again workable. Many correspondents mention the fact that a CQ call on an apparently dead band can produce some surprising results—items such as XW8 and 8F4 have been brought to light on ten by these methods. One entrant in a contest is known to have contacted 81 countries in 33 zones during a weekend on 10m.

Once again your scribe would like to thank the following for their interesting letters and their co-operation in keeping G3FKM supplied with information: G2BOZ, G2LB, G3AAE, GW3AX, G3HCT, G3HCU, G3HDA, G3JVJ, G3KSH, G3LHJ, G3NMH, G3PUF, G3SML, G3SSO, GM3SVK, G3TDW, G3UML, G3UOL, G3URX, G3VJG, G3VMZ, G3VNC, G4MJ, G8JM, G8VG, BRS20317, BRS20439, BRS22299, BRS25429, BRS25605, BRS26222, A3942, A4038, A4056, A4568, A4776, A5032, A5105, A5141, and Robert Dowdeswell.

1·8 Mc/s C.W.: DL0ITU (21.25), VO1HN (03.09), W1JJS (22.40).
3·5 Mc/s C.W.: EP2BQ (18.22), OY2H (22.50), SM2COL/MM (45°N 28°W, 02.00), VO1AW (22.35), ZL3FZ, 4BD, 4IE (06.15—07.00), ZL4BO (17.56).
3·5 Mc/s S.S.B.: KP4AST (00.16), MP4TBO (22.10), TG9EP (08.06), VE2WM (04.05), VK2AVA (19.30), VP2AA (22.00), VP9FJ (06.10), VQ9AA/D (19.30), VS9AJC (23.30), YK1AA (21.00), ZD8ARP (21.30), ZF1BL (22.30), 3A2CP (22.00), 7Q7PBD (22.04), W0GTA/8F4 (19.30), 9H1R (22.50).
7 Mc/s C.W.: KG6AAY (06.40), LU1ZR (Antarctica, 06.40), UA1KAE/2 (Do. 21.07), VE8BB (Zone 1, 05.55), VP2SJ (01.30), VP7NX (22.00), VQ9BC/D, VQ9TC/D (22.45), W7VGQ (04.36), ZL4BO (19.00).
7 Mc/s S.S.B.: HI8NZT (03.25), JA4BJO (17.31), JA6YB (20.50), JX6XF (00.40), KG4BB (00.02), PZ1CF (20.55), TG9EP (05.41), VKs (20.00), VP2AA (22.00), VP3HAG (23.57), W5HWR VP9 (22.50), VQ9AA/D (19.25), XE1CCW (06.32), YV9AA (21.39), ZD8ARP (22.00), ZL2BCG (07.47), 5N2AAF (23.36), 9V1LP (18.38), 9Y4CQ (22.33).
14 Mc/s C.W.: FB8XX (17.20), HZ1RR (17.50), JX6XF (22.50), KW6DS (09.47), VK9CJ (13.10), VK9XI (18.42), VP8IN (Halley Bay, Antarctica, 21.15), VP8IQ (19.30), VP8IY (19.36), VP8JD (S. Orkney, 20.30), VQ8BG (16.30), 5X5SR (20.00), 5U7AK (19.00).
14 Mc/s S.S.B.: CR4AE (22.26), FB8WW (16.50), FB8YY (17.17), FK8AU, FK8BB/P (07.40), FK8BI (08.16), FL8AC (16.14), FO8AQ (15.37), HK0AI (01.46), HL9KH (16.15), KC6BO (16.17), W7ALE/KG6 (10.17), KS6BT (09.30), KW6DS (07.45), VK9OM (07.58), VK0MI (16.10), VP1TC (21.03), VP2MH (20.47), VP8s CW, IK, JB (20.45), VS9OC (21.31).
21 Mc/s C.W.: CO2BO/4 (Isle of Pines, 21.12), FK8AH (11.15), HM1DE (09.00), KG6NAA (10.24), KH6AFS (18.45), TN8AD (15.00), VK8HA (12.20), VK9s DR, GN (09.00), VP8IY (20.00), VQ8BG (09.17), VR2EK (09.15), VR6TC (15.47), ZD8BUD (07.45), ZD9BE (08.50).
21 Mc/s S.S.B.: FH8GF (08.28), FR7ZD (16.10), JAs (07.30—11.00), KG6SB (10.01), KS4CC (16.00), KS6BT (07.35), KH6CH/KW6 (19.35), MP4TBO (07.45), TN8AA (16.10), VK9GN (09.37), VP1PV (15.15), VP2GAI (21.31), VP5RB (12.30), VP8CW (18.39), VP8IK (21.31), VQ8AV (09.50), VQ9BC/D (15.44), VQ9EF (15.00), VS6FS (08.37), ZD8ARP (08.51), ZP3AB (19.20), 5U7AC (17.25), 5X5AU (10.44), 7Z3AA (10.03), W0GTA/8F4 (07.12).
28 Mc/s C.W.: CM2BC (16.30), CR6AI (16.00), EA8EO (15.49), EP2RV (11.30), JA6FOF (09.50), KA9AK (09.13), KV4CI (11.15), MP4BFK (06.12), UA9KQA (10.22), UA0BP (09.03), VK5DS (10.00), VP8HJ (17.35), VS6FO (11.00), VU2WB (11.45), W7LMA (17.11), XE2KF (16.38), ZD5M (14.05), ZD7IP (18.20), ZE3JO (15.30), 5R8CQ (01.38), 6W8DD (17.36).
28 Mc/s A.M.: CR6EF (15.50), FM7WN (14.50), OD5BT (07.25), TU2AF (16.16), VK9PL (10.13), VP8JB (17.38), VQ8BJ (13.00), VS9APW (12.20), Ws (13.00—19.00), XE1CCK (16.35), ZL3RB (09.10), ZS9G (12.16).
28 Mc/s S.S.B.: CE6CA (17.50), CE8AO (18.06), CR9AH (08.20), CT2YA (13.22), DU9MVC (09.09), ET3AC (12.10), FG7XT (11.37), FH8s CD, GF (11.00), FL8AC (13.35), HZ1AB (14.07), JA6DCE (08.45), KA7RF (08.12), KG6AAY (09.00), KR6LL (08.21), KZ5RJ (15.24), OA8V (18.06), PJ2MI (17.35), PZ1BX (15.54), SV0WU (Dodecanese Is.

(*Continued on page 822*)

1966 Countries Table

	1·8 Mc/s	3·5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s	Total
G3NMH	—	—	64	192	132	87	475
G3UML	4	41	64	181	107	108	505
G3SSO	9	15	20	94	108	59	305
GM3SVK	11	10	57	114	117	27	336
G3IAR	7	41	61	92	83	51	335
G8VG	5	28	30	94	76	56	289
G8JM	5	—	14	222	110	17	368
G3HS	15	40	58	110	70	35	328
5N2AAF	9	14	23	137	68	29	280
G3KSH	8	27	59	69	60	25	248
9J2BC	1	1	5	56	51	45	159
GM3KLA	3	38	45	44	70	15	215
G3LHJ	7	23	23	97	48	33	231
9V1LP	6	14	26	49	46	27	148
9V1LK	—	—	10	63	46	19	138
G3IGW	19	43	46	58	55	1	222
G3PQF	—	24	58	18	6	21	127
G3JVJ	16	23	30	20	9	—	98
G3MWZ	7	13	1	42	8	—	71
G3WZ	2	4	27	26	2	—	61
A4038	11	19	29	249	144	98	550
A4609	18	37	74	121	139	73	462
BRS25429	8	48	79	145	121	78	478
BRS26222	5	40	44	215	122	73	499
G8API	2	17	47	161	138	56	422
A4568	5	38	42	203	127	45	460
A4886	6	29	42	193	116	39	425
BRS25605	9	44	56	126	96	43	374
A4431	6	25	40	104	108	30	313
A5105	2	20	28	138	91	35	314
A4552	2	25	12	127	84	30	280
A4048	9	39	52	118	72	26	316
A4955	9	22	33	51	60	22	197
A3699	7	24	27	76	63	16	213
A4182	5	21	25	129	43	28	251
A4311	—	15	13	115	37	23	203
A3942	12	43	69	127	56	1	308
A4370	4	30	10	137	39	1	212
A5025	11	17	30	50	22	14	144
A4489	21	59	76	157	25	1	339

This months' table is in order of 21 Mc/s plus 28 Mc/s totals. Next month will be the last table for 1966 and will be listed by total band countries heard or worked. It is proposed to start a new table from 1 January, 1967 run along the same lines as the 1966 one.

At a recent meeting of Birmingham DXers held at the QTH of G2BOZ, John Allaway, G3FKM, was presented with this unusual trophy as winner of the 1965 LIDXA Contest.

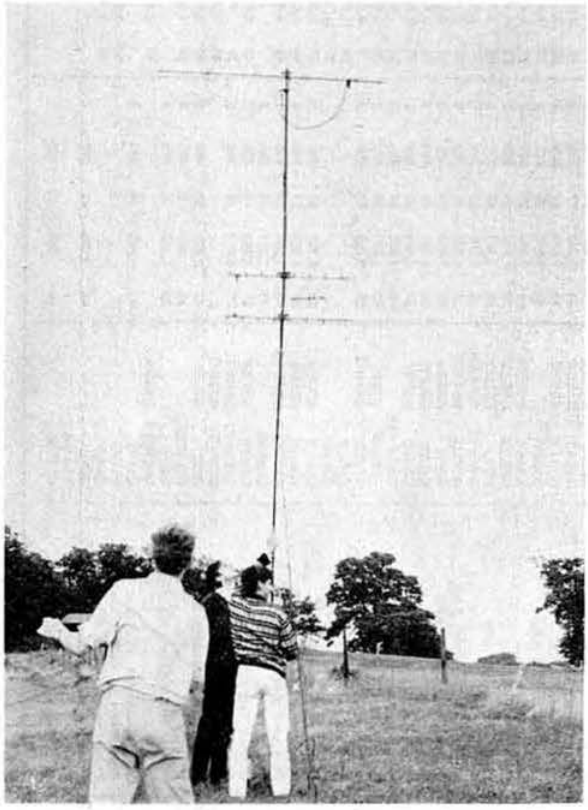
V.H.F. NFD 1966

Report and Results

V.H.F. NFD, 3-4 September, 1966, will long be remembered for its auroral opening and its appalling weather. Fifty-nine groups entered, of which 43 had two stations in operation, and there were four GM, 12 GW, two GC and one GI portable stations, several being the entries of English groups.

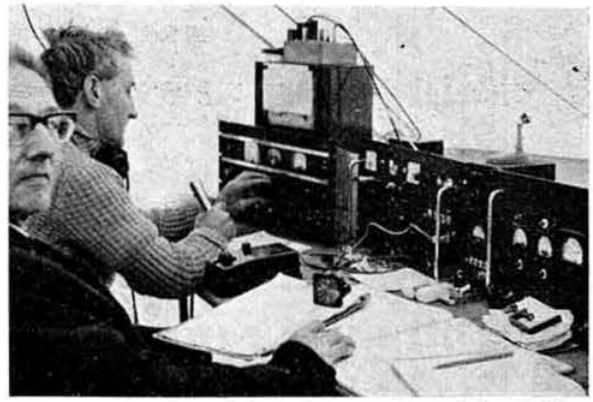
The GB2GC group on Alderney were overall winners, in addition to having leading scores on 70 Mc/s and 144 Mc/s. Their contact between GC3SIT/P and SM6PU on 144 Mc/s was the farthest in the contest; 1310km.

Second place was taken by a joint entry from Wolverhampton Group and Severn Valley ARS who were runners-up on 432 Mc/s. Reigate Amateur Transmitting Society, second on 70 Mc/s, were third overall. The 1296 Mc/s winners, Surrey Radio Contact Club were fourth, with Bournemouth and Poole V.H.F. Group, 1296 Mc/s runners-up, fifth. Sixth position was occupied by AERE (Harwell) who were leaders on 432 Mc/s. Runners-up on 144 Mc/s were the North-West V.H.F. Group, seventh overall.



G3SDQ (centre), receiving assistance from two other members of the Leyton and Walthamstow Group, at the 300ft. a.s.l. site in Epping Forest.

(Photo by G2HR)



The 4m station of the Reigate Amateur Transmitting Society, G3REI/P, at Willingdon Hill, near Eastbourne, was operated by G3NKS and G3PWW. Here G3PWW is operating with G3RAE logging.

(Photo by G3NKS)

Results by Countries

Reigate ATS were the highest scoring English group, in spite of trouble on 23cm. The leading Scottish station was Midlands Contest Club's GM3RUF/P, fifth on 144 Mc/s. Albright and Wilson ARS took the honours for Wales while Ballymena Radio Club were the only representatives of Northern Ireland.

Results Table

The table has been expanded to give more details of levels of activity and distances covered.

Most groups set up one station for 144 Mc/s and one for the other bands. Exceptions were Guildford and Flintshire who gave 432 Mc/s its own station, Purley who coupled 144 Mc/s with 432 Mc/s, Norwich who used three bands at G3MPN/P and Luton who operated G3JZW/P on all four active bands. Southampton Group did well to finish twenty-first without using 144 Mc/s. For two-station entries, the first call-sign in the table is that of the 70 Mc/s station.

70 Mc/s and 144 Mc/s Equipment

Little change was noted in transmitters for these bands with few groups using " unusual " valves in their final stages. Transistor converters outnumbered valves although 6CW4s and E88CCs were very popular. The trend on 70 Mc/s is towards larger aerials with a 3-over-3, several 4 over 4s and two seven-element beams reported. A detailed description of the equipment used by the GB2GC group appeared in " Four Metres and Down " in the November BULLETIN.

432 Mc/s Equipment

No less than 20 transmitters for this band used QQV03-20As in the final stages. Other types used were DET24 (six), QQV02-6 (five), QQV06-40 (three), 6939 (one) a BAY96 varactor tripler at G3FZL/P (see the November issue 1966) and an unspecified varactor tripler at G3LTF/P.

Aerials showed more variation, with 17 different types in use ranging from Purley's 9 element Yagi to the 64 element colinear stack used by Severn Valley ARC.

On the receiving side the GM0290 was the most popular r.f. stage followed by the AF139. Transistor front-ends outnumbered valves by two to one.

1296 Mc/s Equipment

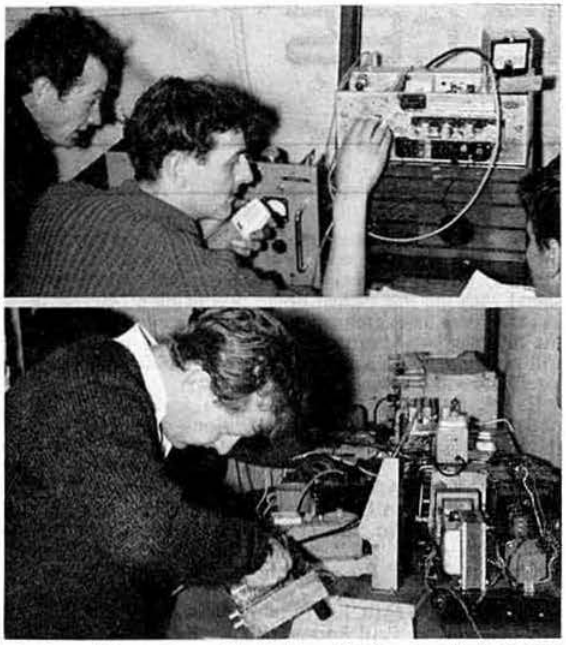
A 2C39 or 2C39A was used in over half the transmitters with the DET24 again runner-up. Two varactor units, one MA4347 and one unspecified were used.

All the receivers used crystal mixers with no r.f. stages in

V.H.F. National Field Day 1966 Results

Position	Total Points	Group	Call-signs		70 Mc/s Band					144 Mc/s Band					432 Mc/s Band					1296 Mc/s Band				
					Posn.	Points	QSOs	Best QSO (Km)	Ops.	Posn.	Points	QSOs	Best QSO (km)	Ops.	Posn.	Points	QSOs	Best QSO (km)	Ops.	Posn.	Points	QSOs	Best QSO (km)	Ops.
1	78629	GB2GC Expedition	GC3POI	GC3SIT	1	28,155	98	752	2	1	44,123	153	1,310	4	9	6,351	11	328	2					
2	59269	Severn Valley ARC and Wolverhampton Group	G3SVR	GW3KMT	4	13,267	77	425	2	4	30,110	185	565	4	2	13,662	46	296	3	9	2,230	3	144	1
3	55374	Reigate Amateur Transmitting Society	G3REI	G3PNA	2	17,744	119	635	2	6	25,924	143	596	4	4	11,436	33	340	2	13	270	1	29	1
4	52525	Surrey Radio Contact Club	G2RD	G3ODY	12	10,345	88	615	5	3	30,848	172	554	4	12	5,832	25	195	5	1	5,500	8	140	5
5	44833	Bournemouth and Poole V.H.F. Group	G3OBD	G6XM	9	11,629	82	392	2	12	17,527	106	571	3	5	10,497	37	237	3	2	5,180	6	140	1
6	41426	AERE (Harwell) ARC	G3PIA	G2HIF	23	7,036	55	555	3	11	17,859	130	438	5	1	14,661	53	408	2	10	1,870	3	117	2
7	41104	North West V.H.F. Group	G3UHF	G8SB	13	9,966	74	378	3	2	31,138	206	525	4										
8	35491	Midlands Contest Club	GW3FIA	GM3RUF	45	2,682	21	275	1	5	27,658	100	625	2	16	5,151	19	170	1					
9	34591	Ealing and District ARS	G3UUP	G3OUF	10	11,248	104	469	5	7	23,343	113	437	3										
10	33532	Worcester and District ARS	G3TQZ	G3NUE	18	9,328	54	426	3	9	21,555	120	558	2	28	2,649	14	154	3					
11	33166	Midland ARS	G3MAR	GW3BA	21	7,293	58	407	3	14	17,020	80	363	4	11	5,943	31	132	3	6	2,910	5	115	1
12	33026	Mid-Essex V.H.F./U.H.F. Contest Club	G3LTF	G3ORL	19	9,233	66	588	2	19	13,299	87	373	3	13	5,574	24	218	2	3	4,920	7	95	1
13	32278	Grimsby ARS	G3NJF	G3RSD	6	12,380	64	450	5	13	17,288	91	425	5	29	2,610	6	275	3					
14	31572	Albright and Wilson ARS	GW3OXD	GW3UEY	17	9,406	57	397	3	10	18,635	105	515	4	22	3,531	13	185	3					
15	31257	Welwyn Garden City	G5UM	G8LM	42	4,038	37	284	4	22	12,937	100	829	9	6	10,062	43	180	5	4	4,110	7	114	3
16	30344	Crawley ARC	G3TR	G3FRV	16	9,543	70	587	2	21	13,070	84	475	4	14	5,451	28	212	1	8	2,280	4	83	1
17	28161	Stean Group	G8NF	G3NPO	3	14,384	71	475	4	15	13,777	77	475	2										
18	27613	Radio Society of Harrow	G3HBW	G3EFX	7	12,083	86	560	1	33	9,021	91	315	4	19	4,149	23	124	2	7	2,360	6	93	1
19	24178	Bristol V.H.F. Group	G3TND	G3KUJ	37	5,163	43	290	2	16	13,668	96	300	3	15	5,295	23	175	3	11	1,050	3	49	1
20	23174	Sheffield ARC	G8NN	G3JRL	29	6,261	40	337	3	18	13,394	76	832	2	23	3,519	15	182	3					
21	22672	Southampton Group	G3MRA		14	9,787	71	588	5						3	12,885	46	408	4					
22	22577	Norwich and District Group	G3MPN		11	10,521	50	517	5	25	11,678	62	400	5	37	378	2	69	5					
23	22214	Barnsley and District ARC	G4JJ							8	22,214	91	570	1										
24	22060	Cumberland and Westmorland Group	G3BJD	G3BW	8	11,858	62	506	3	39	7,520	50	421	5	26	2,682	8	224	3					
25	22015	Crystal Palace and District Radio Club	G3FZL	G3VCP	28	6,297	77	400	4	30	9,556	97	412	5	10	6,162	36	112	1					
26	21822	Burnham Beeches RC	G2XA	G3AHB	31	5,902	68	360	3	26	11,492	108	450	3	17	4,428	24	150	2					
27	21434	South Dorset RS	G3EAT	G3SDS	35	5,382	37	375	6	23	12,539	70	388	6	24	3,513	17	110	6	14	0	0		2
28	21179	Verulam ARS	G3STA	G3VER	26	6,446	87	535	5	20	13,245	114	455	4	30	1,488	18	53	5					
29	21071	Luton and District ARS	G3JZW		46	2,593	25	241	3	28	10,260	90	449	3	7	7,488	42	233	3	12	730	3	37	2
30	20786	Clifton ARS	G3JKY	G3GHN	44	2,997	31	565	3	29	9,945	107	435	4	18	4,374	28	126	5	5	3,470	6	101	4
31	19769	Cray Valley ARS	G3RCV	G3KYV	30	6,146	95	295	2	17	13,623	131	540	3										
32	19664	Derby and District ARS	G2DJ	G3ERD	20	7,727	48	370	3	32	9,282	76	377	5	27	2,655	16	112	3					
†	19431	Flintshire Group	GW3ITZ	GW8AHI	44	2,960	35	275	3	31	9,550	72	387	5	8	6,291	27	261	2					
33	18797	Guildford and District ARS	G3TLM	G8ACJ	24	6,849	78	562	5	36	8,136	64	605	5	21	3,812	25	90	1					
34	17918	Cheshunt and District ARS	G3FD	G3EGD	32	5,824	58	280	3	37	8,107	95	315	4	20	3,987	25	156	1					
†	15689	Blackpool and Fylde ARS	G3UIS	G3UIT	25	6,617	48	469	3	35	8,139	54	467	3	34	933	8	78	5					
35	13858	Oxford and District ARC	G3UJO	G3PMI	34	5,629	62	269	3	34	8,232	74	330	5										
36	13340	Kintyre and Argyllshire	GM3RWM		5	12,382	58	654	3	51	958	6	299	2										
37	12430	Cornish V.H.F. Group	G2BHW	G3XC	43	3,677	26	375	2	38	7,893	37	500	2	35	660	2	140	1					
38	12332	Reading Group	GW5DF	GW5HZ	15	9,672	62	460	2	49	2,660	24	300	2										
39	11795	Lichfield ARS	G3NLY							24	11,795	94	375	3										
40	11121	Cardiff Group	GW5BI							27	11,121	89	392	4										
41	11030	Purley and District RC	G3KTA	G3GKF	33	5,741	87	296	5	43	3,828	52	280	4	31	1,461	12	101	2					
42	8939	Worthing and District ARC	G3JHM	G3FRG	36	5,255	57	340	4	44	3,684	30	330	4										
43	8082	Pontypool ARC	GW3RNH	GW2HIN	40	4,094	29	290	1	41	4,088	40	280	4										
44	7271	Ballymena RC	GI3PDN		22	7,271	49	604	3															
45	6957	Durham City ARS	G3UTS	G3TAK	41	4,081	19	455	3	48	2,876	27	410	8										
46	6953	Dundee Group	GM3NHQ	GM3KYI	27	6,310	15	752	1	53	645	10	135	1										
47	6397	Leyton Group	G3VMS	G3SDQ						46	3,241	53	275	3	25	3,156	26	110	4					
48	6107	Northern Heights ARS	G2SU	G3UBI	47	2,580	22	458	2	45	3,527	35	212	2										
49	5764	Durham	G3LWW		49	879	5	400	1	40	4,885	27	900	2										
50	4661	Plessey (West Leigh) RS	G3IFF		38	4,661	53	420	4															
51	4454	Yeovil ARC	G3CMH	G8AFA						42	3,869	32	300	3	36	585	4	68	1					
52	4183	West Middlesex	G3ERO		39	4,183	48	340	3															
53	3042	Somerset	G2WS							50	1,833	21	210	1	32	1,209	7	122	1					
54	2918	Loughton and District RS	G8AB							47	2,918	43	368	3										
55	2080	Preston ARS	G6FC		48	2,080	48	270	4															
56	1119	Kent	G8AQA												33	1,119	10	70	2					
57	654	Middlesex	G2AVC		50	654	12	132	1															

† = Late entry



The 2m and 4m stations of the Durham City Amateur Radio Society during V.H.F. Field Day. G3UIR is operating the 2m station while G3LIV carries out repairs to the 4m rig.

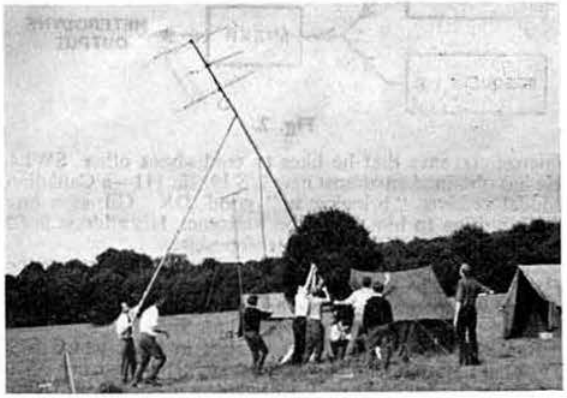
evidence. Two groups (Luton and Severn Valley) used transistorized versions of the popular K6AXN converter while at least three other solid-state oscillator chains were used.

Most of the aerials were parabolas of between 3 ft. and 6 ft. in diameter but there were two corner reflectors and a cylindrical parabolic reflector.

Comments

Many groups requested an earlier start and finish to the contest to eliminate difficulties in dismantling stations in poor light.

The increased activity on the u.h.f. bands prompted several suggestions that three stations should be permitted in



Members of the Purley and District Radio Club during a critical stage in the erection of the 2m and 70cm aerials. Left to right: G3GKF, G3UFY, SWL Chris Amery, G3UOR, G3TWJ, SWL A. Vizoso, G3KTA, SWL Ian Whitehead and G3VKI.
(Photo by G3FTQ)

G3ODY and G3GHI operating G3ODY/P, the Surrey Radio Contact Club's 144 Mc/s station at Ditchling Beacon in Sussex.
(Photo by G3IAS)

future. Comments for and against this proposal would be appreciated by the V.H.F. Contests Committee.

Only one group this year multiplied the distance for each contact on the u.h.f. bands by the band multiplier instead of adding the distances before multiplying.

Several groups failed to send a summary sheet as required in Rule 10.

The dreadful weather on the Sunday forced many stations to close down to prevent damage to aerials and tents.

The 2m long Yagi used by Mid-Essex snapped in half and the 4 ft. dish sheared its clamps and sailed off down the hill.

The station tent at Pontypool ARC's site blew down at 08.10 and the operator was heard to say " leave me here, it's dry inside! "

It should be pointed out that accommodation is not confined to tents, the only requirement being that no stations may be erected on the site prior to the starting time. There were few points regarding operating. Lack of c.w. was mentioned by the more remote groups while several operators requested that stations should state their tuning intentions. " Tuning the band for any possible call " conveys no information. " QRZ around the band " also leaves something to be desired. " Tuning high to low," " Tuning 144·4 up " (on signing with a station on 144·4 Mc/s) or similar statements enable calling stations to judge their chances of making contact and to keep the length of calls to a minimum.

Check Logs

Check logs were received from the following stations and are gratefully acknowledged: G2BQ, G2CHM/P, G2CZH/M, G2DHV, G3JCZ/P, G3NPU/P, G3OHX/M, G3STQ, G5BB, G8ART, GI3HXV, GI3PGG, BRS15744, BRS15822, BRS26234, A3696, A3942, A4048, A4743, A4752, A4871 and A5032. Listener logs will be credited to the V.H.F. Listeners' Championship.

RAE Course

Applications can now be accepted for enrolment to the second term of an RAE Course being run at Chingford Community Centre. Application should be made to the Principal, Chingford Community Centre, Friday Hill House, Simmons Lane, Chingford, London, E4.

QUA Associates

conducted by "JIX"

HOW the time passes so quickly. Literally months have passed since we suspended "QUA Associates" "for a little while." I must apologize to all the members who have written to me, both about the absence of *QUA* . . . and for not replying to some of the letters. There must be quite a number of new call-signs that have arisen from the ranks of our old readers, and so congratulations if this applies to you. Also, there are the new "A" members who have joined the Society since the last appearance of *QUA* . . . Best wishes to you also: no doubt some of these new members will drop a line in due course regarding their activities.

Your scribe hopes that plenty of opportunities will arise from interesting projects through this coming session, and if

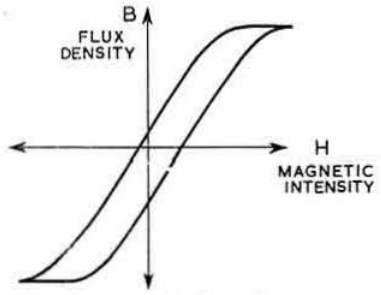


Fig. 1.

you have joined an RAE course I hope you are finding it very interesting. I will look forward to hearing from you in the future, especially regarding the club and group activities that you are engaged in.

Going straight on to a short technical section now, we carry on through the alphabet, dwelling again on the letter H.

H. The symbol for magnetic field strength. Also for the unit of inductance, from Henry, the American scientist who experimented with electromagnets.

Hertz. Heinrich Hertz searched for the electro-magnetic waves that Clerk Maxwell's mathematics had predicted to exist. He found them in the form of radiations from the snapping sparks of a large induction coil. Thus radio communication was made potentially possible, as developed later by such workers as Marconi. The symbol Hz appears to be replacing c/s for frequency, and in future I suppose most dials will be marked in Hz, KHz and MHz!

Hysteresis. It takes energy to magnetize, demagnetize, magnetize in the reverse direction and then demagnetize a particular piece of iron (or iron alloy). This energy appears as heat, and the particular performance of an iron core is understandable by means of its hysteresis loop (or curve), Fig. 1.

Heterodyne. This word comes from the combination of two "bits" coming down from the Greek Language: Hetero—meaning *different* or *other*, Dyne (from dunamis) meaning *power*. It means mixing together two *different* frequencies (r.f. energies) to produce a *beat* or the heterodyne. Thus any whistles produced in a receiver are heterodynes, including the c.w. beat oscillator signals. Superheterodynes are receivers with a local oscillator which mixes a signal with the one picked up so producing a heterodyne—in this case a high frequency one (supersonic) which forms the intermediate frequency (Fig. 2). In the next issue we will continue with a simple design for an add-on heterodyne oscillator suitable for a simple receiver.

R. M. Gilchrist, A5094, writes to say that he hasn't noticed any *QUA*s in recent additions of the BULLETIN. (He's right!), but he is obviously getting on with tech. projects.

Trevor Plumb, A5082, writes his first letter and says that he has obtained an Eddystone 380X. I'm glad to hear you have a school radio club Trevor. He would like to correspond with other "A" members of 14 or 15. Trevor's address is Royal Russell School, Addington, Croydon, Surrey.

Paul Harris, A4410, has recently moved from Scotland to Sheffield and as Paul knows nobody there, he wonders if there are any other "A" members in Sheffield who would like to get in contact with him at 9 Stunperlowe Hall Road. Sheffield, 10.

Malcolm Pritchard, A4894, writes again saying that he took the May RAE and that the most useful book was the *RAE Manual*. He suggested that the chapters on semiconductors could be expanded and a few more specimen papers included.

Philip Reilly, A4054, writes in defence of remarks by A4635 about Liverpool (it's still quite a hive of activity there!).

N. Mugford writes from Cyprus and says the reception of G-stations is not easy out there. He his hoping to get an AR88 from one of his fellow club members.

Gil Wylie A3699 reads *QUA* every month with great

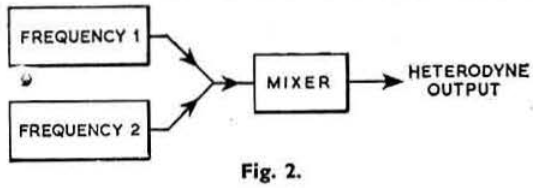


Fig. 2.

interest and says that he likes to read about other SWLs. He has obtained an almost new WS 19Mk. 111—a Canadian Model receiver "bringing in" good DX. Gil says any SWL writing to him would be welcome. His address is 82 Glenpatrick Road, Elderslie, Renfrewshire.

Derek Taylor, A4558, writes from Scotland and wants the *QUA* page to be kept up. His gear at present consists of a five valve superhet—a home brew from a blueprint in one of the "Mags" and a No. 18 set Mark 3.

Paul Gaskell, A4035, has a project in hand which is a Top-Band portable/mobile equipment. He's starting on a converter for 4m and says it will make a change from 160m. Paul intends to take the RAE in December—good luck Paul, and to all the other candidates.

That's all again for this month, so with best 73 until next time, here is your scribe signing off.

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

Single Sideband

By G. R. B. THORNLEY, G2DAF*

THE principle of converting a wanted input frequency on several amateur bands to the receiver tunable i.f. with a range of 500 kc/s is now in common usage and well known. In order to obtain the required stability, the first conversion oscillator is normally crystal controlled. For six amateur bands this requires the use of six crystals and at current market prices the initial cost is not unreasonable.

Consider therefore the difficulties of providing crystals for a continuous coverage receiver designed to operate over the range 0·5 Mc/s to 30·0 Mc/s. Assuming that the tuning remained the same at 500 kc/s, the requirement would be no less than 60 front-end crystals. In addition to the problem of providing a sophisticated switching network to enable any one of 60 crystals to be connected into the circuit, there would be the effect of this requirement on the total cost price of the receiver—in fact the crystal costs would become a significant proportion of the whole. It is not surprising therefore, that communication receiver manufacturers have looked for alternative methods of front-end frequency control, and that development has proceeded along the alternative path of utilising harmonics from a stable low-frequency single crystal oscillator, to either directly heterodyne the incoming signal, or alternatively to lock a separate tunable L/C high frequency oscillator. The National HRO-500 solid state receiver uses the latter system and the method developed by the National design engineers is of sufficient interest to merit a detailed description.

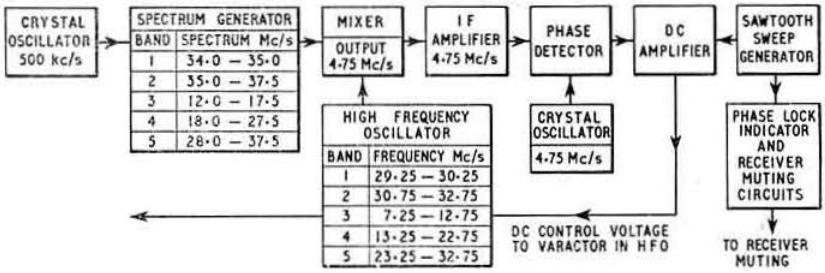


Fig. 1. The basic block diagram of the HRO500 synthesizer.

The National HRO-500 Frequency Synthesizer

The basic operation of the synthesizer portion of this receiver is most conveniently followed by reference to the block diagram shown in Fig. 1. Fifty-two discrete oscillator signals are generated from the harmonics of a single, highly stable, crystal oscillator operating at 500 kc/s. These discrete oscillator frequencies occur at intervals of 500 kc/s starting at 12·0 Mc/s and ending at 37·5 Mc/s. In addition to generation of the high-frequency oscillator signals, phase lock indicator circuits provide a front panel warning that the synthesizer circuits are out of lock. Receiver muting circuits prevent reception until the correct high-frequency oscillator injection has been restored.

The stable 500 kc/s crystal oscillator drives a spectrum generator providing a coherent burst of energy. The coherent nature of the spectrum generator signal ensures that the output will contain only harmonics of the original 500 kc/s reference frequency. However, the harmonic content will have an amplitude distribution around the tuned frequency of the spectrum generator, with the harmonics of maximum amplitude always occurring at the spectrum generator frequency. The nature of the frequency and time domain of the spectrum generator signal is shown in Fig. 2. The spectrum generator is bandswitched and tracked to the high-frequency oscillator so that the harmonic of maximum amplitude will fall between 12 Mc/s and 37·5 Mc/s as required for correct phase lock and control of the synthesizer portion of the HRO-500.

The output of the spectrum generator is coupled to a mixer together with a signal from the tunable high-frequency oscillator. As the high-frequency oscillator is 4·75 Mc/s below the desired spectrum generator output, a 4·75 Mc/s signal is obtained. This signal is in turn amplified and fed to the phase detector.

A second crystal controlled oscillator operating at 4·75 Mc/s provides the gating signal to the phase detector. If the output from the i.f. amplifier at 4·75 Mc/s is not identical to the output from the 4·75 Mc/s crystal-controlled oscillator, an audio beat note is generated whose frequency is the difference between the oscillator and the i.f. output frequencies. This audio beat note is amplified by the d.c. amplifier and applied to a varactor in the high-frequency L/C oscillator circuit. The audio signal thus applied will cause the high-frequency oscillator to sweep in frequency at the best note rate, resulting in a sweep of the 4·75 Mc/s i.f. amplifier out-

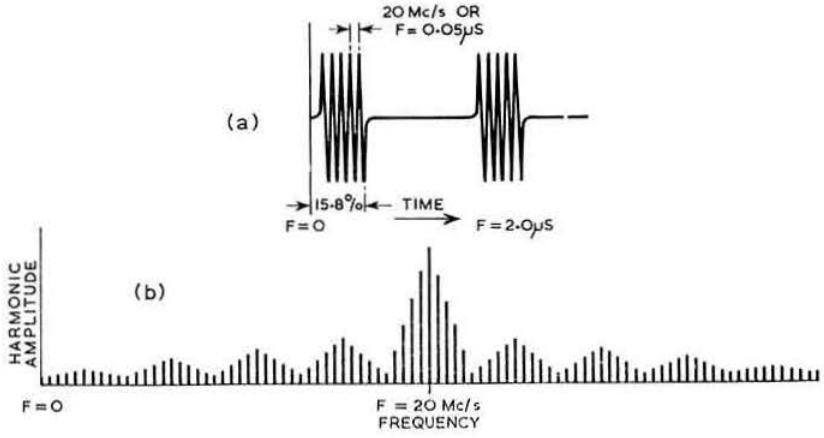


Fig. 2. The spectrum generator frequency and time domain.

*5 Janice Drive, Fulwood, Preston, Lancs.

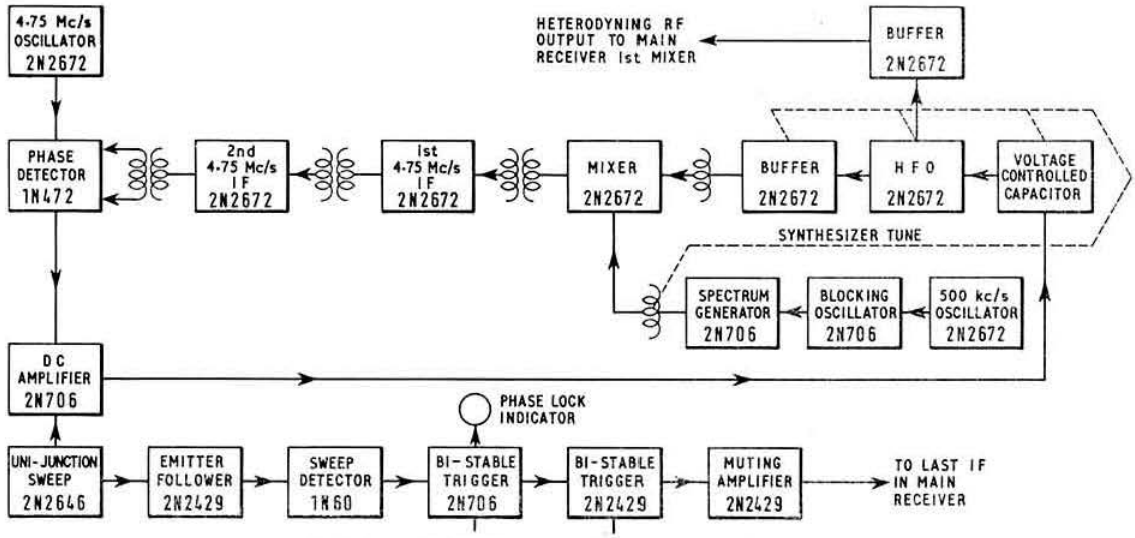


Fig. 3. A detailed block diagram of the synthesizer circuit.

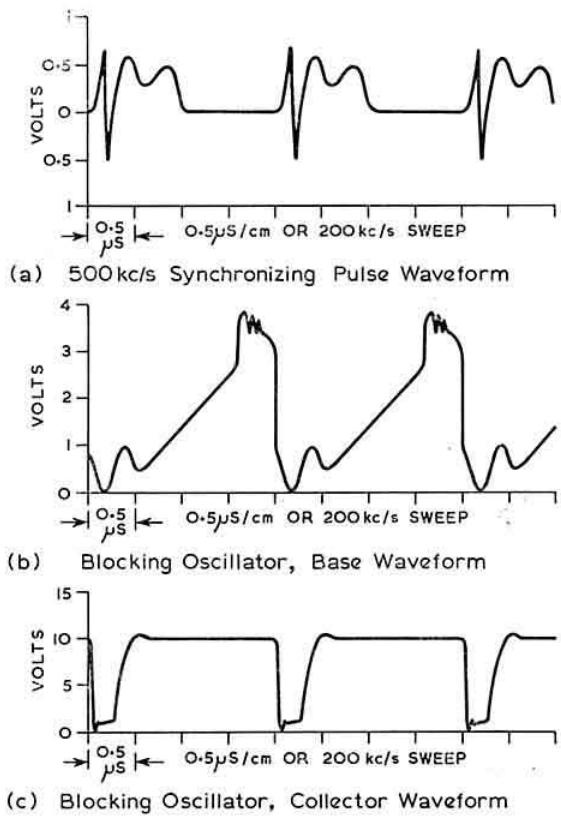


Fig. 4. Spectrum generator waveforms.

put. Within one cycle the i.f. amplifier output should approach and equal the output of the 4·75 Mc/s crystal-controlled oscillator, at which time the polarity of varicap control is such that the two frequencies will lock together. As the frequencies are now identical there can be no beat note; there will be however a d.c. output whose amplitude and polarity is determined by the phase angle difference between the two signals arriving at the phase detector. Any drift of the high-frequency oscillator will cause a phase change and in turn, a d.c. output change of proper polarity will be applied to the varactor and cancel the original drift. Thus the high-frequency L/C oscillator is phased locked on a cycle-for-cycle basis with the desired harmonic of the 500 kc/s reference oscillator.

When phase lock control is lost, the high-frequency oscillator signal may be widely removed from that required to phase lock with the desired spectrum generator output harmonic. A sweep generator is incorporated to vary the varactor voltage from +3 to +8 volts by the sweep generator saw-tooth, thus ensuring a wide frequency scan of the high-frequency oscillator until a 4·75 Mc/s i.f. amplifier output again occurs at the phase detector. The 4·75 Mc/s output will cause the phase loop to lock and the sawtooth generator to cease operation. During such times that the phase loop is sweeping, the output of the sawtooth generator is detected and amplified to light the PHASE LOCK indicator lamp on the front panel. Additional circuits filter the lamp information and generate a muting signal to silence the 230 kc/s receiver i.f. during those periods when the phase loop is out of lock. When phase lock is restored, the sawtooth sweep generator can no longer function, the phase lock indicator lamp is extinguished and the receiver is restored to normal operation.

Examination of the detailed block diagram shown in Fig. 3 will help in understanding the detailed description.

The crystal controlled 500 kc/s reference oscillator is a conventional Pierce circuit with feedback through the 500 kc/s crystal to the base of the transistor. This oscillator has been designed to be well overdriven so that collector current flows during a small percentage of the 500 kc/s repetition rate and develops a short positive pulse. This is shown in the waveform of Fig. 4.

The 2N706 blocking oscillator is adjusted to free-run at a frequency just below 500 kc/s. The pulse from the 500 kc/s oscillator is coupled to the blocking oscillator base circuit through a transformer and this pulse synchronizes the blocking oscillator frequency to the frequency of the crystal controlled oscillator. The blocking oscillator base waveform is shown in Fig. 4. The large amplitude negative pulse, shown in the lower diagram of Fig. 4, is coupled to the base of the burst generator transistor.

When the blocking oscillator pulse arrives at the base of the burst transistor, the system is driven to cut-off, collector current flow ceases, and damping is removed from the tuned circuits. The stored magnetic energy in the tuned circuit will cause a high amplitude oscillation which is available as a spectrum generator or interrupted oscillator signal. The burst generator output circuit coils are switched with the main bandswitched section and tuned with a section of the synthesizer tuning control to provide tracking of the burst oscillator free-running frequency to the frequency of the desired harmonic output. This waveform is shown in Fig. 5.

The blocking oscillator coil and circuit are constructed so that the output pulse width has approximately a 5·8 per cent. duty cycle. This duty cycle causes a harmonic output from the spectrum generator which is essentially zero at all frequencies which are nineteen harmonics removed from the desired harmonic frequency. Harmonics occur every 500 kc/s, therefore the harmonic which is removed from the desired harmonic by 9·5 Mc/s is eliminated. This frequency corresponds to the image frequency of the 4·75 Mc/s i.f. operating in conjunction with the high-frequency oscillator. Thus the system is relatively free from images and no additional selectivity or harmonic filtering is needed prior to use of the burst oscillator signal in the comparison mixer.

The output of the spectrum generator and a signal from the high-frequency oscillator are coupled together at the base of the transistor comparison mixer. The output of this mixer is coupled to the first and second 4·75 Mc/s i.f. amplifiers; the final transformer has a balanced centre tapped secondary winding which provides two outputs with a 180° phase difference for the phase detector.

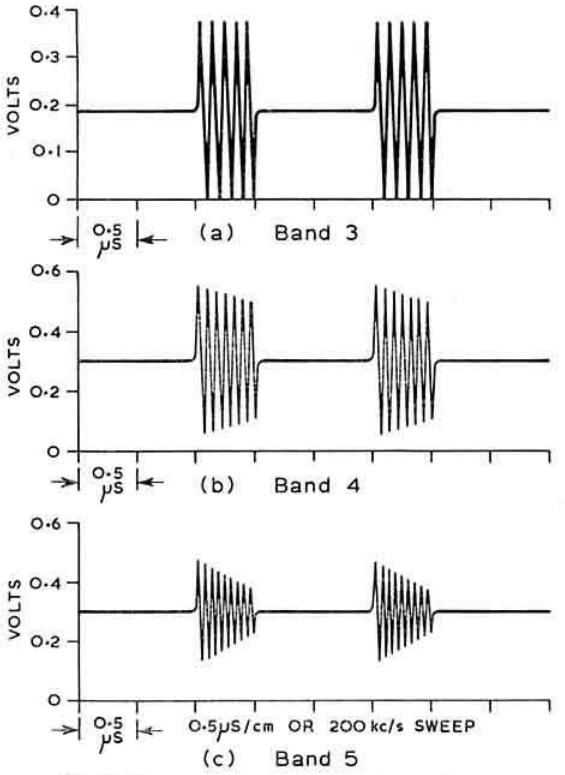


Fig. 5. The spectrum generator output waveform.

Two balanced diodes in the phase detector receive the balanced output from the i.f. stages at approximately 4 volts peak-to-peak, together with an independent signal derived from the stable 4·75 Mc/s crystal oscillator. This oscillator is operated in grounded base configuration with feedback from collector-emitter. A 4 volt oscillator signal is applied in parallel to the phase detector diodes and this gating signal in conjunction with the signals from the comparison i.f. causes one of the diodes to conduct more heavily than the other, resulting in a negative or a positive output at the junction of the diode load resistors. Actually the d.c. amplifier is so constructed that negative signals will take it beyond cut-off. Therefore, phase lock will always be obtained with a positive output sense from the phase detector. In normal operation, phase lock control will usually be obtained for phase detector voltages between +0·3 and +0·8 volts.

Output from the phase detector is fed through a low pass filter and through the d.c. amplifier, and will normally fall within the range +3 and +8 volts when the synthesizer is correctly operating and locked. This d.c. output is applied to the varactor VC-47, connected to the tuned circuits of the high frequency oscillator in such a way that varactor control will be substantially constant from band-to-band depending on the padding capacitors in use.

The high-frequency heterodyning oscillator is operated in the grounded-base mode with a tuned circuit functioning as the collector load. The three associated coils are bandswitched and padded to ensure correct frequency range and synthesizer dial calibration; the tuning capacitor being controlled by the SYNTHESIZER TUNE control. Output from the high frequency oscillator is taken through a buffer amplifier to the first conversion mixer in the main receiver. In addition to this, a second output is taken to the synthesizer mixer (after amplification), thus completing the phase-lock loop.

When the phase-loop circuit is not locked, the high-frequency oscillator may not be at a frequency 4·75 Mc/s below the desired harmonic output from the spectrum generator, and the system will not lock. To overcome this possibility, a unijunction sweep circuit is incorporated in the HRO-500 synthesizer. This network has the additional function of providing gain frequency characteristics in the control circuits to ensure stable phase-loop operation. In the event that there is no i.f. output, there will be no output from the phase detector, and the transistor d.c. amplifier will be cut off. Under these conditions the unijunction sweep transistor and associated circuits, will produce a repetitive sawtooth that will swing the varactor through a considerable capacity range and cause a rapid frequency scanning of the high-frequency oscillator until such time as a 4·75 Mc/s i.f. signal results. At this time a d.c. output will be obtained from the phase detector that will prevent the d.c. amplifier reaching cut-off and the saw tooth sweep will cease.

The sawtooth appearing at the base of the unijunction transistor is fed through an emitter follower to a bistable trigger whose return circuit is fed through the PHASE LOCK indicator lamp. If for any reason phase lock is lost, the resultant sawtooth switches the bistable trigger to conduct heavily and light the indicator lamp. When phase lock control is resumed, the sawtooth waveform will disappear the bistable trigger will " open " and the PHASE LOCK indicator lamp will be extinguished. Additionally the bistable controls a muting amplifier connected to the third 230 kc/s i.f. amplifier in the main receiver, so that the receiver is held inoperative until such time that correct phase lock has been resumed.

South Western Regional Meeting

2 October, 1966

APPROXIMATELY 75 members and guests assembled at the Royal Hotel, Weymouth on 2 October, 1966, for the Region 9 ORM.

The Representatives of Region 9, Mr R. E. Griffin, G5UH, and Region 17, Mr L. Southwell, G3JLS, were present: RSGB Council and Headquarters were represented by Mr L. E. Newnham, G6NZ, Mr G. Twist, G3LWH, and the Society's General Manager, Mr J. A. Rouse, G2AHL.

The programme commenced with a conducted tour of the BBC Short Wave Station, Rampisham, visitors being guided to the area by G3TTC and G3OAP, talk-in stations on 1875 kc/s and 70·38 Mc/s.

At the Business Meeting following the luncheon at the Royal Hotel, Mr W. A. Scarr, G2WS, Past President, and Mr J. Etherington, G5UG, Council Member, accepted invitations to join Official Representatives on the platform.

The meeting was opened by Her Worship, Councillor Mrs L. Hill, Mayor of Weymouth who extended to members a cordial welcome to Weymouth and expressed interest in Amateur Radio activities. A bouquet was then presented to the Mayor by the General Manager's daughter, Sarah.

Official speeches from the platform were dispensed with and the meeting was thrown open to questions and discussion by members. These included increased use of the 7 Mc/s band to justify retention of the frequency internationally and G3NOF raised the subject of Regional Lectures and the RSGB tape library service. Extension of the latter was highly desirable and offers of assistance in this matter were requested from members. Reciprocal licensing in Germany was raised by G3DTB, and G6NZ spoke on the RSGB International Radio Communications Exhibition and on licence regulations. G6SV raised the matter of BULLETIN delivery and G3KUJ asked about matters regarding the G8-licence, referring especially to possible extension to include 144 Mc/s. Much discussion on this took place, including increased use of 70cm. G2WS offered practical suggestions for organizing increased u.h.f. activity and G3NOF raised the problem of interference on 3·5 Mc/s in his area. Many other matters were raised and the meeting was closed by the Regional Representative at 4.30 p.m.

After the meeting came the Draw which was organized by the Weymouth/Dorchester and Yeovil groups. During the afternoon, the ladies were conducted on a coach tour of the area organized by the wife of G3EAT.

Tea was at 5 p.m. and was followed by a highly interesting lecture on " H.F. Aerial and Feeder Matching Problems " by Mr R. A. Herbert, M.A., C.Eng., A.M.I.E.E. of the BBC Engineering Dept at Rampisham. This was well received and much discussion followed.

The ORM was brought to a close at 8 p.m.

The Regional Representative, G5UH, wishes to acknowledge the work carried out by Mr W. H. Burden, G3EAT, and local members in the organizing of the event, and to Mr R. A. Herbert for undertaking the lecture at short notice.

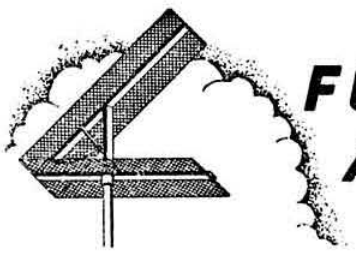
Region 1 Lecture

MERSEYSIDE

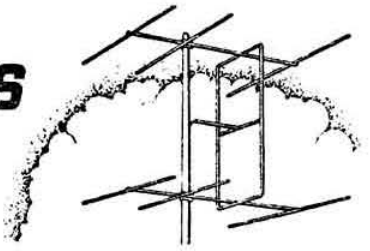
Aerial Power Tactics

Mr Peter Jones, G2JT, will deliver a lecture entitled "Aerial Power Tactics" in Liverpool on 25 January, 1967. Tickets will shortly be printed and will be available free of charge from B. O'Brien, G2AMV, 1 Waterpark Road, Prenton, Birkenhead.

Please apply early as a large attendance is anticipated.



FOUR METRES AND DOWN



By JACK HUM, G5UM*

Seymour V.H.F.

YOU could see more v.h.f. devices than ever at the 1966 RSGB International Communications Exhibition. Not only were the well known products on the stands where you would expect them to be (many of them a challenge to the amateur constructor to build anything as good, if he could, and as in fact he did on the home construction stand), but several quite new items of distinct promise made their début at the Seymour this year.

After all the comment which has appeared in " Four Metres and Down " and elsewhere on the subject of signal shifters and sideband for v.h.f., there was a thoroughly topical note about the introduction by TW of an equipment intended to appeal to the h.f. bands operator who wishes to " have a go " with sideband on v.h.f. using his existing signal source.

Rated at 150 watts p.e.p. at 2m this new addition to the famous line of TW devices for v.h.f. has a QQV06-40A output stage and a neat oil filled dummy load. A built-in Nuvistor converter produces an i.f. of 28-30 Mc/s. The r.f. unit will cost £69 and the p.s.u. £30.

Delivery, reported G3HGE, justifiably proud of this first design to come out of his new works at Bury St. Edmunds, is about three months from date of order.

In view of criticisms which have been levelled at 2m sideband, on both operational and technical grounds, it is heartening to learn that TW will include in the instruction book about this new equipment some notes on the proper use of s.s.b. on the " very highs."

Elsewhere in the Seymour Hall further emphasis on signal shifting was in evidence on the Amateur Radio Mobile Society's stand. Here the effect of " pulling " a crystal's frequency by adding parallel capacitance was demonstrated on a digital counter. The ease with which a 6 Mc/s crystal could produce a 5 kc/s swing at 2m by varying a 10-150 pF capacitor must have persuaded many watchers to join the increasing number of operators who already use this technique for " getting out from under." Wisely, the ARMS folk reminded onlookers that the degree of shift would be determined by the activity factor of the crystal in use.

On opposite sides of the centre aisle were J-Beams and Electroniques (STC) Ltd., each showing the " Channel Master " aerial rotator. The latest version exhibited at the Seymour received a work-out that must have crowded into the four days of the exhibition the equivalent of a year or two's rotation under normal conditions; visitors were invited to pre-set the pointer on the console to a desired bearing and to watch the cursor lock on to it while the 8-over-8 J-Beam up aloft went round. The rotating unit and the companion console with built-in step down transformer to 22 volts was listed at 17 guineas.

Apart from the professional v.h.f. offerings there were, on the Home Construction stand, several forward-looking designs of such impeccable finish as to dispose once and for all of that silly appellation " home brew." There was nothing wet about *them*!

Congratulations of course to G8ACC for winning the " Thorogood Plaque " with his 7 watt transistor transmitter for 432 Mc/s, to G3HBW for the now well known FET converter for 432 Mc/s and to G3NRI for his 144 Mc/s transverter (the two latter members get RSGB cash awards); but congrats also to everyone else who entered a " piece " but did not win anything, for it was their example that mattered. If there are any commiserations to hand out let them go to the judging committee who were faced with so many " bests " that it must have been heart-breaking to deny any of them a prize.

So much for one man's very quick v.h.f. round up at the Seymour, and quite possibly an incomplete one at that (apologies in advance for any omissions).

Morse from " B " to " A "

Holders of Sound Licence B are not permitted to use Morse or frequencies below 427 Mc/s. Some of them want to. This means learning the code and taking out a Sound Licence A. Hence the recent requests for " Slow Morse on Seventy," or even on " Two."

These requests were quickly met by four or five operators who at once got in touch with G3KGU, the Society's slow Morse practice organizer, and offered their services. Not all were in areas where there was a large enough " clientèle " to justify the effort, but some of them were. First off the mark seems to have been G3OWA whose magnificent 70cm signal from quite a low power rig has already been heard up country to the extent of 40 or 50 miles on 432·5 Mc/s at eight o'clock on Tuesdays or Wednesdays.

Farther north a regular sked kept by G3NNW of Rochdale with G3LLE of Sheffield *on telegraphy* offers a source of most valuable practice. Their frequencies are 433·08 and 433·52 Mc/s respectively, and the circuit operates every Wednesday at 20.00 GMT.

" There's a 1200 ft. monster hill slap in the direct line between us but we always manage to make a QSO," reports G3NNW, who goes on to say: " We stick to about 8 to 10 w.p.m. and natter for about half an hour. I am always looking for c.w. contacts on 70cm so urge the lads to polish up their brasses!"

How the Morse problem looks to a G8-plus-three is described by G8AHZ of Didcot in Berkshire. Peter says: " Living away from a high activity area and in a 200 ft. hole in the local terrain, I find 70cm needs an evening of knob twiddling and beam turning to make sure of a signal. On the other hand, 2m sounds more like a ham band, even when using a simple 2-element quad, and there are nearly always signals to be heard without any beam twiddling or having to work the other fellow on the landline first! In short, my aim is to get on to 2m."

Like many other G8-plus-three men he is not in a position to receive whatever slow Morse may be going on 1·8 Mc/s.

* Send reports for the January issue by 12 December to G5UM at 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester.

Again, like many other G8-plus-three men, he thinks it would be a very good thing if the Sound Licence B holders were at least given the opportunity to use 2m.

Up Derbyshire way a useful service is being provided by G3LGK of Ilkeston every Thursday as follows:

19.00 GMT, beaming south-west;
19.45 GMT, beaming south-east;
20.30 GMT, beaming north-west.

The frequency in use for these slow Morse practices should be noted by all North Midland and South Yorkshire listeners likely to be within range: it is 434·326 Mc/s, well outside the zoned communication area of " Seventy " so that no disturbance shall result to regular users of the 432-434 Mc/s segment. Mode of operation is m.c.w., with A3 announcements.

It would hearten all concerned if listeners to 70cm slow Morse would report results. It can be frustrating to pound away week after week into the "deserted air" (apparently) with no reaction from the " audience," as many 160m slow Morse operators will confirm. Say something, and the services will continue. Say nowt and they won't!

Beaconry

From one type of beacon (the manually operated slow-Morse sending) to another (the automatic tell-you-that-your-converter-is-working-after-all type). . . .

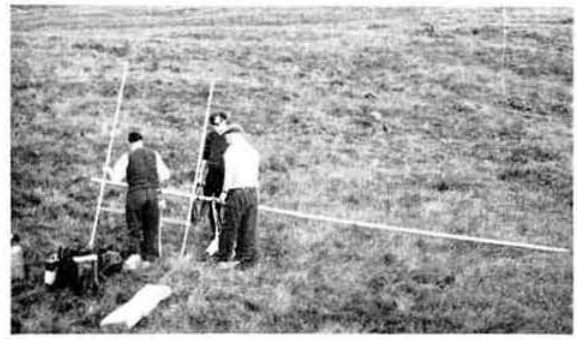
By now many operators in the West Country and Wales are aware that GB3GW atop the Electrical Engineering Department of the University College of Swansea has been radiating since 30 September on 144·25 Mc/s. The output is 5W from what must be one of the most advanced designs of beacon transmitter yet in use anywhere on 2m, being completely solid state with what you might call some sophisticated circuitry if you hadn't looked up that adjective and discovered what it really means (go on, consult the Concise Oxford now!). The aerials, directed slightly north of east from Swansea, should give excellent coverage over the active Midland v.h.f. terrain.

Reporting this good news, Ron Barrett, GW3DFF, says: " Reports of reception of GB3GW will be welcomed, and will be acknowledged by a special QSL with a photograph of the aerial arrays." It is worth recording that an excellent press coverage was secured for the beacon's advent by means of a story in the *South Wales Evening Post*. This item was far removed from some of the fatuous flam that smears across the columns of the local Press when attempts are made to do a good job of public relations about Amateur Radio.

In the Swansea case, no individual local member was identified—which was quite a change, seeing how often local papers insist on " the human angle." This is how the members wanted it. What they also wanted was a sensible description, preferably with a nice big top-column picture of the GB3GW mast complex on the roof of Swansea University College, and these things they got—because, we suspect, they carefully briefed the Press, and the Press in turn reacted enthusiastically and accurately.

Rather farther to the south-west, the new 70cm beacon from Cornwall had not appeared on the air at this writing, although the exciter chassis construction is coming on apace. When GB3CTC *does* appear on 70cm it will provide an invaluable marker of DX-ish quality to the majority of users of the band.

Worthing's Don Hayter, G3JHM, who has done so much to help the 4m Gibraltar beacon into satisfactory service, reports that ZB2VHF from its excellent new site should be fairly regularly audible in the UK. From his South Coast location he has heard it a number of times, under m.s. conditions, as have G3JVL, G3PLX and G3GHO. Reports on ZB2VHF from 4m operators would be most welcome from any district.



The Cumberland and Westmorland V.H.F. Group took part in the Region I Field Day on 11 September. G3BJD, G3YJ and Bill Byers are seen assembling a 2m 6-over-6 aerial at the site, 6 miles north of Millom in Cumberland. *(Photo by G3VJI)*

Skeds Operative and Wanted

It seems appropriate to follow beacon news with sked news, since transmitting schedules regularly kept do indeed have a beacon-like quality—psychologically as well as electronically—to remote listeners in search of a signal.

All who have followed the well known schedules from G3OCB of Truro to G3BA of Sutton Coldfield and to G3SHK of North-West London will like to know that these now operate at 22.15 and 22.00 GMT respectively on the national sideband channel of 145·41 Mc/s, Monday evenings. Even taking into account the penetrative quality of s.s.b., these schedules over difficult landward paths reflect great credit on the operators concerned and their equipments.

Almost as far north-west as Truro is south-west, while still remaining in England, there is another " out in the blue " operator whose activities will have many people listening out for him. He is G3OHK of Workington in Cumberland, who in company with local colleagues G3BJD and G3RHE regularly activates the top end of the 2m band every Sunday at 10.00 GMT. Well situated on high ground overlooking the Solway Firth to the north and with sea paths to Ireland and Wales, G3OHK will welcome 2m skeds at any time on Sundays after the local three-way has finished. His QTH is 25 Causeway Road, Seaton, Workington, Cumberland.

Another long haul sked in which the redoubtable G3SHK is engaged is that with the Liverpool University Amateur Radio Society's station, G3OUL. Time 20.00 GMT Mondays, usually on the s.s.b. channel of 145·41, while G3OUL operates phone and c.w. on 145·38 Mc/s.

As for " Skeds Operative " on 70cm please re-read the foregoing item about G3NNW and G3LLE and regard it as coming under this heading, too. And if you are farther south than the Sheffield to Rochdale path take note of a new schedule which has just come into operation in east London, to help swell the amount of Home Counties activity to be heard on Monday evenings. Called "The North East London Net," its operation is described by G8APJ of Leyton in the following terms:

" The procedure is as follows: Whoever calls 'CQ Net' is controller for that evening (Monday nights at 21.00 GMT). As each operator calls in he reports his call-sign and frequency to the controller. And as each finishes his over he passes it back to the controller who then specifies who is to transmit next, and on what frequency. Anybody with RS59 signals is welcome, whether with wide band or narrow band converters."

This seems to us to be a well organized arrangement. May it enjoy many " checkers in " to help sustain its activities. It will certainly encourage operators outside the immediate vicinity to lie in wait for contacts after the net has finished, as the Mid Herts operators have found on 433·1 Mc/s these last two years—again Mondays at Nine.

Four Metres Versus Channel 4

The concatenation of the 4m band with TV Channel 4 in the Midlands has discouraged many operators from coming up on 70 Mc/s while video is on. One answer: get away from it all by going portable. By the time these notes appear, the December c.w. contest may have seen several operators doing precisely this, despite the rigours of operating /P in this climate of ours at the height of winter. (Now say it couldn't have been much worse during V.H.F. NFD this year, and you will find many seconders!)

Just what can be done on " Four " by hitting the high spots has been demonstrated for quite some months past by G3RWM of Erdington, whose habit has been to take his TW Communicator out to Barr Beacon three miles east of Walsall and 700 ft. up. The aerial, *electrically rotated* from the operating position in the car, is a three-element Yagi, and most of these islands have been covered, from Antrim to Rutland. The customary frequency at G3RWM/P is 70·47 Mc/s but nine other crystals are available. And in spite of the onset of winter it will still be well worth listening for him every Sunday throughout the day. His comment, to stimulate more 4m activity, is:

" It is believed that there are still many B44 and Reporter rigs that have not been aired lately. Perhaps with the details of the G2WS high-*Q* filter in mind some of their owners may emerge from hibernation."

More " Four-Nets " Mobile

Further to last month's note about the 4m mobile net activity in the Malvern area, news comes from Cambridge that a similar scheme is about to be initiated there. The common frequency will be 70·225 Mc/s, at least to start with, and G3EDD, G3GGK, G3KRL and G3MGM are already equipped with the gear and mobile whips in readiness.

" On the way to work and on the way home " is the intended mode of operation, as it so successfully is elsewhere.

The Cambridge members declare that their enthusiasm was largely inspired by a visit to the recent EI/GI convention when the well-integrated net that spreads from Belfast southwards to well over the border was heard in operation.

" You need only put out a brief CQ Four on 70·26 Mc/s in Ireland and you can be pretty sure a GI or EI will be there waiting for you," observes G3GGK.

Turn Beams Ulsterwards!

Still on the subject of 4m in Northern Ireland, here is the other side of the penny: Bert McHenry, GI3NSM, laments the lack of activity to be heard from the mainland, and wishes that the men across the water would turn their beams westwards more often.

Having re-equipped himself with an exceptionally fine station—at least, that is how it looks to us, for there are 50 watts in, a 4-element beam at 45 ft. and an all-Nuvistor converter—Bert is in a position to give long distance c.w. contacts to anyone anywhere at any time: skeds at weekends or late at night would be particularly welcome. His usual frequency is 70·32 Mc/s.

If you want Co. Down for your " Four Metres and Down Operating Award," 70 Mc/s version, Bert is the man to get hold of. Even if you don't, it is well worth thinking around the idea of setting up a regular schedule with him simply in order to promote more activity on the band. The very sound of GI being worked from the mainland is enough " to encourage the others."

IOM Firsts on 432 Mc/s

By any reckoning a 70cm station on the Isle of Man can be regarded as rare (or rarish) DX. So when GD8AGY returned home to the Island from his Cheshire *pied-à-terre* and put himself on the air " Stroke P " he found himself much in demand. In company with G8AEG he notched a large number of contacts from the portable site of which the following are believed to be the first from the Island on 432 Mc/s:

29 July	GD8AGY/P to GW8AHI
30 July	GD8AGY/P to EI2W
31 July	GD8AGY/P to GD3FNQ/M
5 August	GD8AGY/P to GM3FYB

Any claimants to earlier " First on 432 " from GD-land should let " Four Metres and Down " know.

GD8AGY generously acknowledges the first GD-to-G contact to have been made by GD3FNQ/M with G3EKP " . . . his power even lower than my own one watt output so I extend congratulations to him."

In view of the trend towards high gain low input exciter stages in 70cm transmitters, with all the attendant advantages of TVI abatement, less weight, lower power requirements and greater portability, the equipment used at GD8AGY/P is of particular interest. Starting at 8 Mc/s it employed only three valves to get to 432 Mc/s, namely, an ECF82 pentode oscillator and triode tripler, then an E180F doubler followed by a QQV02/6 tripler-p.a., the latter modulated by a pair of OC28 transistors.

Kevin remarks that when the contact was made with GW8AHI the latter had but 4 watts to a 6AM4, a valve we cannot recall previously being used as an output stage—but why not? The similar but more up to date A2521 triode has

BAND PLAN

for

FOUR METRES

A band plan for 4m, based on the zonal plan published on page 804 of the December 1965 RSGB BULLETIN, is being considered by the V.H.F. Committee. Members who have views on this subject are invited to write to Headquarters for a

QUESTIONNAIRE

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

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG*	Craigowl Hill, Dundee	145·985 Mc/s	A1	S
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3GEC	Hammersmith, London	431·5 Mc/s	F1	
GB3GI	Strabane, N.I.	145·990 Mc/s	A1	
GB3LER	Lerwick	145·995 Mc/s	A1	S
GB3LER	Lerwick	70·305 Mc/s	A1	N/S
GB3LER	Lerwick	29·005 Mc/s	A1	N/S
GB3VHF	Wrotham, Kent	144·50 Mc/s	F1	North-West

*Not operational

RSGB V.H.F. BEACON STATION GB3VHF

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

Date	Time	Error
12 October	10.53 GMT	300 c/s low
19 October	13.50 GMT	270 c/s low
26 October	13.47 GMT	220 c/s low
2 November	16.15 GMT	80 c/s low

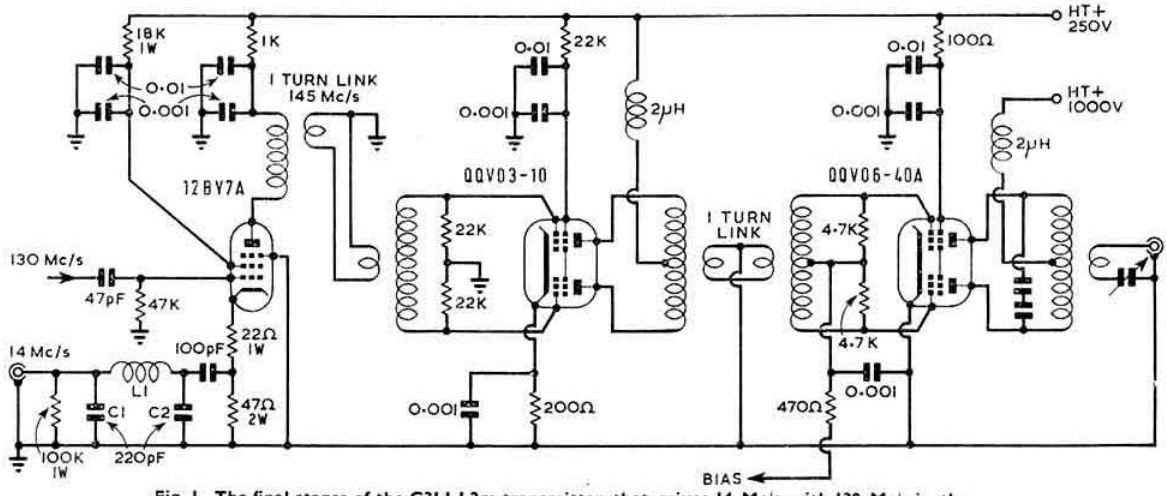


Fig. 1. The final stages of the G3LLJ 2m transmitter that mixes 14 Mc/s with 130 Mc/s in the 12BY7A stage. The inductor L1 in the cathode circuit of the latter consists of seven turns of 12 s.w.g. wire on a ¼ in. diameter former, to a length that would make 8 t.p.i. All other inductors except that for the p.a. final are slug tuned as described in the accompanying note by G3LLJ.

been known on many a field day to have given a good account of itself.

The receiver at GD8AGY/P was as small as the transmitter, consisting of an AF139 trough line pre-amp with a converter-triple-conversion system after it.

"Seventy" on Merseyside

Back now to the mainland, but continuing in a 70cm context, the Liverpool University Amateur Radio Society, maintaining its noted high level of activity, claims to be the first north western station to put a varactor tripler into commission on 432 Mc/s. As from early October one has been pumping out five watts of r.f. on 70cm, driven by the station TW2. One of the members, G8AGG, also has a varactor in use.

Apropos the recent discussion here about the audio characteristic realized from one of these devices, G8AIA, who is a member of the G3OUL fraternity, remarks: " We have had extremely good reports using our tripler, with only a slight deterioration in modulation characteristics as compared with the signal put out by the TW2."

Taking their 70cm equipment out of doors, they put G3OUL/P in operation 1600 ft. up on Merryton Low in Staffordshire during the October 432 Mc/s Open Contest. The claimed score was 5879 points from 66 contacts, and best DX was G3LTF near Chelmsford.

Tech Corner

From G3LLJ

The G3BA mixer unit described in " Four Metres and Down " is of great interest. A unit used at G3LLJ has proved quite useful from 20m to 2m.

In Fig. 1, L1, C2 and C1 represent a half wave filter at 14 Mc/s which offers excellent suppression at 28 Mc/s. The remaining coils except the p.a. are ⅜ in. diameter slug tuned to 145 Mc/s. The only controls required on the front panel are P.A. TUNE and LOAD. To move frequency on 145 Mc/s either the 130 or the 14 Mc/s source may be varied.

The drive at G3LLJ is from a 6AK5 amplifier plus a watt or so at 14 to 16 Mc/s.

A word of warning: don't run a 100 watts or so of s.s.b. into a dummy load and on to the exciter with the sideband rig's gain control down. This is asking for all kinds of spurious responses. Instead, disable the p.a. and take the energy from the driver, thus maintaining a better proportion of audio to suppressed products.

From G3VPF (ex-A4388):

With reference to the comments by A4035 on the A4388 transistor converter for 4m, here are the answers to the very useful points raised:

(a) *Injection:* in the original layout mixing was obtained by coupling L1 to L2, the earthy end of each being adjacent.

(b) *Crystal:* the 65 Mc/s crystal used gives an i.f. of 5·1 to 5·7 Mc/s and is obtainable from Henry's Radio as an HC-6/U third overtone device, operated on its fifth overtone. These crystals are found to be quite active and no trouble was experienced at A4388 in getting any of them to work on the fifth overtone; some will even go off on the seventh overtone.

(c) *Interference from TV:* since the circuit was originally published G3VPF has now set up QTH at Brighton, living within a few hundred yards of the Channel 2 repeater station. Using the original circuit, a " spurious " of the vision carrier appeared at 70·4 Mc/s, plus or minus 50 kc/s at about S9, and again at 70·75 Mc/s. These unwanted visitors were reduced to S1 by the simple expedient of placing a series tuned circuit at Channel 2 frequency across the input socket of the converter. This circuit consists of a 3-30 pF capacitor in series with an inductor made of 6 turns of 20 s.w.g. to a diameter of ⅜ in. and half an inch long.

From G3JGO:

I found the contributions by G3BA about the " Variverter " most interesting. It occurs to me that the TR1930 and 1980 series of transmitters offer a simple device for doing this almost ready made, with the advantage of gang tuning so that adequate suppression of undesired products, a possible pitfall for the inexperienced, is assured. Also, it may be cheaper!

In these ex-Air Force units the complete equipments may be identified as follows:

TR1934 and 1985: 100 to 125 Mc/s.
TR1935 and 1986: 124 to 156 Mc/s.
TR1936 and 1987: 115 to 145 Mc/s.
TR1997 and 1998: 100 to 156 Mc/s.

The transmitter units are as follows:

Type 96 10R/90 100-156 Mc/s (has CV133 doubler).
Type 81 10R/80 124·5-156 Mc/s.
Type 74 10R/17668 100-125 Mc/s.
Type 64 10R/2391 115-145 Mc/s.

All the sets are similar but in one the doubler stage is a CV133 not a CV136. In all cases the driver is a QV04/7 and the p.a. is a TT15.

In the original transmitter, drive is picked up from the receiver crystal multiplier chain at half the final c.o. frequency. This is heterodyned up with the output of a crystal oscillator at 4860 kc/s, doubled, and used to drive the TT15 p.a. to some 12 watts input. By this means an offset of 9·72 Mc/s between the transmit and local oscillator frequencies is always obtained.

By substituting 67·5 Mc/s drive, picked off before the last doubler of the existing 2m rig, but otherwise as described by G3BA, and converting the original c.o. to a buffer for an external 4·5-5 Mc/s v.f.o., the device becomes a low power 144-145 Mc/s trans nitter, or a driver for a high power rig. Probably a damping resistor across the c.o. output transformer would help the bandwidth and stability but no other internal modifications would seem to be necessary. The (push pull) input to the balanced modulator is via the two pins on the ceramic plate on one side of the unit.

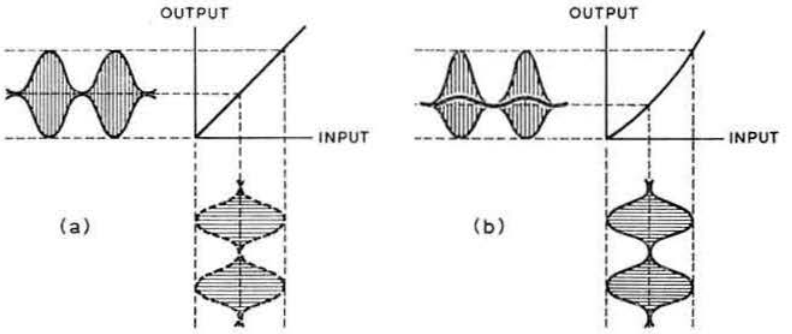


Fig. 2. Two diagrams to illustrate the accompanying note by G8ARV, in which (a) represents a linear waveform output to input, while (b) shows the non-linear condition provided by class B and C amplifiers, and by varactors. The actual output, says G8ARV, consists of a distorted r.f. and a.f. component shown as the thick line.

Power is fed in via an eight-pin miniature Jones socket, unmodified connections being as follows:

Pin 1, 6·3 V; Pin 2, earth; Pin 3, p.a. heaters; Pin 4, h.t. 200 V modulated; Pin 5, 250 V; Pin 6, −50 V bias; Pin 7, p.a. heaters.

The multiway plug is for metering, typical readings on a 1mA 75 ohm meter being:

1, c.o. grid; 2 and 3, balanced modulator grids; 4, doubler grid, 0·3 to 0·6 mA; 5, driver grid 0·1 to 0·5 mA; 6 and 7, p.a grids, 0·1 to 0·5 mA, and 8, p.a. anode and screen plus driver screen, 0·7 mA (equivalent to 70 mA).

All the transmitter stages are gang tuned, with tracking by trimmers and copper cores. It will, of course, be necessary to make sure that the upper sideband at 72-72·5 Mc/s and not the lower one at 63-62·5 Mc/s has been tuned in with an absorption wavemeter; alternatively injecting at 77 rather than 67·5 Mc/s makes the unwanted sideband lie outside the tuning range and may be desirable from a TVI point of view.

From G8ARV :

With reference to the varactor mentioned by G3FZL in the October " Tech Corner," I also have pondered whether the modulation frequency is increased by the multiplication ratio or not. In any linear device the output power is proportional to the input power and hence the modulation will remain unchanged and undistorted.

However, in a varactor (or valve for that matter) the output power is not proportional to the input power (*cf.* class C), and hence the modulation will be distorted. But distortion on a wave results from the introduction of harmonics such as the second or fifth (etc.), so that in a varactor audio harmonics *are* produced but they make themselves known as distortion on the waveform.

I wonder if other readers agree with this theory? Perhaps the two accompanying diagrams help to clarify it.

Fig. 2 (a) shows the situation in a linear class A amplifier.

Fig. 2 (b) shows the class B, class C or varactor condition, where the actual output consists of a distorted r.f. and audio component shown as the thick line.

More Oscarlations

The trouble about attempting to give the latest news about *OSCAR* on this page is that it may be out of date before it is printed, for the very good reason that the next device may get itself shot into space at very short notice as and when there is payload to spare in the next missile off.

However, the following notes from G2AOX give the picture as up-to-date as possible at the time of going to press.

What seems unlikely, says Bill Browning, is that *OSCAR 5* will be launched this year. It is almost certain, however, that when it is it will be the *EUROSCAR* built by DJ4ZC for Region 1 of the IARU. This, when received in California, will require a few finishing touches to the package, and then a launch may be requested.

As far as is known, *OSCAR 5* will be similar to *OSCAR 3* in many details, operating as a translator on the 2m band, with an input frequency of 144·1 to plus or minus 20 kc/s, and an output frequency of 145·9 to the same tolerance. The p.e.p. output will be one watt.

The receiver sensitivity is planned to be far superior to that of *OSCAR 3*, and tests have shown that from a ground station with a long Yagi and 100 watts transmitter input a full signal to noise ratio can be realized in the transponder. Any signals in excess of this will simply cause the a.g.c. system to operate and so block all signals.

A two-channel telemetry will operate on 145·95 Mc/s and will emit a steady carrier interspersed with the now familiar HI III characteristic. The time cycle will be representative of the internal temperature and battery voltage.

The expected battery life will be from three to four weeks. As for the orbit, this will be nearly circular and at a height of about 575 miles, pretty similar to that of *OSCAR 3*.

In response to many enquiries Bill Browning reports that *OSCAR 3* is still in orbit but not transmitting. Its period, inclination angle and separation are exactly the same as the day it was launched. The perigee is sustained at the original height of 909 km and the apogee since launch has decreased by only 2 km to its present 939 km.

" The expected life of *OSCAR 3* is about a 1000 years, unless anyone goes up and brings it down!" remarks G2AOX.

OSCAR 4 also is still in orbit but not transmitting. The last figures quoted for the apogee are 32,858 km, and as the perigee is 161 km the satellite is coming very near the point of re-entry.

Now would seem to be the time to set up schedules with other stations outside the UK against the possible launch of *OSCAR 5* before long, and all interested should send details of call-sign, name and address, and details of what they propose to do, to Project Oscar Inc, Foothill College, Los Altos Hills, California.

Meanwhile, G2AOX will continue to despatch *OSCAR* news to all who have deposited s.a.e.s with him—and already almost a hundred have, in seven countries: the latest, R.E.P., Portugal.

If *you* want latest *OSCAR*-info send an s.a.e. now to Bill Browning, 47 Brampton Grove, London, NW4.

Here and There

Quick work by the V.H.F. Contests Committee will be applauded by all who went in for V.H.F. NFD in September: the results were on the 30 October RSGB News Bulletin. Way out ahead was that fine GB2GC team with 78,629 points. (See page 809 for the full results.—EDITOR.)

* * *

The RTTY sked between G3IIR and G3BPT in the south-eastern London area has now been running for over three months. They do it cross band 4m to 2m.

* * *

Harking back to the comments about 23cm by G3TMG last Spring, members of the Hayes Grammar School Radio Club report that they have a certain amount of basic equipment for around 10 Gc/s, and would be glad to hear from G3TMG on a " brain picking " basis. It seems to us that they are sufficiently near to the GEC group in north Middlesex to hold out some hopes of hearing *them* on s.h.f. Messrs A. Haigh, G8ARJ and F. C. Fuller, A4420, can be reached c/o Hayes Grammar School, Wood End Green Road, Hayes, Middlesex.

* * *

Back in circulation after a six-months' closure while his old shack was being demolished and a new one built alongside the garage is G3THC of Wolverton in Bucks. He asks friends to look out for him on 2m and 4m.

* * *

Interested in sideband on 70cm? It's on the increase in many areas, *e.g.* G3OCB of Truro now has 6 watts of it on 433·41 Mc/s and a p.a. is on the stocks.

* * *

During a visit to HB9RG of Zurich during the spell of top conditions in September, PA0QC was able to participate in the establishment of three new " firsts " from that station on 432 Mc/s, with PA0GER, ON4HN and G3LQR. Suffolk to Switzerland is good going on " Two," but on " Seventy " . . . well! Good work, Simon of G3LQR.

* * *

Bulging with crystals for zones where you don't live? Then list them for " Xtal Xchange." Others may need them. Say also what crystals you *haven't* got but want.

* * *

Keep Mondays free of other arrangements if you can. A few CQ calls on "Two" on activity night may unearth more activity than you think is around on a cold winter's night. Remember: the other chap is waiting for *you* to illuminate the band. Don't let him think it's dead.

Reports required on DL0AR and DM3IGY

The Scientific Observation group of the DARC is anxious to receive reports of reception of these transmitters. Reports should give the following details: Date; Time in GMT; Station heard; Strength of signals; Propagation mode, e.g. tropo/sporadic *E* or auroral reflection. Suitable report forms may be obtained from RSGB Headquarters to whom all reports should be sent in the first instance. These will then be sent to the DARC at monthly intervals.

Brief details of the transmitters are:

DL0AR. Located at Heddesden, Teutoberger Wald, W. Germany; Long. 08° 49′ 18″ E; lat. 51° 54′ 49″ N. Output power 200 watts to a 4-element Yagi beaming North. Call is sent by c.w. every 21 seconds. Frequency: 29·000 Mc/s.

DM3IGY. Located at the Geophysical Observatory, Collm. near Oschatz, E. Germany. Long. 13° 00′ 02″ E; lat. 51° 18″ 06′ N. Call sent by c.w. Frequency: 28·000 Mc/s.

Reports sent to Headquarters should be marked " Scientific Studies Committee."

The Month on the Air (Continued from page 808)

14.50), TN8AA (12.05), UA0BX (09.35), VKs (08.30—11.00), VP1PV (17.50), VP2AA (17.40), VP5RS (15.52), VP8s CW, JB (17.23), VQ9AA/D (09.35), VS6AJ (11.36), VS6FS (09.45), VS9AJC (14.47), VU2CN (08.53), XW8AL (09.05), YA1FV (10.25), 4M5A (12.55), 5R8AS (16.58), 5Z4AA (13.45), 7Z3AA (08.35), W0GTA/8F4 (07.35), 9M2LO (08.49), 9X5MH (17.00).

DX Briefs

FU8AG will be returning to the **New Hebrides** from leave in France on 31 October. He will be active again for three years or so, and hopes to be on 14 Mc/s c.w. from about mid-November.

Those still needing a contact with Macquarie Is. will be particularly sorry to learn that Colin, VK0MI, was recently taken ill and had to be rushed back to his home in Australia for an operation. All will wish him a speedy recovery.

KG6IG, on the **Bonin Islands,** has been reported on 14,030, 21,030 and 28,030 kc/s by the W6s. His operating hours are given as 22.00 to 24.00, but it is hoped that he may decide to come on at other times to give the Europeans a chance to contact him.

WB2VJD/CE0, **Easter Island,** will be on the air until the end of January. He has a sked with his QSL manager on 14,222 kc/s at 24.00 on Mondays and Wednesdays. No reports of his being heard in Europe have been received so far.

WA9FUX/XV5 is a newly licensed station in Saigon, **Vietnam.** He is said to prefer 21 Mc/s c.w. activity. According to A3942 a report sent to a box number in Peking given by " ZA0BY," heard on 80m produced a mass of propaganda leaflets from Radio Peking!

TR8AG, Gabon, now has s.s.b. equipment, and has been heard at around 20.00 on about 14,140 Mc/s, working PY2PE.

According to VK3AHO there is now a station on the air from **Nauru.** His call is said to be VK9DF, and he was on around 14,160 kc/s at about 12.00

G3POX will be accompanying a survey expedition to Central Australia in the new year and may be active with the call VK8OX.

* * *

All correspondents are thanked for their assistance, and special thanks are due to the following: The *West Gulf DX Bulletin* (W5IGJ), the *L.I.D.X.A. Bulletin* (WA2EFN), *DX'press* (PA0FX), *The DX'er* (W6HVN), *Florida DX Report* (W4MVB), *DX News Sheet* (Geoff Watts), *The Ex-G Radio Club Bulletin* (W3HQQ), *CQ DX* (ARI), *The DX'ers Magazine* (W4BPD), *On the Air* (ON4AD), and *KARL News*. Please send all reports for the **February** issue to arrive no later than **11 January,** for the **March** issue by **8 February,** and for the **April** issue by **15 March.**

Radio Amateur Emergency Network

SEVERAL justifiable complaints have been received from members that news of RAEN activities throughout the year has been sparse, and these notes are intended as a stop-gap until the Committee organizes proper facilities to ensure more regular news flow.

The non-appearance of the *Newsletter*, along with the lack of publicity of arrangements for the annual Rally, were occasioned by the committee member concerned being overwhelmed by an unprecedented amount of work just prior to the agreed publication dates. Furthermore, it would appear that this work burden is not going to slacken in the forseeable future and hence he has asked to be relieved of these duties.

Accordingly, the Committee has proposed the appointment of a member whose main function is to deal with publicity; G3PAZ has agreed to undertake these responsibilities for a trial period, and so it is hoped to obviate difficulties in the future in this direction.

RAEN News

The Committee is pleased to announce the award of the Raynet Trophy for 1967 to the Manchester Group which, under the expert guidance of John Scarborough, G3MBQ, has been built up in record time to a fully active group with excellent liaison with the Manchester Police, and which has been called upon on several occasions throughout the year to render assistance to the Police Forces of Manchester and the West Riding. A Certificate of Commendation is to be presented to the Essex Group which, throughout the year has maintained its high state of preparedness for action by holding exercises within the Group and on behalf of the Essex Constabulary.

Membership Cards

At the request of the Hon. Registration Secretary, John Denny, 40 Canada Road, Woolston, Southampton, the Committee has agreed that, henceforth, re-registration will take place on or before 30 June in each year so that cards are not caught up with the Christmas rush. Accordingly, registration cards should be sent as *soon as possible* and will be franked as valid until 30 June, 1968. Deadline for re-registration this time will be 1 February.

Many members have questioned the necessity for this. There are several reasons, the main one being that each member of RAEN is insured whilst operating in a genuine emergency or practice thereof and we are required to keep an up-to-date record of members. Remember, therefore, that if you have not re-registered you may not be insured!

BRCS HQ

The equipment originally installed at BRCS Headquarters has been removed as it was difficult to ensure access at all times. The station, G3NAT, is temporarily installed at the QTH of G3IIR and will eventually be operational from the QTH of G3FZL. The station operates on 70·375 Mc/s (Raynet channel) with outgoing links in addition on 2m.

Groups

Many new Groups emerged from their chrysalis stage during the year and, no doubt, the excellent RAEN stand at the Society's Exhibition which was organized by the Surrey Group will serve as a spur to others "on the brink." There should be no excuse for the lack of knowledge on how to get started since an excellent publication was issued by the Surrey Group on this topic. Those who missed details should write to G3VK for a copy (s.a.e. please).

The death of the Dorset County Controller, Gordon Udall, G2HCD, left a difficult gap to fill, but G6SV is standing in until more permanent arrangements can be made.

Equipment

Equipment on loan has been forthcoming in prodigious quantities and over 300 sets have so far been issued. These are most readily convertible into the 4m band on 70·375 Mc/s and the 4m activity is growing in consequence. Please note that this equipment is issued only through County or Independent Area Controllers.

RAEN Rally

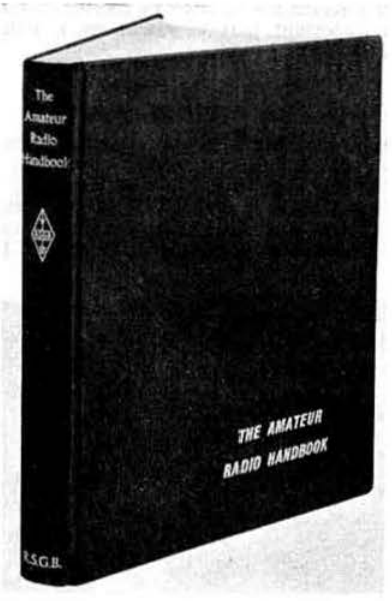
As mentioned earlier, things went awry in the organization of this year's rally. However, G3FZW wrote individually to all those who took part in the 1964 and 1965 Rallies forwarding rules and arrangements prior to this year's rally and, although this gave little notice, it is hoped that the event was not marred too much because of this fact. The winners will be announced when the logs have been studied.

And Finally

The Secretary's address is E. R. L. Bassett, 57 Upper St. Helens Road, Hedge End, Southampton. By forwarding reports of your activity (news works both ways you know) it enables the Committee to keep abreast of events and helps when it comes to award the Raynet Trophy. CUAGN sooner!

G.A.A.

Out of Print!



The Third Edition of the *Amateur Radio Handbook* is now out of print and Headquarters is no longer able to supply copies. There is just a possibility, however, that some booksellers may still have some in stock.

Work on the Fourth Edition of the *Handbook* has already commenced and it is hoped that copies will become available in late spring 1967. Full details will be published in the RSGB BULLETIN as they become available.

NEWS . . .

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

Faeroes Radio Amateurs

Faeroes Radio Amateurs (FRA) has applied for membership of the International Amateur Radio Union. An earlier application was held up because the Danish national society (EDR) claimed they represented the interests of amateurs in the Faeroes. The new application is supported by EDR.

Radio Altimeters

Certain types of radio altimeter which operate in the 420-460 Mc/s band have been causing interference to observations made at the Mullard Radio Astronomy Observatory at Cambridge. The interference is caused by the local oscillator in the altimeter receiver which operates in the radio astronomy band 406-410 Mc/s. Pilots of aircraft registered outside the UK which carry specified types of radio altimeter have been requested by the Board of Trade not to operate them when flying within UK airspace.

Conference on Natural Disasters

The Yugoslav National Society (SRJ) was one of the organizations invited to participate in a Conference on Natural Disasters, held last month in Skoplje, Yugoslavia. The Conference was convened by the International Civil Defence Organization to discuss various aspects of rescue and on-the-spot intervention in cases of disaster. SRJ members played an important part in rescue work following the Skoplje earthquake of 1964.

New NRRL Officers

Mr. Odd Krane Thvedt, LA1TE, has succeeded the late Per Gunderson, LA5LG, as President of NRRL. Mr. Ragnar Otterstadt, LA5HE, is the new Vice-President. The latter represented NRRL at the IARU Region I Conference in Opatija last May and he was a member of the NRRL delegation present at the Malmoe Conference in 1963.

G2BVN operating the Knokke Convention station ON6HC last September.

(Photo by G6NZ)

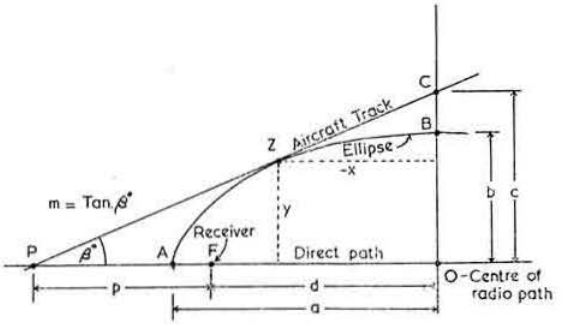
A Little Flutter on V.H.F.

(Continued from page 799)

to publish this article which covers part of an official programme of research in tropospheric propagation; secondly, J. A. Lane, M.Sc., M.I.E.E., of the Radio and Space Research Station for his very valuable suggestions and collaboration throughout the work; and third, the Abbot of Douai Abbey for providing facilities and every encouragement for pursuing the research.

Appendix

Calculating the position of zero-beat, given a straight aircraft track and terminal positions of the radio path.



Zero-beat occurs at Z where the aircraft track touches an ellipse which has foci at receiver and transmitter.

O is half way between foci.

$OF = d$ (*half* path length).

Let $OA = a$

$OB = b$

$OC = c$

$\text{Tan}\,\beta = m$

The aircraft track has equation $y = mx + c$

and the ellipse has equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

These equations must be solved simultaneously to obtain values of x and y, the co-ordinates of Z, a point satisfying both equations.

Since Z is a tangent point, x and y have only one value. After applying this condition and making various substitutions we get:

$$-x = \frac{m(c^2 + d^2)}{c(1 + m^2)}$$

$$y = \frac{c^2 - m^2 d^2}{c(1 + m^2)}$$

Co-ordinates of zero beat position in terms of parameters of aircraft track and distance between receiver and transmitter.

If the distance from F to P, the point at which the track intersects the radio path, is known instead of OC, let $FP = p$.

then $c = m.(p + d)$

The parameters of the ellipse may be found from the formulae

$$b^2 = \frac{c^2 - m^2 d^2}{1 + m^2}$$

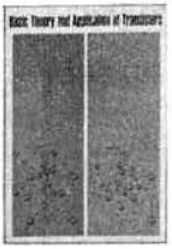
and $a^2 = b^2 + d^2$ (a property of the ellipse).

The bounce path is longer than the direct path by $2(a - d)$ at the zero beat point Z.

"A Little Flutter on V.H.F."

On page 711 of the November issue of the RSGB BULLETIN there was a typographical error under the heading "Steam Train Performance": the first line should have read "If one were to say that a car would do 0-60 m.p.h. in 30. . . ."

GIFTS FOR THE AMATEUR AND SWL



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263 PAGES **11s. 6d.**

Covers in detail theory through to practice involving as little maths as practicable

A Dover Publication prepared by the US Dept. of the Army

WE CAN ALSO SUPPLY FROM THE SAME SERIES:

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ARRL ANTENNA BOOK **18s. 6d.**

SHOP AND SHACK SHORTCUTS (CQ)

Tips and ideas to help the amateur improve his equipment **29s. 6d.**

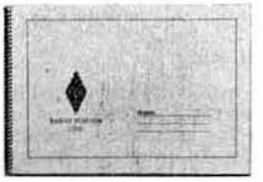
V.H.F. MANUAL (ARRL)

Transmitters, receivers, converters etc. **18s. 6d.**

MORE SUGGESTIONS CAN BE FOUND ON PAGES 855 AND 860

- PRICES INCLUDE POSTAGE
- STAMPS AND BOOK TOKENS CANNOT BE ACCEPTED

RADIO SOCIETY OF GREAT BRITAIN
28 LITTLE RUSSELL STREET, LONDON, WCI.



LOG BOOKS

Two from our range of six

RADIO STATION LOG

50 PAGES **7s. 3d.**

V.H.F. AND CONTEST LOG

50 PAGES **7s. 3d.**

Spiral bound for convenience

ALSO:

MOBILE MINI-LOG ... **3s. 10d.**

LISTENER'S AND OBSERVER'S LOG ... **7s. 3d.**

RSGB STANDARD LOG ... **7s. 3d.**

MARTIN'S LOG ... ... **22s. 6d.**

OTHER SUGGESTIONS

ADMIRALTY GREAT CIRCLE MAP
Centred on London. Latitude and Longitude indicated. Coloured. 26 × 26 in. **8s.**

RSGB AMATEUR RADIO CALL BOOK
British Isles. 1967 Ed. **6s. 6d.**

TECHNICAL TOPICS FOR THE RADIO AMATEUR **10s. 8d.**

WIRELESS WORLD DIARY 1967 **6s. 4d.**

FOR MEMBERS

EASIBINDERS
Round backed, gold blocked, for RSGB Bulletin **16s. 6d.**

LEATHER KEY FOBS with RSGB diamond attached. Black, red, green, blue, natural **7s.**

RSGB TERYLENE TIE
Maroon or dark blue **16s.**

RSGB TIE CLIP **5s.**

CAR BADGE RSGB or RAEN Emblem **9s.**

RSGB BLAZER BADGE Black or dark blue **8s.**

News from Headquarters

Region 1 Bulletin

At the Region 1 Conference at Opatija it was reported by delegates from several countries that there was a demand for copies of the *Region 1 Bulletin* for circulation amongst members of their National Societies. In order that the best and most economical method of producing the *Bulletin* can be ascertained it is essential to obtain an estimate of the number of copies that would be required on a subscription basis. The *Bulletin* is produced at three monthly intervals and usually consists of 30 pages of A4 size. Will readers who are interested in receiving the *Region 1 Bulletin* on a subscription basis please advise G2BVN, c/o RSGB Headquarters.

RSGB QSL Bureau

Holders of special licences with the GB prefix should note that the QSL Bureau routes all cards for such calls to the licensee unless requested to do otherwise.

Members are reminded that they can assist the QSL Bureau by sorting their cards by prefix before despatch to G2MI.

Representation 1966-1968

The following members have been appointed as Area Representatives:

BELFAST
S. H. Foster, GI3GAL, 31 Belmont Park, Belfast 4.

MAIDENHEAD
C. N. Cory, G3MEV, 6 Belmont Crescent, Maidenhead.

Affiliation

The following societies are now affiliated to RSGB:

BARRY COLLEGE OF FURTHER EDUCATION RADIO SOCIETY
D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam.

CAMBRIDGE HOUSE BOYS' CLUB
M. J. Pollard, Cambridge House Boys' Club, 151 Camberwell Road, London, SE5.

GUERNSEY RADIO AND ELECTRONICS SOCIETY
Cdr. H. J. P. Crousaz, GC3ODE, The Lodge, La Corbinerie, Oberlands, St. Martins, Guernsey, C.I.

LUDLOW GRAMMAR SCHOOL AMATEUR RADIO SOCIETY
J. H. Cummings, The Grammar School, Ludlow, Salop.

MID. HERTS. AMATEUR RADIO SOCIETY
H. R. Thornton, G3PKV, 43 Fordwich Road, Welwyn Garden City, Herts.

UNIVERSITY OF NOTTINGHAM RADIO SOCIETY
K. L. Taylor, Students' Union, University of Nottingham, Nottingham.

Headquarters Fund—List No. 30

The following are additions to the list of contributors to the fund; R. C. Hewitt, G3NIX, J. Dewhurst, D. C. Mills, G3KVT and D. A. Wilcocks, G3JSA.

Total amount contributed to date: **£2,256 14s. 7d.**

The President, Council and Headquarters Staff send Christmas Greetings to all Members of the Society

RSGB Dinner Club

The first meeting of the Dinner Club was held on Friday, 18 November, at the Kingsley Hotel, London.

Over 40 people attended, including G5ADO/DJ5SJ and G5AAA/K0JBA, and W3INH with his wife.

Under the chairmanship of the President of RSGB, R. F. Stevens, G2BVN, an informal discussion took place after dinner to determine the future course of the Club. It had been pointed out that the London Members' Luncheon Club, which had functioned successfully for 16 years, had never been an official RSGB organization, although it was the only one to extend regular hospitality to overseas visitors. The meeting agreed generally that some form of official RSGB activity must at this stage be set in motion, because of the ever-growing number of tourists visiting Britain.

The meeting decided that a Christmas Dinner should be held at the Kingsley Hotel on Saturday, 7 January, 1967, and that from then on the Club would meet every quarter.

Arrangements for the reception of overseas guests who were not in London at the time of one of these regular meetings were now in hand and would be announced shortly.

Insurance of Motor Vehicles used in Rallies and D/F Events

In view of the new approach which has been made to the principles of motor vehicle insurance, members are advised to consult their insurance companies before they use their cars (or other vehicles) at rallies and D/F events.

Vacancy on Headquarters Staff

A vacancy will occur on the Society's Headquarters staff early in 1967 for a member with a sound knowledge of company secretarial and accountancy practice. Possession of an amateur licence would be an advantage though is not essential.

Members who wish to be considered for this interesting appointment are invited to write to the General Manager giving full details of education, experience and salary expected. Envelopes should be marked "Private and Confidential".

Planning Permission

In the August issue of the BULLETIN, it was stated that the Council was taking Counsel's Opinion on the question as to whether Planning Permission for the erection of aerials for use by amateurs might in certain circumstances, not be required. A joint Opinion has now been given by Mr D. P. Kerrigan, Q.C., and Mr F. Maurice Drake, D.F.C., M.A. (Oxon), which is to the following effect:

(*i*) Counsel are " firmly of the opinion that any aerial erected in the curtilage of a dwelling house *does* require Planning Permission unless: (a) it does not exceed 10 ft. in height or: (b) it is fixed to the dwelling house and is of such size and appearance that, like an ordinary domestic television aerial, it would be considered to be not materially affecting the external appearance of the house ".

(*ii*) Work carried out for the maintenance, improvement or alteration of a building does not require Planning Permission, if it does not materially affect the external appearance of the building. Counsel are of the view " that it is accepted that an ordinary domestic television aerial does not materially affect the external appearance of a building, this being a result which can probably only be justified because domestic television aerials have become the rule rather than the exception for the vast majority of dwelling houses. A radio aerial of similar size to a domestic television aerial would similarly *not* require Planning Permission, but anything larger would require such Permission ".

Counsel suggest that in view of the considerable membership of the Society it would be appropriate to approach the Minister of Housing and Local Government with a view to getting him to make an order removing the requirement of Planning Consent in the case of all radio aerials up to a reasonable height erected by amateurs. The Council have agreed that a case should be submitted to the Minister of Housing and Local Government and a member of the Society who is a licensed amateur and a solicitor has agreed to prepare a case for such submission.

Royal Television Society

The Television Society—the oldest society in the world for the furtherance of the television art—is now the Royal Television Society, the honour having been bestowed at the beginning of the society's 40th anniversary year. Royal recognition, on the recommendation of the Privy Council, highlights contributions which members have made to the development of British television.

The Society was founded in September 1927 following a meeting of the British Association in Leeds. The first chairman was Dr. C. Tierney and Mr. J. Denton first secretary. Subsequently the late Geoffrey Parr became secretary during which period the status and prestige of the society greatly increased. The Council of the RSGB met in the offices of the Television Society in Red Lion Square, Holborn, during the 1939-45 war until the Square was devastated by air raids.

The Royal Television Society has a membership of about 1700 including many members of the British Amateur Television Club. Its chairman, John Ware, G6RSA/T, is also chairman of BATC.

G 5 Licences

At the Reception for Overseas Visitors at the RSGB International Radio Communications Exhibition on 28 October 1966, the President, Mr R. F. Stevens, announced that the Post Office had agreed to dispense with the double-barrelled call-signs for reciprocal licences. In future, only the three letter G5 call-sign need be used.

Silent Keys

We record with much sorrow the passing of the following amateurs.

S. Entwistle, G5VN, of Blackpool, Lancs.

S. A. C. Howell, G5FN, of Sale, Cheshire.

M. A. Palmer, G6OZ, of Weston-super-Mare, Somerset.

E. Hoad, G8ABO, of Clanfield, Hants.

Obituaries

René Bard, ON4PG

We were sad to learn of the death of René Bard, ON4PG, who lost his life in a motor accident on 15 September, near Consdorf in the Grand Duchy of Luxembourg.

René was 37, a Professor at Arlon Technical College, and was highly respected for his scientific knowledge. In amateur circles he was well known for his technical skill—his rigs were home-made—and his willingness to help all whom he met. He was the perfect host; his hospitality was boundless. He had been to Berdorf to help G3BID put up some aerials and met his death while driving home.

He leaves a widow and young son, to whom we extend our sincerest sympathy.

E.M.W.

Don B. Knock VK2NO

Many older generation members will be sorry to learn of the death of Don Knock after many years of ill health.

Don was one of radio's real old timers and was active in 1911. Later he operated as G6XG before making his home in Australia. He was a radio journalist of great ability and was a regular contributor to the technical press in Australia. He also pioneered V.H.F. and was active on the 56 Mc/s band before the war. During a short stay in North West Australia, his station VK6NK was instrumental in saving the lives of two aviators who were forced down in the bush. He also built one of the early country broadcast stations 2MO.

A man of great personal charm, he will be sadly missed by his many friends throughout the world and by those close to him who watched his stoical and courageous fight against painful and crippling illness.

Leslie Willard, G8RO

It is with deep regret that we report the death of Les Willard, G8RO, of Tangmere, Sussex.

Les was not only well known and respected by the local amateurs, but also by many RAF amateurs who passed through the famous fighter station where he was a civilian employee. Many of those who were posted abroad maintained a link with the home country by keeping skeds with G8RO on 15m.

To his widow, his two sons and his daughter we extend our heartfelt sympathy in their bereavement.

R.E.L.

Writing to Headquarters?

When writing to Headquarters please use separate sheets of paper for:

- Changes of Address (return a wrapper from the *Bulletin* if possible)
- Orders for Publications
- Queries
- *Bulletin* items
- Committee items

When paying your subscription please return the reminder card sent to you by Headquarters or quote the date on which your subscription falls due.

Whenever you write to Headquarters please write your name in block letters and quote your call-sign, BRS or A number.

Society Affairs

A Brief Report on the September, 1966 meeting of the Council

THE meeting was held on 10 September, 1966 and was attended by Messrs R. F. Stevens (President), J. Etherington, J. C. Foster, E. G. Ingram, L. E. Newnham, A. D. Patterson, W. A. Roberts, G. M. C. Stone, J. W. Swinnerton, and E. W. Yeomanson (Member of the Council), John A. Rouse (General Manager and Secretary) and P. C. M. Smee (Assistant Secretary).

Apologies for Absence were submitted on behalf of Messrs N. Caws, J. C. Graham, J. F. Shepherd, G. Twist, and Louis Varney.

Recommendations of Committees

The Council accepted recommendations relating to the organization of a centre for the December RAE (*Education*), the awards for Home Constructed Exhibits at the IRCE (*Exhibition*), all Regional Representatives becoming ex officio members of Membership and Representation Committee (*Membership and Representation*), the award of the Norman Keith Adams Prize, the Bevan Swift Memorial Prize, the Courteney Price Trophy, the Wortley Talbot Trophy, the Ostermeyer Trophy, the Founders Trophy and the institution of London Lecture Meetings (*Technical*).

Membership and Affiliation

The Council elected 131 new members (103 Corporate, 28 Associate) and accepted 14 applications for transfer from Associate to Corporate grade.

The subscriptions of six members were waived on the grounds of blindness and disability, and the subscriptions of one member was reduced in accordance with previous decisions of Council.

Affiliation was granted to the following:
Nailsworth & District Amateur Radio Society;
Painton Radio Club;
University College of Swansea Radio Society.

Regional Representatives Conference, 8 October

Arrangements were discussed and an agenda was drawn up.

Annual Accounts to 30 June, 1966

The Annual Accounts were tabled for comments before the October Council Meeting.

Region II Representative

Acting on advice from members in the Region, the Council appointed Mr M. Williams, GW3LCQ, to the vacant office of Region II Representative. (Mr Williams' appointment was reported in the November issue of the RSGB BULLETIN. —EDITOR.)

Society Trophies

The award of the Calcutta Key, Founder's Trophy and Rotab Trophy was agreed (see page 670, October, RSGB BULLETIN).

Thomas Memorial Cup

This trophy which has been donated by the First Class Operators' Club will be awarded to the leading UK operator in the c.w. section of the 7 Mc/s DX Contest.

International Amateur Radio Union

It was agreed that an editorial should appear in the BULLETIN correcting recent misleading statements regarding the IARU. (See page 637, October issue—EDITOR.)

Minutes of Committees

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

Mobile (26.7.66), Education (30.7.66), Exhibitor (5.8.66), Membership and Representation (9.8.66), Finance & Staff (9.7.66), Technical (11.8.66) and H.F. Contests (25.8.66).

The meeting ended at 3.00 p.m.

A Brief Report on the October, 1966 meeting of the Council

THE meeting was held on Sunday, 9 October, 1966, and was attended by Messrs R. F. Stevens (President), J. Etherington, J. C. Foster, L. N. Goldsbrough, J. C. Graham, E. G. Ingram, L. E. Newnham, A. D. Patterson, J. F. Shepherd, J. W. Swinnerton, G. Twist and E. W. Yeomanson (Members of the Council) and John A. Rouse (General Manager and Secretary).

Apologies for Absence were submitted on behalf of Messrs N. Caws, W. A. Roberts, G. M. C. Stone and Louis Varney.

Press and Public Relations

It was agreed to investigate the cost of employing a professional press and public relations firm to handle the Society's publicity.

Non-members

It was decided that the Membership and Representation Committee should endeavour to ascertain why only some 60 per cent of licensed amateurs are members of RSGB.

Council Election

It was reported that five nominations had so far been received.

Recommendations of Committees

The Council accepted recommendations relating to the conditions governing the future use of the Arthur Watts Trophy, the results of the First 432 Mc/s Contest 1966 and the First 1296 Mc/s Contest 1966 (*V.H.F. Contests*), the organization of a centre for the May 1967 RAE (*Education*) and the award of the 1950 Council Trophy in connection with the 1966 D/F National Final (*H.F. Contests*).

Membership and Affiliation

The Council elected 141 new members (112 Corporate, 29 Associate) and accepted 10 applications for transfer from Associate to Corporate grade.

The subscriptions of six members were waived on the grounds of blindness and disability.

Affiliation was granted to the St. Helens Electronics Society.

Region 3 Representative

The Council appointed Mr R. W. Fisher, G3PWJ, to the vacant office of Region 3 Representative (Mr Fisher's appointment was reported on page 748 of the November 1966 issue of the BULLETIN.—EDITOR.)

Annual Accounts

The Society's Annual Accounts for the year ending 30 June, 1966 were approved. (Copies of the accounts were sent to members with the November 1966 issue of the BULLETIN.—EDITOR.)

Planning Permission

Consideration was given to legal advice on the question of planning permission for aerials. It was agreed to proceed with an application to the Minister of Town and Country Planning for the removal of the requirement for planning consent for amateur aerials. (A statement on this subject is published on page 827 of this issue.—EDITOR.)

RSGB Film Library

The Council accepted with regret the resignation of Mr C. W. Austin, BRS22019, from the office of Honorary Curator.

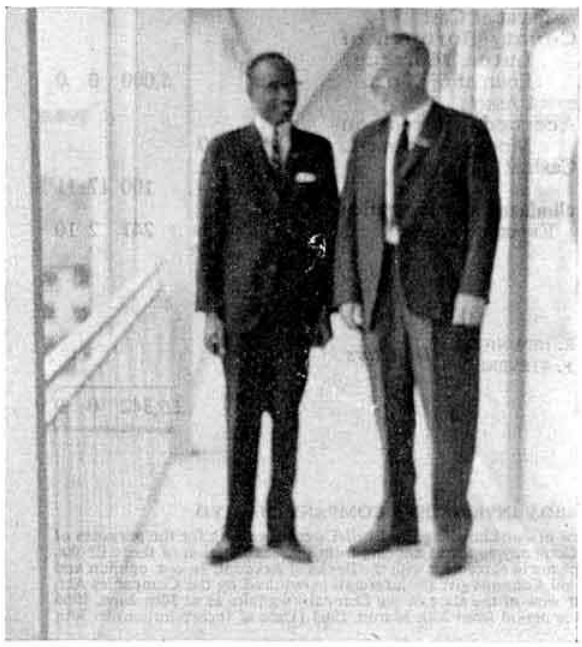
Region 9 ORM

It was reported that 45 members had attended the business meeting at the ORM in Weymouth on 2 October, 1966. The discussions had ranged over a wide variety of Society affairs and the general atmosphere had been most cordial. (A report on the meeting is published on page 816 of this issue.—EDITOR.)

Minutes of Committees

The Minutes of the following Committee Meetings were received as reports: V.H.F. Contests (27.7.66), Mobile (23.8.66), Scientific Studies (5.9.66), Education (7.9.66), Exhibition (6.9.66), and H.F. Contests (22.9.66).

The Council was in session for nearly 3½ hours.



Sewell T. Brewer, EL2S, President of the Liberian Amateur Radio Association, with the President of RSGB, Mr R. F. Stevens, G2BVN, at the ITU building in Geneva.

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 Amateur Radio Call Book

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

G5OX, C. H. F. Hubbard, 111 Barberry Avenue, Chatham, Kent.

G3KKF, J. Court, 2 Martin Dale Crescent, Martin Mill, nr. Dover, Kent.

G3KXT, R. I. Richardson, 50 Hayes Street, Hayes, Bromley, Kent.

G3LOV, M. J. Francis, 35 Downs Wood, Epsom Downs, Surrey.

G3SHS, R. W. Perrin, 5 Waylands Close, Knockholt, Kent.

G3TOX, R. Luxford, 33 Long Lane, London, N.3.

G3VAG, R. C. Greenleaf, 27 Ernest Road, Wivenhoe, Essex.

G3VLD, T. A. Denny, 3 Atridge Chase, Perry Street, Billericay, Essex.

GM3VCD, R. Holt, 13 Royal Street, Gourock, Renfrewshire.

G8ACC, S. F. Weber, 65 Combemartin Road, Southfields, London, S.W.18.

G2BCH, J. P. O'Brien, 29 Crossways, Clacton-on-Sea, Essex.

G3NNO, M. T. George-Powell, 82 Forest Aveune, Starbeck, Harrogate, Yorks.

G3SDJ, H. A. H. Jeffries, 23 Carlton Road, Gidea Park, Romford, Essex.

G3UOI, J. C. Firby, 7 Salisbury Avenue, West Lane, Baildon, Shipley, Yorkshire.

G3VDX, R. C. Luckock, Walton House, Alvechurch Highway, Lydiate Ash, Nr, Bromsgrove, Worcestershire.

G3VKC, E. Haycock, "Two Four," The Comyns, Bushey Heath, Watford, Herts.

G4AC, E. L. Postans, "Arish Mel," 7 Moorfield Road, Woodbridge, Suffolk.

G8ARR, P. J. Edwards, 28 North Roundhay, Kitts Green, Birmingham, 33.

GW2FOF, G. Williams, Somerset House, 67 Brook Street, Williamstown, Rhondda, Glam.

Lambda Investment Company Limited

New Ruskin House, 28 Little Russell Street, London W.C.1

Directors: L. E. Newnham (*Chairman*) N. Caws (*Secretary*)
R. C. Hills, J. F. Shepherd and R. F. Stevens

Report of Directors

The Directors submit their Report and Statement of Accounts for the period 26th March, 1965 (Date of Incorporation) to 30th June, 1966. The profit for the period after making Provision for Taxation amounted to £16 14s. 9d. which the Directors propose should be carried forward.

On behalf of the board
L. E. Newnham, *Chairman*

LAMBDA INVESTMENT COMPANY LIMITED

Profit and Loss Account for the period from 26th March, 1965 (Date of Incorporation) to 30th June, 1966

	£ s. d.		£ s. d.
Sundry Expenses	16 9 11	Luton Mortgage Loan Accrued Interest from 10th June, 1966	18 9 10
Audit Fee	2 2 0	Bank Deposit Interest	28 0 10
Provision for Corporation Tax at 40 per cent	11 4 0		
Balance Carried to Balance Sheet ..	16 14 9		
	£46 10 8		£46 10 8

Balance Sheet—30th June, 1966

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Share Capital			**Investment at Cost**		
Authorized			County Borough of Luton Mortgage Loan at 6¾% p.a...		5,000 0 0
100 Shares of £1 each	100 0 0		**Current Assets**		
Issued			Accrued Interest on Mortgage Loan ..	18 9 10	
87 Shares of £1 each fully paid ..		87 0 0	Cash at Bankers ..	82 8 1	
Profit and Loss Account					100 17 11
Balance		16 14 9	**Preliminary and Formation Expenses**		241 2 10
		103 14 9			
Liabilities					
Radio Society of Great Britain—Loan Account	5,225 0 0				
Audit Fee	2 2 0				
Corporation Tax due 31st March, 1967 ..	11 4 0				
		5,238 6 0	L. E. NEWNHAM, R. F. STEVENS } *Directors*		
		£5,342 0 9			£5,342 0 9

AUDITORS' REPORT TO THE MEMBERS OF LAMBDA INVESTMENT COMPANY LIMITED

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit. In our opinion proper Books of Account have been kept by the Company so far as appears from our examination of those Books. We have examined the above Balance Sheet and Profit and Loss Account, which are in agreement with the Books of Account. In our opinion and to the best of our information and according to the explanations given us, the said Accounts give the information required by the Companies Act, 1948, in the manner so required, and the Balance Sheet gives a true and fair view of the state of the Company's affairs as at 30th June, 1966 and the Profit and Loss Account gives a true and fair view of the profit for the period from 26th March, 1965 (Date of Incorporation) to 30th June, 1966.

Thames House, Queen Street Place, London, E.C.4.
14th November, 1966.

EDWARD MOORE & SONS
Chartered Accountants

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.

Radio Facts and Fallacies

The article by G3JGO in the October issue is most commendable, and only the sternest critic would disagree. But I take up this role on his point that "a simple low-level speech clipper would be much more effective."

If an audio waveform is amplified and clipped, it will have a flat top, i.e. each semi-sinewave becomes a trapezoid. But from simple Fourier analysis we find that a trapezoidal waveform must contain almost an infinitude of odd harmonics. If we assume that these are effectively filtered out before modulating the p.a., then we are back to sine-waves, and nothing more than speech compression has been accomplished. And speech compression can be carried out far more cheaply than clip-filtering.

If in spite of our filter (and Fourier) we think that we still maintain our flat-topped waveform, it is true that we have sharpened the rise-time of each trapezoid. Since intelligence cannot be conveyed by any steady-state situation, it follows that while the modulator may be achieving peak power over a greater time-interval, the r.f. envelope is unvarying during that time. Therefore the period during which no intelligence is being conveyed has been increased, which accords with the *reductio ad absurdum* that with infinite amplification and infinite clipping no intelligence can be conveyed.

I do however agree with the writer's remarks about negative cycle loading, but suggest that a method of positive peak expansion which I described in the BULLETIN, April, 1958, may prove useful.

It is most pleasing to see the perfect one-to-one s.w.r. debunked. I haven't got such an animal, but nearly everyone else seems to have. And I think it would be of great value if G3JGO were invited to run a series of "Fallacies," of which too many abound.

He might find, for a start, some material in the discussion as to whether we should not pay at least as much regard to the electric field around an aerial as to the current flowing in it. At the present time, one has to get out the "Big Books" to find this point even brought to notice, and this lack of information initiates I believe, some of the frightful "clangers" one sometimes hears on this subject.

H. S. CHADWICK, G8ON

Worksop, Notts.

The author replies: As I understand G8ON's letter, he is in disagreement with my statement that a low level speech clipper would do the same job as negative cycle loading. What I had hoped to convey was that the same distortion of the negative swing could be accomplished with much less power dissipation, at a lower level with cheaper components, but that the little extra trouble involved in making a low level clipper (having gone so far) would yield more talk power. Apparently, G8ON does not accept that a clipper increases the "talk power."

Although by Fourier analysis it is possible to express any repetitive wave shape as a series of sinewaves, the sinewave's only claim to importance is ease of handling mathematically. Musically, a sine wave is uninteresting and for communication it must be modulated in some way to make it convey any information.

The human voice has a particularly complex waveform with a carrier which may be sinewave plus harmonics or white noise, modulated and filtered by the nose and mouth. Experiment has shown that it contains short spikes of considerable amplitude which would severely limit the average power if they had to be kept below the maximum peak level (100 per cent modulation in the case of radio), but these may be clipped off, and the level raised 6db without noticeable distortion (this process is known as fully modulating!). For radio transmission it is desirable to filter out the resulting distortion products above about 2·5 kc/s which would give splatter. After ensuring against splatter (we hope) the level can be raised further until the clipper starts to cut into the body of the waveform, having eliminated the spikes at about 20db of clipping. The distortion rises, exactly as it would with over modulation, but there is a gain in communication efficiency, although the speech sounds unnatural. This is not the end of the line, however. It is quite possible to infinitely clip speech so that only the zero crossings are retained, and yet maintain good intelligibility. CR filtering before and after clipping was found to make the speech more pleasant. Full details can be found in [1].

I agree with G8ON that compression is useful, particularly in the case of s.s.b. where a.f. clipping is of little advantage, but the slow response of most compressors is no substitute for peak clipping—better still use both!

Positive peak expansion may seem attractive in theory, but it is questionable how many p.a.'s have sufficient grid drive to take two or three hundred per cent upward modulation even if the modulator and transformer will take it without saturating. However, as all TV transmitters work on these lines, it certainly is tried and tested!

B. PRIESTLEY, G3JGO

[1] "Effects of Differentiation, Integration and Infinite Peak Clipping on the Intelligibility of Speech", J. C. R. Lichlider and Irwin Pollac, *Journal of the Acoustical Society of America*, Vol. 20, p. 42. 1948.

Class B Licences

Mr Wiltshire has written a good letter, but one feels that his case is weak. Had he, for instance, suggested that G8-plus-3 licensees be allowed to pass a 6 w.p.m. Morse test and then be granted permission to operate c.w. only in the range 144·0 to 144·1 Mc/s for a period not to exceed 18 months, then one would have had considerable sympathy for him. As it is, his approach seems to be "I am losing interest in 70cm, I can't be bothered to learn Morse, so please give me a couple more bands"—hardly an attitude in the best traditions of Amateur Radio! Particularly so when one realizes that he already has a couple of bands available *above* 70cm which seem to offer an endless source of activity to those interested in "the construction and operation of v.h.f. and u.h.f. equipment." No, Mr Wiltshire, instead of bemoaning your fate get out the tape recorder, buy the RSGB practice tape and do 30 minutes Morse practice a day for the next four months. You will find then find yourself a Class A licence holder with all bands available and may also find that the door has been opened to a new and fascinating world. Despite my "ancient" call-sign I have, like many other old timers, voluntarily sat and passed the RAE so that I can have the satisfaction of knowing that I have *earned* the privileges of a Class A licence holder.

ANGUS D. TAYLOR, GW8PG

Upton, Wirral, Cheshire.

The suggestion by G8AKA that the terms of the Class B licence might be modified to allow operation on the 144 Mc/s band in addition to the frequencies at present permitted has much to recommend it.

Although activity on 144 Mc/s appears generally to be at a much higher level than on 432 Mc/s there are still many areas of the country where additional activity would make the band more rewarding to all operators, particularly during periods of poor conditions; the potential addition of 500 Sound Licence B holders would do much to improve the occupation of the band, an important matter in itself when it is known that Business Radio users are casting envious glances at the "wide open spaces" of the v.h.f. and u.h.f. Amateur Bands.

The same arguments would apply to operation on the 70 Mc/s band but the matter there would be one for international, rather than national decision; however it is difficult to imagine any serious objections to the suggestion as applied to the 144 Mc/s band.

Lest it be imagined that I am unduly biased as the holder of a Sound Licence B may I add that I intend to take out a Sound Licence A as soon as possible.

C. P. HOWARD, G8ANU

Milford, Stafford.

I feel sure that the plea by G8AKA in the November 1966 BULLETIN will find a ready response from all holders of not only G8 call-signs but also all GM8's!

An expansion in the terms of the Amateur (Sound) Licence B to include the 2m band would be welcomed with open arms.

R. St. J. ANDRES, GM8AOU

Kirriemuir, Angus.

The timely letter from G8AKA regarding the above form of restricted licences must express the views of many holders of G8 + 3 call-signs. The present holders have not, to the best of my knowledge, caused any trouble to other services by their activities. There appears to be a belief that any operator who has not passed a Morse examination must automatically be of an irresponsible nature, and devoid of grey matter.

I gather that operation down to 144 Mc/s is permissible under the Geneva Regulations of 1949, and would like to enquire who the body is that prevents G8s from operating on 144 Mc/s. Is it the GPO or, as some suspect, a small percentage of members of some committee?

May I suggest that this is a matter that should be taken up by the Society on behalf of the G8s, the majority of whom, I imagine, are members, and entitled to the Society's full support on this subject.

The passing of a Morse examination will not improve the operating ability of any licensee. As regards technical knowledge, although I profess no skill for myself, many of the stations I have worked have high professional qualifications, far in excess of some operators on other bands, and are often employed all day on equipment operating at frequencies that make 144 Mc/s look like Top Band. It seems absurd to impose severe restrictions on a man with a B.Sc., etc., who can not only design and construct his own equipment for 70cm, 23cm, and lower, but also write highly technical articles for others to base their equipment on.

Let us bring this matter into the open—who are the opposition?

At September, 1966 there were 476 Class B licensees—what about 476 letters both to Headquarters and the GPO. If this does not have the desired effect do let us remember that every G8 is represented by a Member of Parliament, of one party or another, although in over 50 years I must confess that I have not had reason to avail myself of their services.

Come along all G8s, let us get organized, and begin to bring things up to 1966, and not continue to be hamstrung by what I feel is a minority dictatorship.

JOHN TRUSCOTT, G8AGO

St. Albans, Herts.

If the commercially coveted and often sparsely populated 2m band can be enlivened in the manner of 70cm by the admission of the "G8 plus three" licences then I, as one confirmed v.h.f. addict, would be very pleased. Obviously 4m could not be so opened because of international regulations.

Some, as Mr Wiltshire declared (November issue), regard the Class B licence as the easy (or lazy) way out, but I would think that working the UK and occasionally Europe on difficult bands and with mainly home-constructed equipment usually of limited power capability, is more commendable than the purchase of high powered l.f./h.f. equipment in order to join the DX rat-race.

Don't misunderstand me—I don't want to belittle the joy of working DX, but it does seem to me that the "operator-only" is missing most of the point of his hobby unless he is also constructor and experimenter.

One frequently hears the bleat "Too many v.h.f. articles in the BULLETIN these days—not enough on l.f.'s and h.f.'s." Why? Firstly, the v.h.f./u.h.f. man is usually a good deal more experimentally minded than the "other half" and secondly the techniques for frequencies below 30 Mc/s are well established whereas above this barrier the field is still open to originality and individuality.

The G8's would still find that c.w. is one of the more effective modes (and I don't want to re-open this old, weeping sore again!) even on 2m and would continue to graduate (?) to Class A licences: if the opening of 2m to such enthusiasts will help in any of these respects, then the sooner the better.

MICHAEL DIXON, G3PFR

Bushey Heath, Herts.

I warmly endorse the remarks of G8AKA. *Inter alia*, I think we deserve some compensation for the 7 Mc/s segment (420-427 Mc/s) which was arbitarily withdrawn.

I have often operated v.h.f. transmitters on the air in the course of my employment with a Service department and also as a part-time Civil Defence volunteer. But it is illegal for me to use (for instance) a TR 1987 on 2m as an amateur.

Lack of Morse code does not inhibit the operation of a variety of business radio and public utility v.h.f. radiotelephone services by technically unskilled operators.

Some time ago it occurred to me that Civil Defence signallers might be given Morse instruction. I wrote to the Home Office accordingly; pointing out that Morse instruction facilities would improve recruiting and provide a useful reserve of trained telegraphists. After nuclear bombardment line telephone and radio telephone equipment might be damaged, but it would still often be practicable to improvise telegraphic communication. Moreover, telegraphic communication was secret.

I was thanked for my interest, but informed politely: "The question of training volunteers in the use of Morse code has been examined from time to time but this method has not been found suitable for Civil Defence purposes."

I think that American amateurs have often found c.w. useful for emergency communication after floods and similar disasters, but perhaps they have a different kind of Morse over there!

The suggestion that G8's should be permitted to use slow Morse on 70cm is interesting. At one time all G3's had to spend a 12 months' probationary period on c.w. Those who kept to the spirit of the regulation had usually developed very stable oscillators by the time they were ready to go on phone. At u.h.f. stability is relatively difficult to achieve. Can't we be permitted to walk before we can run?

I don't think that c.w. at 5 w.p.m. or so would be a nuisance to other operators. An operator who sent really atrocious code at 2 w.p.m. would soon QRT because he wouldn't get any contacts anyway. Of course, even G3's don't send at 12 w.p.m. for meteor scatter and moonbounce.

Finally I would urge that an increase in c.w. on 70cm is likely to discourage the use of super-regenerative receivers which are unsuitable for c.w. reception (and other things).

May we hope to look forward to the issue of the new Amateur Sound (B) Licence in 1967?

ERIC O. T. SABIN, G8AKR

Monkmoor, Shrewsbury.

I would confirm that many stations in this area hold similar views to those of G8AKA.

The suggestions and points of view that have arisen during discussions with other stations are:

(*i*) *Morse Code on 70cm and above*

Grant holders of Sound Licence 'B' permission to use Morse on 70cm and above, either anywhere within their allotted frequencies or, within specified subsections of the bands, if it was considered that there would be inconvenience/interference to other stations.

This would enable:

(*a*) G8——'s to attain the necessary speed, both sending and receiving, to obtain their Sound Licence 'A'.

(*b*) Many more QSO's to be made over difficult paths.

(*c*) Similar equipment to be used which would be advantageous for portable working, and for new stations to get on the bands.

(*ii*) *Phone only on Two Metres*

Grant holders of Sound Licence 'B' permission to operate phone only on 2m 12 months after their licence has been issued, provided that they also operate on at least one band above 2m. Also a maximum d.c. input limit might be imposed, of, say, 25 watts. This would enable:

(*a*) More duplex contacts.

(*b*) More contacts over difficult paths on 70cm by prearranged skeds on 2, including contacts with the Fl—— stations who, I believe hold the equivalent of our 'B' Licence but operate on 2m.

This would comply with the Geneva Regulations 1949, while at the same time make the 'B' Licence a merge of the US Novice licence, the French Fl—— licence and the present G8—— licence.

FRANCIS B. BLAKE, G8AAF

Beaconsfield, Bucks.

With all due respects to G8AKA, and in his position I would probably feel the same, that is, now that I have my feet under the table I'll get all I can, the next logical step would be to allow non-technical people to operate providing their equipment is purchased from a reputable manufacturer.

As he so rightly points out, we who read Morse can work alongside commercial and service stations because should we inadvertently interfere with their service we would quickly be told *in Morse, of course*.

Finally, anyone who cannot be bothered to learn a simple 12 w.p.m. Morse just isn't interested enough to use our facilities.

R. C. M. DAWES, G3MZT

East Barnet, Herts.

Wife or XYL?

May I plead for the abolition of the term " XYL "? When conversing with other radio amateurs' wives I refer to their husbands by name or as, " your husband " never as, " Ur OM " nor even to my husband as " MOM "—one can imagine the raised eyebrows and hurt looks that would result from such temerity! Is it therefore too much to ask that our husbands either make an effort to remember and use our names or, failing that, use the simple term " my wife "—only two syllables as opposed to three. Time and motion addicts please note.

I really do object to being referred to as if I were a chemical formula or radio component, added to which the " ex " always makes me feel so very second-hand, rather like ex-government surplus! I always suffer especially badly at rallies and similar events. At every entrance sits a little man with a mountain of cards and gallons of ink, brimming over with enthusiasm to label each and every newcomer. All very well if you happen to nurture a school-boy passion for badges and secret signs and code words but to label a woman as an " Ex Young Lady "—is it nice, is it decent?

Please, dear radio amateurs, we love you very much and if you could make an effort to spare our feelings in this matter you never know, we might even stop referring to your precious radios as " that heap of old rubbish."

BRENDA A. BLANCHARD,
Wife of G3JKV

East Grinstead, Sussex.

Contests

Activity on the h.f. bands during the *CQ* contest prompts me to enquire whether the RSGB Contests Committee is giving any consideration to the problem of alleviating congestion on the bands at least during RSGB contests.

Between September, 1965 and June, 1966 there have been seven letters in the BULLETIN on the subject of contests, but I have not been able to find any views expressed by the Contests Committee.

Like many other amateurs, my operating time is limited and while I am not " anti-contest," something really must be done to stop the farcical situation that existed on the three h.f. bands last weekend. With s.s.b., Yagi or cubical quad aerials communication with any part of the world is relatively easy—a contest today is not a test of operating ability but a test of endurance.

There is little doubt that many stations which were active were forced to take part in the contest—or at least give contest reports—in order to communicate with anyone at all, as indeed I was myself.

Is it too much to ask that the Contests Committee gives some thought to this problem taking G5YN's suggestions in his letter to the BULLETIN of September, 1965 as a basis? A lead by the RSGB could well lead to rationalization in other countries.

G. R. SCOTT-FARNIE, C.B.E., G5FI

London, SW1.

In September's *Month on the Air*, John Allaway is very surprised to see how few UK stations feature among the competitors in contests and finds this difficult to understand.

Perhaps UK amateurs have appreciated how pointless most of these contests are and to what extent they ruin this hobby, for the majority whose interest lies in other directions.

The rubber stamp QSO, the exchange of numbers, seems to be as unpopular with UK amateurs as it deserves to be, and UK amateurs may be proud of their abstention from these futile QRM factories.

G5YN's letter in the BULLETIN appealed for a degree of restraint and discipline by the sponsors of contests in restricting contests to a portion of each band and thereby not ruining the hobby for all the non-contestants. A very restricted proposal of this nature was passed at Opatija, but only for certain types of contest.

During a contest it is virtually impossible to compare different aerials, different microphones, different coupling arrangements or, in fact, any experimental tests on the air, for which Amateur Radio was once renowned.

On bands where activity is at a low ebb, on v.h.f. bands for example, contests probably serve a very useful purpose by providing a reasonable level of activity, and occupying the Amateur Bands. But few would maintain that 80 or 20m require the additional stimulus of contests to provide a level of activity.

So long as the organizers of contests on these crowded bands fail to show enough restraint to restrict these contests to a small portion of each band, and so leave band space for the non-contestants, the UK amateurs are to be congratulated on abstaining and so leading the world to a saner use of the overcrowded bands.

It is to be hoped that RSGB will give a lead by restricting its contests to small portions of any band used. By the low UK participation, the British amateur has clearly expressed his objection to the present day world-wide contests.

E. M. WAGNER, G3BID

London, NW3.

QSL Managers

I have just read the BULLETIN for October and wish to comment on the remarks in " The Month on the Air " from VE4OX. It is stated " that all QSL's received for stations for whom VE4OX acts as QSL manager VIA THE BUREAU are destroyed and not answered. He considers that anyone really interested in receiving QSL's would send direct WITH SAE AND IRC's (my capitals) and that people who QSL via the bureau are merely collecting wallpaper."

My first reaction after reading this was to say " Who does he think he is?" Not only does he want s.a.e.'s and IRC's also but he then has the unmitigated gall to say that all amateurs who do use the bureaux for QSL purposes are just collectors of wallpaper.

I would like to ask the question " What is wrong with using the bureaux? " The QSL bureaux were around a long time before any so called QSL manager was thought of and they have always to my mind done a good job. Not only do they get the cards circulated but (and this is a big point with some amateurs) they do keep down the costs in this hobby, especially for some of our amateurs who cannot afford to send s.a.e.'s and IRC's to get cards direct. For example, in this part of the world if I sent a QSL + s.a.e. + IRC's by airmail to Canada it would cost me $1.05 Malaysian which is 2/6d. in English money. To this I must add the price of the s.a.e. and the IRC's so the costing now is about 5/- and for one, I just cannot afford to do this. I fail to see or understand why an amateur who has completed the final courtesy of a contact should be penalised because he has sent his card via the bureau and not direct. It is not costing VE4OX anything to send the QSL's back via the bureau to the amateurs who wish their cards that way.

Although it is not stated, I presume that VE4OX has instituted this course of action with the consent of the stations for whom he is acting as QSL manager. Or has he? It would be interesting to know what they think about the situation.

I feel sure that if some of the big guns in DX, like Gus and the Yasme Foundation can send out cards via the bureau, VE4OX would not include these operators in his classification of people who merely collect wallpaper. If this is the attitude that is going to be taken by QSL managers then I for one say that it is about time we forgot about them before the whole business gets out of hand.

H. PAIN,
ex/op ZB2A, XZ2HP, VS7PH, DL2XS, G3ATH, GI3ATH, 9M4MT, 9V1MT.

Singapore 19.

Council Elections

Once again I have received my voting paper for the election of Council for 1967.

Every year they arrive and every year I just don't return mine. It's not that I don't want to vote or that I don't appreciate what the Council members do for us. The plain truth is I just don't know any of the people who are putting up for election. I see their names mentioned in the BULLETIN but I feel I honestly can't vote for some person who is a perfect stranger to me.

I have been a member of the RSGB for 16 years and I have yet to see one name I really know putting up for election. To ask me to put a cross against one name or the other to me would be like sticking in a pin to find winning race horses or football teams. I believe there must be many more members who feel as I do.

What the answer is I just don't have a clue. But you can bet my membership fee will be paid as usual next year.

Best wishes to the new Council and may the RSGB flourish.

D. SMITH, G3LTU

Cleethorpes, Lincs.

CONTEST NEWS

RESULTS—REPORTS—RULES

Third 70 Mc/s Contest (Portable) 1965

Poor conditions and bad weather prevailed during the Third 70 Mc/s Portable Contest held on 24 July, 1966. Despite this, an excellent winning score of 16,643 points was achieved by GW3RUF/P operating from Brecon. Undoubtedly the comparatively high level of activity made such a score possible and it is pleasing to note the increasing activity from Northern Ireland (although more entries from this area would be welcome) and the many new calls that appear in the logs. In second place was GW3OXD/P (Radnor) closely followed by G3PMJ/P (Staffs.). For a notable performance G3PMJ will be awarded a special certificate of merit as highest scoring G station. The score of GM3RIK/P in Argyll, occupying eleventh position, is also worthy of note.

Comments

Weather played up again, spent afternoon and evening in thick cloud (G3RXJ/P). Station gave his QTH as . . . . . , this puts him in sea (G3KNB/P). Would much prefer QRA locators to facilitate calculations (G3JEQ/P). GC3OBM heard at 15.10 GMT, (GM3RIK/P). Glad I took a key as three contacts accounted for half my score (G3ABM/P).

The lack of c.w. is noted by several entrants whose calls went unanswered. However, most of the longer distance contacts were made on c.w. It is possible that future rules may provide a stimulus for this mode. It is also expected that the timing of this contest will change as many considered the closing time rather late.

Several entrants comment on Sporadic *E* conditions during the contest, a method of propagation that could well be used in future years

The committee wishes to thank all those who submitted entries, and the following for check logs; G3ERO, G3HWR/P, G3OBD G3OHH, G3VAL/P, BRS15744, A4048, A4242 and A5032.

Third 70 Mc/s Contest (Portable) 1966

Call-sign (portable)	Posn.	Score	QSOs	QTH (County)	Best QSO Station	Distance Miles
GW3RUF	1	16643	98	Brecon	GI3PDN/P	250
GW3OXD	2	13914	85	Radnor	GM3RIK/P	245
G3PMJ	3	13197	97	Staffs	GM3RIK/P	217
G3NUE	4	9613	61	Somerset	GI3CDF/P	243
G3POI	5	8943	92	Sussex	G3NJF/P	187
G3EFX	6	8001	58	Dorset	G3NJF/P	200
G3OJE	7	7646	89	Bucks	G3RLE/P	153
G3NJF	8	7428	44	Lincoln	GC3OBM	290
G3VCP	9	6630	83	Surrey	G8NF/P	189
G3UUP	10	6572	68	Bedford	G3NUE/P	154
GM3RIK	11	6549	28	Argyll	G3NJF/P	250
G3ULT	12	6525	74	Berks	G8NF/P	180
G3BXS	13	6430	75	Oxford	G3RLE/P	155
G3JEQ	14	6388	74	Berks	G3NJF/P	154
GI3PDN*	15	5868	50	Londonderry	GW3RUF/P	250
G3GGL	16	5628	48	Salop	GM3RIK/P	240
GI3TLT	17	5592	31	Co. Down	G3AHB/P	300
G3FD*	18	5196	68	Bedford	G3NUE/P	136
GI3OIC	19	5099	48	Antrim	GW3RUF/P	226
GW3ITZ	20	5000	52	Denbigh	GI3PD/P	215
G3KNB	21	4956	51	Cheshire	GM3FYV	214
G3AHB	22	4660	56	Bucks	GI3TLT/P	300
G3JMY	23	4524	35	Somerset	G8NF/P	197
GI3CDF	24	4166	47	Co. Armagh	G3NUE/P	243
G3RCV	25	3903	59	Sussex	G3PMJ/P	153
G3RLE	26	3800	44	Yorks	G3BXS/P	155
G3RXJ	27	3611	41	Sussex	GW3RUF/P	152
G3PCR	28	3500	43	Oxford	G3NUE/P	120
G3PUO	29	3406	38	Lancs	GI3OIC/P	158
G3UDN	30	3191	35	Oxford	G3POI/P	125
G3VJN*	†	3187	37	not given	—	—
G3ABM	32	2336	22	Cheshire	GI3PDN/P	199
G3NN	33	2011	30	Yorkshire	G3AHB/P	135
G2WS	34	1715	20	Somerset	G3BXS/P	73
G3JDM	35	1356	15	Staffs	G3PUO/P	77
G3OMU	36	567	10	Hants	GW3RUF/P	100
GI3VHY	†	534	14	Co. Down	GD3FOC/M	60
G3OHX/M	38	433	10	Middx.	G3RXJ/P	49

* No distance column, only claimed points.
† No Cover sheet.

Fourth 144 Mc/s Contest (Portable) 1966

Entries for this contest totalled 43, comprising 31 Gs, nine GWs, two GMs and one EI. A further 32 G, five GW and one GM portables appeared in the logs, but did not send in entries.

Top scorer was G3POI/P operating from Ditchling Beacon in Sussex. Only 23 points behind was GW3RUF/P, the Midlands Contest Club Station, operated by G3KXA from the summit of Snowdon. 2000 points separated the leaders from G3LTF/P operated by G3LTF and G3JMA.

The furthest contact was made by G3KMT/P who worked ON4ZN/P at 513 km.

Comments

Sad lack of c.w. contacts (G3POI). Very little use made of c.w. (G2WS). The scale of 25Km to one centimetre on the continental QRA locator map defeats precise determination of distance (G3PIA). QRA locator much appreciated in calculating scores (G3JEQ).

How do we know if some of the Europeans are portable or /A? (G3LTF). A big trouble was my terrible long call-sign (GM5ADM/DJ7HR/M). Sorry more stations did not turn their beams my way. Furthest heard was G3PIA/P (EI4BF). Enjoyed ourselves in spite of an invasion by thousands of flies (G3NLY). First time I've heard QRM on 2! (A4871).

Several operators are still in difficulties with the QRA locator. At least three do not believe in square 80 which is in the bottom right hand corner of the two-letter square. There is some doubt about the accuracy of the following locators received during the

Leading "G" Station in the Third 70 Mc/s portable Contest was G3PMJ/P, at Merryton Low, four miles North East of Leek in Staffordshire.

(Photo by G3PMJ)

contest: ZN83J, YN34E, YL06D, YN92E, ZM62G, YO33E, ZO39G and XK94. Would the " owners " please check.

A pleasing feature of the results is that 17 counties are represented in the first 20 positions. Some stations, however, are still handicapped by lack of activity. GM3PSP/P, 1806 ft. a.s.l. in the Pentland Hills had 20 GM contacts and four G, all the latter on c.w. His best contact was with G3KCB/P in Cheshire. G3XC/P in Cornwall averaged over 400 points per contact from another " isolated " location.

There were less comments than usual with the logs and no rule changes were suggested.

Check logs were gratefully received from G2BQ, G3JKV, GW3GHC/P, BRS15744, A3942, A4048, A4242, A4743, A4871, A5032 and A5082.

	Call-sign (portable)	Pts.	Contacts	Best Contact km	County	Power Watts	Aerial
1*	G3POI	26357	107	495	Sussex	20	10
2	GW3RUF	26334	102	412	Caerns.	25	10
3	G3LTF	24292	94	470	Essex	25	10
4	G3AOS	23904	107	550	Staffs.	25	4/4
5	G3NUE	23558	95	438	Somerset	25	10/10
6	GW3OXD	22209	114	420	Radnor	20	6/6
7	G3KMT	21022	107	513	Salop.	10	6/6
8	G3XC	20805	51	463	Cornwall	25	6/6
9	G3FRV	20489	96	467	Sussex	12	10/10
10	G3OBD	20035	90	485	Dorset	25	4×7
11	G3KCB	18788	87	338	Cheshire	25	6/6
12	GW3RJH	18009	93	350	Denbigh	25	8/8
13	G3NJF	16145	54	475	Lincs.	24	6/6
14	G3PSH	15938	75	510	Somerset	15	10
15	G4JJ	15709	66	482	Derby.	10	5
16	G6SC	15125	72	445	Bucks.	25	6/6
17	G3PIA	15046	82	430	Berks.	15	6/6
18	GW3LEW	14712	73	420	Glam.	10	6/6
19	GW3RXK	14115	66	340	Salop.	25	6/6
20	G3EFX	14051	69	403	Oxon	25	5/5
21	G5HZ	13493	59	435	Berks.	16	6/6
22	G3BA	13448	66	450	Westmorland	20	10
23	G3MAR	13183	69	360	Worcs.	25	8/8
24	G3JRL	13015	66	485	Derby.	10	4/4
25	G3CGQ	12282	60	350	Bucks.	12	10
26	G3JEQ	11844	59	360	Berks.	10	5
27	G3FD	11514	59	498	Beds.	18	8
28	G3ERD	10800	63	475	Derby.	15	10
29	GW2CZM	9839	47	295	Caerns.	16	4/4
30	G3DTB	8996	52	465	Wilts.	15	6
31	G2BLA	8747	45	345	Herts.	10	5
32	GW2HIN	8276	51	263	Monmouth	10	6
33	GW3MAX	7373	43	232	Monmouth	15	6
34	GM5ADM/ DJ7HR	5516	19	374	Lanark.	—	3
35	G6SN	4869	21	235	Yorks.	15	4
36	EI4BF	4584	12	425	Wicklow	10	4
37	G3NN	3694	22	298	Yorks.	20	4
38	G3NLY	3305	50	160	Staffs.	16	6/6
39	G3PZF	3052	25	345	Kent	10	5
40	G2WS	2934	23	210	Somerset	12	5
41	G3JDM	2465	21	130	Staffs.	15	5
42	GM3PSP	2194	24	320	Midlothian	15	8
43	G3KEU	2130	17	400	Durham	10	4/4

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

First 70 Mc/s Contest (Open) 1967

The rules are unchanged from last year.

1. When: 10.00 GMT to 20.00 GMT on Sunday, 12 February, 1967.

2. The General Rules of RSGB Contests to be published in the January 1967 issue of the RSGB BULLETIN will apply except as superseded by the rules of this contest.

3. Eligible Entrants: All operators must be fully paid-up members of the RSGB resident in Europe and hold a current Amateur (Sound) Licence. Multiple operator entries will be accepted provided that only one call-sign is used.

4. Sections (A) Single operator, receiving no assistance, at home. (B) Other stations.

5. Contacts may be made on any mode permitted in the Amateur (Sound) Licence except A2 (m.c.w.).

6. Scoring will be on the basis of one point per mile.

7. Contest Exchanges: RST or RS reports followed by the contact number and location (e.g. RST 599001, 4 north Macclesfield, Cheshire). This location must be identifiable without ambiguity on the Ordnance Survey " Ten-mile " map. Alternatively, five-figure QRA locators may be exchanged. It is the responsibility of the receiving operator to obtain the information necessary to calculate his distances correctly.

8. Entries: (*a*) Logs should be tabulated in columns headed in this order: " Date/Time (GMT) "; " Call-sign of station contacted "; " My report on his signal and serial number sent "; " His report on my signal and serial number received "; " Location of station received "; " Call-sign of operator " (Multi-operator entries only); " Points claimed."

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

(*c*) Entries must be post-marked not later than Monday, 27 February.

9. Awards. At the discretion of Council miniature cups will be awarded to the winners and Certificates of Merit to the runners-up in each section.

First 144 Mc/s Contest (C.W.) 1967

This contest is now the only v.h.f. one in the RSGB Calendar scored on a " points per contact " basis.

1. When: 12.00 GMT to 22.00 GMT on Sunday, 29 January, 1967.

2. Sections: (a) High Power (up to 150 watts input to the p.a. stage); (b) Low Power (up to 30 watts input to the p.a. stage).

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

4. Contacts: May be made on A1 only.

5. Scoring: For each completed contact with a station in the operator's own county or in an adjacent county 10 points may be claimed . For each completed contact with a station in any other county in the operator's own country 20 points may be claimed .For each completed contact with a station outside the operator's own country 30 points may be claimed. In addition 20 bonus points may be claimed for each British Isles county worked.

7. Contest Exchanges: RST reports followed by the contact number, and county (e.g. RST559001, Cornwall, or RST579002, London). The full name or the abbreviation given in the January, 1967 RSGB BULLETIN must be used to designate the county.

7. Logs: (a) Must be tabulated in columns headed (in this order) " Date/Time (GMT)," " Call-sign of Station Contacted," " My report on His Signals and Serial Number Sent," " His report on My Signals and Serial Number Received," " County," " Bonus Points," " Points Claimed."

(b) The cover sheet must be made out in accordance with RSGB Contests Rule 4 and the declaration signed. The address of the station must include the county.

(c) Entries must be postmarked not later than Monday, 13 February 1965.

8. Awards: At the discretion of the Council of the RSGB, certificates of merit will be awarded to the leading station and runner-up in each section.

CONTESTS DIARY

14-15 January	—Affiliated Societies' Contest (1·8 Mc/s) (see page 836)
29 January	—First 144 Mc/s Contest (C.W.)* (see above)
4-5 February	—ARRL DX Contest (Phone)
12 February	—First 70 Mc/s Contest (Open)* (see opposite)
18-19 February	—First 1·8 Mc/s Contest
18-19 February	—ARRL DX Contest (C.W.)
4-5 March	—Second 144 Mc/s Contest (Open)* and 144 Mc/s Listeners' Contest*
4-5 March	—ARRL DX Contest (Phone)
11-12 March	—BERU (see page 838)
18-19 March	—ARRL DX Contest (C.W.)
2 April	—Low Power Contest (3·5 Mc/s)
15-16 April	—Second 70 Mc/s Contest (Open)* and 70 Mc/s Listeners' Contest*
7 May	—Third 144 Mc/s Contest (Portable)*
27-28 May	—First 432 Mc/s Contest (Open)*
28 May	—First 1296 Mc/s Contest (Open)*
3-4 June	—National Field Day
2 July	—Fourth 144 Mc/s Contest (Portable)*
8-9 July	—1·8 Mc/s Summer Contest
23 July	—Third 70 Mc/s Contest (Portable)*
2-3 September	—V.H.F. NFD/IARU Contest*
10 September	—80 Metre Field Day
14-15 October	—RSGB 21-28 Mc/s Telephony Contest
14-15 October	—Second 432 Mc/s Contest (Open)*
15 October	—Second 1296 Mc/s Contest (Open)*
28-29 October	—RSGB 7 Mc/s DX Contest (Phone)
11-12 November	—RSGB 7 Mc/s DX Contest (C.W.)
18-19 November	—Second Top Band Contest
3 December	—Fourth 70 Mc/s Contest (C.W.)*

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

Second 1296 Mc/s Contest 1966

A further increase in the number of entrants for this contest (16 October) over the previous one in May, shows that the band is slowly gaining popularity.

It would also appear from the notes received that there is a desire amongst contestants to divorce the contest from the 70cm event which has formerly run concurrently. Due notice will therefore be taken of this suggestion and other minor points which were mentioned.

It would also appear to be desirable to continue with the crossband contact feature, although the opinion is formed that there are one or two different interpretations of this rule. The Contests Committee would welcome your thoughts on this point.

Congratulations are due to the leading stations, especially the winner, G3MCS.

Only one multiple-operator entry was received: G8ACE/P, operated by G8ACE and G8ACP, south west of Royston, Herts., amassed 6125 points from 13 contacts, their best DX being a 113 mile contact with G3NNG/P. The equipment included a transistorized K6AXN-type converter, a 2C39A in a G2RD box cavity and a 2 ft. by 4 ft. parabolic cylinder at 18 ft.

Position	Call-sign	Location	P.A. Stage	Input (watts)	Receiver	Aerial	Contacts	Points
1	G3MCS	Aylesbury	3CX100A5	40	K6AXN	3 ft. parabola	16	6340
2	G2RD	W. of Croydon	TD1-100	30	Xtal mixer	3 ft. parabola	18	5630
3	G8AL	Chingford	2C39A	20	1N23B	6 ft. parabola	15	5613
4	G3FP	Croydon	2C39A	80	Xtal cavity	3 ft. parabola	14	5180
5	G3LTF	Chelmsford	4CX100A5	80	1N23E	2 ft. 6 in. parabola	9	4660
6	G3GWL	Bletchley	2C39A	40	—	4 ft. parabola	10	4575
7	G3NNG/P	W. of Wantage	2C39A	10	Xtal mixer	6 ft. parabola	7	3895
8	G5FK	Wembley	2C39A	35	Sim 2 (K6AXN)	2 ft. 6 in. parabola	14	3690
9	G3RPE	E. of Tring	2C39A	20	K6AXN	4 ft. parabola	10	3630
10	G8AEJ	Croydon	2C39A	40	1N23B	3 ft. parabola	9	2655
11	GW3ATM/A	Chepstow	2C39A		K6AXN	32 ele. stack	4	1775
12	G3OXD/A	S.E. Dudley	DET24	15	K6AXN	8/8 and dish	7	1500
13	G3FEX/P	Storrington	2C39A	5	Xtal mixer	8/8 and 16 in. parabola	3	1300
14	G3EGV/P	S. of Hungerford	2C39A	6	Xtal mixer	3 ft. parabola	4	870
15	G2WS	Weston-super-Mare	2C39A	15	K6AXN	8/8 slot	3	730
16	G8AOD	—	—	—	—	—	2	530
17	G3HWR	Potters Bar	2C39A	25	—	2 ft. 6 in. parabola	3	355
18	G3RIN	Redhill	2C39A	30	—	6/6	2	195

Affiliated Societies' Contest 1967

The rules for the Affiliated Societies' Contest to be held on 14-15 January, 1967 are as set out below. The attention of non-contestants is called to Rule 6. It is not in the spirit of this Contest that a Society station should be operated by only one member for all or nearly all the time and entries which indicate this method of operation may be rejected by the Contests Committee.

Rules

1. The contest is open to all Societies in fully paid-up affiliation with RSGB at the time of the Contest. Societies may enter more than one station provided that different call-signs are used.

2. The General Rules to be published in the January, 1967 issue of the RSGB BULLETIN relating to RSGB Contests will apply except as superseded by the rules of this Contest. For the purpose of this Contest **all entries are classed as multi-operator stations.**

3. The Contest will be in two periods:
19.00 to 23.00 GMT, 14 January, 1967 and
19.00 to 23.00 GMT, 15 January, 1967.

4. Entrants must operate in the 1·8 Mc/s band on c.w. only, and operate in such a way as to minimize interference with other band users. Contacts with telephony stations are not permitted.

5. Fifteen points will be scored for contacts with Affiliated Society stations, and five points for all other contacts. Contacts may be made once only with a station during each operating period. The contest score will be the sum of the points obtained in both periods, and the combined log will be prefaced by a cover sheet made out in accordance with RSGB General Rule 4.

6. Affiliated Society stations **only** must send AFS to identify themselves as contestants, after the report serial number groups, e.g. 559004AFS. Serial numbers will advance throughout the entire contest.

7. Call-signs which have been issued to Societies must be used, but their use at an alternative address is not debarred. If no Society call-sign is held the call-sign of a member may be used. More than one entry will be accepted from a club or society provided that where a club call-sign has been issued, that call-sign is used for the " A " station. Additional entries must use members' call-signs.

The contest is organized to promote club activity and it is not in the spirit of the contest that a station be operated for most of the contest period by only one operator.

8. Entries must be postmarked not later than **31 January, 1967,** and must be submitted in the following form:

Date/ Time GMT	Call-sign of station worked	Our report on his signals and serial no. sent	His report on our signals and serial no. received	Enter AFS if received	Call-sign of Operator	Points Claimed

Cover sheets and log forms are available from RSGB Headquarters on request.

9. The declaration must be signed by an officer of the Affiliated Society, who will be held responsible for the conduct of the station(s).

10. At the discretion of the Council of the RSGB, the **Edgware Trophy** will be awarded to the Affiliated Society submitting the highest total checked score.

With the generous co-operation of the Codar Radio Company, the Amateur Radio Mobile Society recently donated a Codar AT5 transmitter to the Cheshire Homes as a companion unit to the Lafayette receiver given last year. Capt. E. E. Worrell, G5AAB/W3MDI, formally presented the transmitter at the RSGB Radio Communications Exhibition in October to Mr F. C. Ward, G2CVV, RSGB Region 4 Representative.

(Photo by G3NMR)

Second 432 Mc/s Contest, 1966

The 432 Mc/s Contest on 15-16 October, like its predecessor in May, was again dominated by the number of G8 three letter call-signs entering. A very welcome sign indeed. Congratulations are due to the leaders, especially to G8ACP/P, who occupied third place overall. G3NNG/P and G3LTF again demonstrated their prowess by creating magnificent scores when related to the length of the event and prevailing propagation conditions.

Prior to formulating the rules for the event, contestants were asked to make their feelings known concerning a shut down between midnight and 6 a.m.; no one had anything to say about this proposal, and so a shut down was arranged. However, G8ANY, G3OJE, G8AEG, G3OUL, G8AHE/P, G3OXD/A and G3NNG/P now state that a continuous contest is the way they would like it, and so it would appear that the original timing will be reverted to in future. The exception to this view is voiced by BRS15744, BRS262234, A4048 and G3NKS who prefer the split contest, one of whom thought it a nice gesture and would suit the older contestants who had reached the stage where they perhaps required a little rest halfway through the event, sentiments with which your adjudicator agrees!

It is interesting to note that three contestants, namely G8AOP, G8AGG and G8ADH/P used varactors. G8AOP used an EF80 as his final valve on 144 Mc/s, feeding into a BAY66 diode. He claims an output of 1 watt at a signal frequency of 432 Mc/s, with 4 watts input at 144 Mc/s. The varactor at G8AGG was a Microwave Associates MA4061A diode, driven with 12 watts at 144 Mc/s providing a measured 6-7 watts output on 70cm with satisfactory modulation (injected at 144 Mc/s). He is at present designing similar gear for 70cm to 23cm. G8ADH/P does not give much information about his varactor, except that his input at 144 Mc/s was 15 watts to a QQV03-20A.

Points of interest from numerous letters accompanying entrants' logs are as follows: G8AHF complains of QRM and cross-modulation. G3OJE considers that conditions in his area were flat; he recommends a little known transistor, type AF239 as a pre-amplifier at 432 Mc/s. G8AEG and G3OXD/A share the same views on propagation as the winner, G3NNG, who says it was "diabolical." G8AHE/P suggests high and low power sections. G2XV and G3OXD/A would like to see a c.w. contest comparable to the 2m event. In this respect there are plans afoot which they may find satisfactory. Finally, GW3RUF/P makes a statement about his location which is food for thought. He wonders if he was located too high to take advantage of his local temperature gradient.

Check logs and entries for the Listener's Championship from BRS15744, BRS26234/P and A4048 and check logs from G3HWR and G2DHV are acknowledged.

The V.H.F. Contests Committee is very appreciative of the interest and expressions indicated by the numerous notes and letters on the contest.

Second 432 Mc/s Contest Results

Position	Call-sign	Location	P.A. Stage	Input	Receiver	Aerial	Contacts	Points
1	G3NNG/P	Nr. Wantage	DET24	12	2N2857	2 × 8/8	93	8632
2	G3LTF	Nr. Chelmsford	4X250B	150	T1XM05	72 ele. stack	71	7962
3	G8ACP/P	Nr. Royston	QQV03-20A	30	Transistor	8/8	81	7122
4	GW3RUF/P	E. of Brecon	QQV02-6	8	6CW4	10 ele. Yagi	55	6800
5	G3EGV/P	Nr. Hungerford	QQV03-20A	20	A2521	24 ele. Stack	78	6446
6	G8AJU/A	Woodcote	QQV03-20A	25	A2521	40 ele. stack	79	5939
7	G3OUL/P	Nr. Leek	QQV03-20A	20	AF139	10 ele. Yagi	66	5879
8	G8ADC	Dunstable	QQV02-6	7	AF139	10/10	79	5439
9	G3VJX/P	E. Ludlow	QQV02-6	5	GM0290	10 ele. Yagi	57	5215
10	G3CZU/P	Nr. Minehead	4X150A	150	GM0290A	2 × 18 ele.	38	4791
11	GW8ACG/P	S. of Flint	DET24	25	AF139	6/6	45	4714
12	G8AHE/P	Broadway	QQV02-6	8	GM0290	14 ele. Yagi	57	4610
*13	G8AKE	Melton Mowbray	4X250B	150	AF186	2 × 14 ele.	46	4073
14	G8ADU/A	W. Gt. Malvern	QQV03-20A	25	GM290	14 ele. Yagi	52	3929
15	G8ABP	S.E. Birmingham	QQV06-40A	60	GM0290	14 ele. Yagi	52	3655
†16	G2XV	S. Cambridge	—	100	—	—	35	3643
17	G3VOC/P	Nr. Brighton	DET24	25	GM290A	2 × 4/4	48	3512
18	G3OXD/A	Nr. Dudley	DET24	25	AF139	8/8	50	3487
19	G3NKS/P	Nr. Worthing	QQV03-20A	15	AF186	10 ele. Yagi	49	3331
20	G8AL	Woodford	QQV06-40A	40	AF139	24 ele.	66	3293
21	G3NJF/P	Claxby	QQV03-20A	20	AF139	48 ele. stack	23	2729
22	G8AAZ	Wimbledon	QQV03-20A	20	AF186	8/8 & 14 ele.	59	2346
23	G5FK	E. of Ruislip	TT24	8	A2521	10/10	56	2337
24	G2RD	W. of Croydon	QQV03-20	30	AF139	6/6	60	2258
25	G8AOD	E. Grinstead	QQV02-6	12	EC88	10 ele.	39	2109
26	G8AEG	Ashby-de-la-Zouch	QQV03-20A	18	AF139	14/14	32	2088
27	G3RIN	Redhill	QQV03-20A	30	AF186	14 ele.	36	2041
28	G8AJD	Potters Bar	QQV03-20A	24	GM290A	8/8	53	2032
29	G2HDJ	Staines	QQV06-40A	120	BFY90	4 × 11 ele.	45	1950
30	GW2DJ/P	Llangollen	QQV03-20A	18·5	GM0290	14 ele. Yagi	21	1948
31	G8AAY/A	Poole	QQV03-20A	25	A2521	2 × 14 ele.	24	1877
32	G8AEJ	Croydon	QQV06-40A	30	BF180	24 ele. Yagi	52	1868
33	G8AMU	Reigate	QQV03-20A	30	AF186	10 ele.	41	1712
34	G3SUT	Sutton Coldfield	QQV03-20A	25	GM0290	14 ele.	30	1648
35	G8AAF	Beaconsfield	QQV03-20A	27	GM0290	10 ele. Yagi	40	1587
36	G5DF	Reading	ACT22	30	GM0290	16 ele. stack	25	1548
37	G3AHB	Slough	QQV03-20A	36	TIXM101	10 ele. Yagi	46	1504
38	G8AGG	Nr. Prescot	Varactor MA406/A	12	AF139	10 ele. Yagi	24	1501
39	G8AHZ	Didcot	QQV06-40A	20	GM290	18 ele.	24	1490
40	G8UCU/P	E. of Brighton	QQV02-6	3·5	GM290	8/8	17	1403
41	G8AAJ	Crystal Palace	QQV03-20A	24	AF186	10/10	45	1387
42	G3OJE	Nr. Croydon	QQV06-40A	30	AF239	14 ele.	37	1257
43	G8ANS	Nr. Barnet	QQV03-20A	26	2N3478	18 ele.	37	1188
‡44	G3JKY/A	S. of Bromley	QQV03-20	24	GM0290	8 ele + corner reflector	29	1152
45	G8ART	New Barnet	QQV03-20A	33	AF139	24 ele.	32	1136
†46	G8AHF	East Cowes	QQV03-20A	28	BF180	2 × 14 ele.	19	1119
47	GW3ATM/A	Chepstow	QQV06-40	25	6AM4	16 ele stack	18	1112
48	G8ADH/P	E. Ringwood	Varactor	15	GM0290	14 ele. Yagi	17	974
49	G3NZG/P	N. of Dorchester	QQV02-6	5·5	AF186	10 ele.	12	881
50	G8AQD	N.E. Croydon	QQV02-6	8	AF139	8/8	34	869
†51	G5UM	N. of Hertford	QQV03-20A	18	AF139	6/6/6/6	24	858
52	G8AIE	Barnet	QQV03-20A	20	AF139	6/6	23	836
53	G3LTN	Andover	QQV06-40A	50	A2599	18 ele.	15	781
54	G8APV/A	London S.E.4	QQV06-40A	30	GM0290	8/8	31	700
55	G2WS	Weston-super-Mare	QQV03-20A	25	AF139	6/6	13	627
56	G8ANY	Blackpool	QQV03-20A	15	GM0290	14 ele.	11	608
57	G8AOL	Bexleyheath	QQV02-6	8	GM290	8 ele. Yagi	18	529
58	G8AOP	Birmingham	Varactor	4	AF139	14 ele.	10	366
59	G8ACK	London N.W.	QQV02-6	10	GM0290	14 ele.	9	184

* No declaration. † No cover sheet. ‡ Member of V.H.F. Contests Committee.

BERU Contest

Rules for the Thirtieth Event, 11-12, March 1967

RADIO amateurs throughout the British Commonwealth are invited to take part in the Thirtieth BERU Contest to be held on 11-12 March, 1967. The Contests Committee is again arranging to secure the maximum amount of overseas publicity but invites the assistance of members in bringing the dates and rules to the notice of operators throughout the Commonwealth.

Rules

1. **Sections.** The contest is divided into two sections: (*a*) High Power—maximum licensed power; (*b*) Low Power—maximum input 25 watts.
2. **Duration.** The contest (both sections) will start at 00.01 GMT on Saturday, 11 March and end at 23.59 GMT on Sunday, 12 March, 1967.

Appendix

The following call areas are recognized for the purposes of scoring in the BERU contest:—

AC3 Sikkim
AP (West Pakistan)
AP (East Pakistan)
G, GB, GC, GD, GI, GM, GW—as one call area
MP4 (Bahrein)
MP4 (Muscat and Oman)
MP4 (Qatar)
MP4 (Trucial Oman)
VE1
VE2
VE3
VE4
VE5
VE6
VE7
VE8
VK0 (Australian Antarctica)
VK0 (Heard Island)
VK0 (Macquarie Island)
VK1
VK2
VK2 (Lord Howe Island)
VK3
VK4
VK4 (Willis Island)
VK5
VK6
VK7
VK8
VK9 (Admiralty Island)
VK9 (Christmas Island)
VK9 (Cocos Island)
VK9 (Norfolk Island)
VK9 (Nauru)
VK9 (New Guinea and Bismark Island)
VK9 (Papua)
VO
VP1
VP2 (Angilla)
VP2
VP2 (Antigua and Barbuda)
VP2 (British Virgin Islands)
VP2 (Dominica)
VP2 (Grenada and Dependencies)
VP2 (Montserrat)
VP2 (St. Kitts and Nevis)
VP2 (St. Lucia)
VP2 (St. Vincent and Dependencies)
VP3
VP4
VP5 (Turks and Caicos Islands)
VP6
VP7
VP8 (Falkland Islands)
VP8 (Grahamland)
VP8 (Sandwich Islands)
VP8 (South Georgia)
VP8 (South Orkney Islands)
VP8 (South Shetland Islands)
VP9
VQ1
VQ7 (Aldabra Island)
VQ8 (Chagos)
VQ8 (Agalega)
VQ8 (Rodrigues)
VQ8 (St. Brandon)
VQ8 (Mauritius)
VQ9
VR1 (Gilbert and Ellice Islands)
VR1 (British Phoenix Islands)
VR2
VR3 (Christmas Island)
VR3 (Fanning Island)
VR4
VR5
VR6
VS5
VS6
VS9 (Aden)
VS9 (Maldive Islands)
VS9 (Kamaran Island)
VU2
VU4 (Laccadive Islands)
VU5 (Andaman and Nicobar Islands)
ZB2
ZC4 (5B4)
ZD5
ZD7
ZD8
ZD9 (Gough Island)
ZD9 (Tristan da Cunha)
ZE
ZF1 (Cayman Islands)
ZK1 (Cook Islands)
ZK1 (Manihiki Island)
ZK2
ZL1
ZL1 (Kermadec Island)
ZL2
ZL3
ZL3 (Chatham Island)
ZL4
ZL4 (Auckland and Campbell Islands)
ZL5 (NZ Antarctica)
ZM7 (Tokelau)
ZS3
ZS8
ZS9
4S7
5H3
5N2
5W1
5X5
5Z4
6Y5
7Q7
8P (The Gambia)
9G1
9H1
9J2
9K2
9L1
9M2
9M6
9M8
9V1

3. **Eligible Entrants.** The contest is open to all fully paid-up corporate members of the RSGB resident within the United Kingdom and to all amateurs licensed to operate within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by the rules of the contest.
4. **Operator.** Only the entrant will be permitted to operate his station for the duration of the contest.
5. **Entries.** Entries should be set out, as shown in the example, on ONE SIDE ONLY of foolscap or International A4 paper. **Entries must be postmarked not later than 3 April, 1967,** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1, England. Log sheets are available from RSGB Headquarters on request.

BERU CONTEST, 11-12 MARCH, 1967

Claimed Score.....

Section: (High or Low Power).....

Name..... Call-sign.....

Address .....

Transmitter.....(D.c. input to any stage of the transmitter shall not exceed 25 watts in the Low Power Section.)

Receiver..... Aerial(s).....

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

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

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

SAMPLE LOG SHEET

Date	Time GMT	Call-sign of station worked	RS sent him	RS he sent me	Band Mc/s		Bonus Points	Points Claimed
11	0005	G4XXX	569001	559002	14		20	5
11	0009	VK2ZZZ	579002	569004	14		20	5
12	0012	GM4YYY	569113	579112	14		—	5
12	0730	GW4ZZZ	589154	589164	21		20	5
Total (Bonus Points + Points Claimed) 60 + 20 = 80								

6. **Bands.** Operation is restricted to the following bands: 3.5, 7, 14, 21 and 28 Mc/s. Transmission must be of type A1 (pure c.w.) only, and frequent tone reports of T8 or less may result in disqualification.
7. **Licence Conditions and Power Input.** Entrants must operate within the terms of their licences.
8. **Contacts.** Contacts may be made with any station using a British Commonwealth call-sign except within the entrant's own call area. British Isles stations may not work each other for points. Contacts with unlicensed stations will not count for points. The decision as to whether or not a contact is valid will rest with the RSGB Contest Committee. Only one contact on each band with a specific station will count for points. **Duplicate contacts should be logged,** but no points claimed.
9. **Scoring.** Each completed contact will score **5 points.** In addition a bonus of **20 points** may be claimed for the first contact with each new Commonwealth call area (as defined in the Appendix) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.
10. **Contest Exchanges.** Contest numbers must be exchanged and acknowledged before a contact may count for points. The contest number of six figures shall be made up of the RST report and three figures starting with 001 for the first contact and increasing by one for each successive contact, e.g., 559001 for the first and 439002 for the second contact, and so on.
11. **Awards.** At the discretion of the Council, the BERU Senior Rose Bowl or miniature will be awarded to the winner of the High Power

Section, and the Colonel Thomas Rose Bowl will be awarded to the leading British Isles station in the High Power Section. The winner of the Low Power Section will be awarded the Junior Rose Bowl or miniature.
Certificates will be awarded to the first three entrants in each section. In addition a certificate will be awarded to the leading entrant in each call area regardless of the number of entrants in his call area provided that his score exceeds 1,500 points in the High Power Section or 750 points in the Low Power section. A certificate will be awarded to the runner-up in each call area in which there are ten or more entrants, provided his score exceeds 1,500 points in the High Power Section or 750 points in the Lower Power Section.

Rules for the BERU Contest Receiving Section, 1967

The rules for the Receiving Section of the BERU Contest 1967 are as follows:

1. **Eligible Entrants.** The contest is open to all fully paid-up members of the RSGB resident within the United Kingdom and to all short wave listeners resident within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by these rules. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.
2. **Duration.** The contest will commence at 00.01 GMT on Saturday, 11 March, 1967, and end at 23.59 on Sunday, 12 March, 1967. The BERU Contest for transmitting amateurs will take place during the same period.
3. **Entries.** (*a*) To count for points, a station outside the entrant's own call area must be heard in a contest contact and the following details logged in columns headed as follows: (i) Date/Time (GMT); (ii) Call-sign of Station Heard; (iii) Report and Serial Number sent by Station Heard; (iv) Call-sign of the Station being worked; (v) Band in Mc/s; (vi) Bonus Points Claimed; (vii) Points Claimed. CQ or Test calls will not count for points.

(*b*) Entries must be set out on ONE SIDE ONLY of foolscap or International A4 paper. Entries must be postmarked not later than **12 April, 1967** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1. Log sheets are available from RSGB Headquarters on request.

(*c*) All entries must contain the following declaration:

I declare that this receiving station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I do not hold an amateur transmitting licence.

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

4. **Scoring.** Each complete log entry will score 5 points. In addition, a bonus of 20 points may be claimed for the first station heard in each new Commonwealth call area (as defined in the Appendix on page 838 of this issue of the BULLETIN) on each band. The British Isles (G, GB, GC, GD, GI, GM and GW) count as one call area only as indicated in the Appendix to the rules of the Transmitting Section. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately; points may be claimed for both entries.
5. **Awards.** At the discretion of the Council, the Receiving Rose Bowl or miniature will be awarded to the winner and a certificate of merit to the runner-up in each of the IARU continents.

144/432 Mc/s Cumulative Activity Contests 1967

These short contests have been devised with a view to increasing and co-ordinating activity rather than a pure contest, especially at 432 Mc/s. It should be noted that they are framed for fixed stations only, although there is nothing to prevent a /A or /P station entering, but they will not be eligible for an award. The 144 and 432 Mc/s activity periods, although on the same dates, are separate contests.

Rules. The General rules for RSGB contests published in the January 1967 issue of the RSGB BULLETIN will apply except as superseded by the rules of this contest.

Contacts. (i) A station may be contacted once during each activity period.

(ii) Contacts may be made on all permitted modes except A2 (m.c.w.).

Eligible Entrants. Single operator, fixed stations only.

Scoring will be on the basis of one point per km.

Contest Exchanges. (1) RST or RS reports followed by serial number. Serial numbers advance throughout the activity periods.

(2) Location information.

(*a*) 144 Mc/s. Only QRA locators are required on the logs for the purposes of scoring. However contestants are reminded that they may exchange any other type of location information if they wish.

(*b*) 432 Mc/s. QRA locators or a distance and bearing from a town identifiable without ambiguity on the Ordnance Survey " Ten-mile " map.

Entries. (i) Should be submitted on RSGB Contest Log Sheets. QRA locators should be entered in column 5. In the 432 Mc/s event columns 6 and 7 may be used for the " Ten-mile " map locations, if used.

(ii) Must be post-marked not later than 14 days following the last activity period of the Spring and Winter events.

(iii) The cover sheet must be made out in accordance with the General Rules.

Awards. At the discretion of Council, certificates of merit will be awarded to the winners of the two bands for each of the " Spring " and " Winter " events.

Cumulative Activity Contest 144 Mc/s (Spring) 1967

Duration—19.30-21.00 GMT

Activity Period	Date	Modes
1	21 January	Phone only
2	4 February	C.W. only
3	18 February	Phone only
4	11 March	C.W. only
5	25 March	Phone only
6	8 April	C.W. only

Cumulative Activity Contest 144 Mc/s (Winter) 1967

Duration—19.30-21.00 GMT

Activity Period	Date	Mode
1	9 September	Phone only
2	23 September	C.W. only
3	7 October	Phone only
4	21 October	C.W. only
5	4 November	Phone only
6	18 November	C.W. only
7	9 December	Phone only

Cumulative Activity Contest 432 Mc/s (Spring) 1967

Duration—21.00-22.30 GMT. All modes may be used (see *Contacts*)

Activity Period	Date	Activity Period	Date
1	21 January	4	11 March
2	4 February	5	25 March
3	18 February	6	8 April

Cumulative Activity Contest 432 Mc/s (Winter) 1967

Duration—21.00-22.30 GMT. All modes may be used (see *Contacts*)

Activity Period	Date	Activity Period	Date
1	9 September	5	4 November
2	23 September	6	18 November
3	7 October	7	9 December
4	21 October		

Can You Help?

P. P. Clark, A3259, 15 Denstone Avenue, Davyhulme, Urmston, Manchester, who requires information on converting an RF27B and a Marconi RP47B for four metres?

M. Fisher, A4882, 169 Almondbury Bank, Almondbury, Huddersfield, Yorkshire, who requires any modification details to improve a WS19 Set Mk. 3/1 and a B44 Mk.2?

R. F. Hills, BRS26703, who wishes to obtain a list of the connections for the 16 way plug on the panel of the Collins TCS-6 transmitter, details of the power requirements, and a circuit diagram?

CLUBROOM

A Monthly Survey of Club and Group Activities

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

AERE (Harwell) ARC took their axes to the Exhibition and ground away on the topics of QRA locators and that 13·5 watts p.a. dissipation for NFD transmitters. In the current newsletter under review, G2HIF makes some comparisons between h.f. operation in 1952 and present day conditions, and although the assessment is in the light of experience during the Jamboree-on-the-Air, the conclusion is that generally speaking, s.s.b. has led to some pretty slick operating with a considerable reduction in time wastage. *G2HIF.*

Barry College of Further Education RS held its inaugural meeting on 18 October and got off to a good start with an attendance of 20. Club nights are to be Wednesdays and a station under the call GW3VKL will be in operation between about 7 and 9 p.m. *GW3VBP.*

Basingstoke ARC will be meeting next on Saturday, 10 December, in the Immanuel Hall, Wote Street, Basingstoke, when G2DX will be giving a talk on " Early Experiences in Amateur Radio." Visitors are assured of a warm welcome. *G3CBU.*

Bedford and District ARC has had a couple of months of enforced inactivity as the school in which the meetings are held is not available during inter-term holidays. This enforced break has, however, had a good effect, for members are now back with renewed enthusiasm. *G3VBA.*

Blackwood ARC has an extensive programme planned for the winter months, and which includes a series of lectures aimed at those who wish to sit the RAE. A site to erect a new clubhouse has been cleared, and it is hoped to start construction shortly. *G3NDR.*

Bristol RSGB Group was recently given a demonstration of v.h.f. and u.h.f. aerial arrays by G3JMY. To cover the large lecture theatre, closed circuit television was employed, a camera and large screen monitor being used. This proved to be a highly successful operation resulting in all members of the audience having a good view. *G5UH.*

British Amateur TV Club journal *CQ-TV* contains the circuit of a transistor modulator suitable for grid modulating a 4X150 or QQV06-40 valves. A particular feature is the use of high voltage transistors in the final stages, and the attainment of a 3 Mc/s bandwidth. *G6OUO/T.*

Bromsgrove and District ARC has extended its activities and now meets additionally on the third Tuesday of the month at Burcot Village Hall. The next meeting, which is on 9 December, will be in the Co-op Hall, Bromsgrove, and is an open night. Visitors are assured of a cordial welcome. *G2CLN.*

Cambridge and District ARC had a stand at the " Leisure Opportunities " fair. Although in competition with more than 50 other stands, the club attracted a considerable amount of interest with the visitors, and a few new members were enrolled. In October a bumper Junk Sale was held and led to an all-time attendance record. Later that month G5UM gave details of his Quickstarter converters. *G5QB.*

Members of the Dorking and District Amateur Radio Society worked 39 stations from the site 5 miles SW of Minehead during the second 70cm Contest on 15-16 October. It was the first time this portable station had been used. Equipment included two 18 element parabeams. Driving, a Frost-bitten G3LBA.

Chelmsford ARS devoted its October meeting to transistors and transistorization. Equipment shown included transmitters, receivers and test gear. Prompted by this display thought is now being given to the possibility of making the equipment for the next NFD fully solid state. *G3RZP.*

Civil Service RS reports that the current series of meetings is now in full swing with many visits of particular interest in the programme. Application has been made for a club licence, and it is hoped that the new call-sign might have some connection with the name of the club. *G3IIE.*

Conway Valley ARC meets on the third Thursday of each month and is always happy to welcome prospective members and visitors. At the December meeting on the 15th a Quiz is to be held, which should be most entertaining. *GW3RUA.*

Cornish ARC reports that its s.s.b. group is now getting to grips with the construction of the " Cornish Clubman " exciter under the eagle eye of G3LPB. In the issue of *Link* under review, the editor comments on the lack of contributions for the club magazine. Last month MARS editor let forth with the same cry, and Cornish members might care to refer to our remarks under Midland ARS in the November issue for they would seem to apply here also. *G3OCB.*

Coventry ARS meets at Canal House, Drapers Fields, and visitors and prospective members are always welcome. Under the title " The poor man's guide to his feeder line," G5GR, with a few crisp and pointed words, lays a couple of ghosts to rest. And not before time. *G3UOL.*

Crawley ARC heard G6YP lecturing on the " Metropolitan Police Communications Network " at the November meeting. *G3FRV.*

Crystal Palace and District RC recently held a hi-fi evening complete with dual concentric speakers, pressure tweeters and all the other sundry bits and pieces aimed at producing realistic sound. *G3FZL.*

Dorking and District Radio Society have successfully employed their ex GPO van in the second 70cm Contest on 15-16 October. During the contest the Society worked 39 stations using the Society's call G3CZU/P. The van made its first public appearance at the RSGB Woburn Rally in September.

Dynamics Radio. This is a recently formed group within the Hawker Siddeley Dynamics organization at Coventry and membership of which is open to employees. Already a club station under the call-sign G3VLG is operating, and an ambitious programme, including moonbounce, has been formulated. *G3LVG.*

East London District recently heard a lecture by G3EPU on the history of Trinity House, and of the electronic equipment used throughout its services. Following the talk a film was shown of G3EPU's visits to various Trinity House locations. Also screened was a film of the previous NFD. *G2ABC.*

East Worcestershire ARG is looking forward to a Daystrom demonstration which is to take place on 8 December. To meet a demand, the group is planning additional meetings during the winter session, these being held between the regular meetings. *G3HCT.*

Echelford ARS is looking forward to the visit to the ABC TV Studios on 4 December. In the current newsletter under review the birth of a particularly nasty type of TVI has been noted. This relates to TV receivers employing transistor front ends. There can be no doubt but that this will be serious for, with a front end bandwidth as wide as a barn door, and the high susceptibility of bipolar transistors to cross modulation, even if you only radiate pure signal, trouble seems inevitable. *G3HZL.*

Edgware and District RS held a successful D/F contest at the end of September. Keen interest was shown in the club's constructional contest which took place mid-November. The club net takes place every Wednesday at 21.00Z on 1875 kc/s. *G3RAA.*

Well known DX operator Les Lyske GI3CDF, leading station in the 1965 7 Mc/s RSGB Telephony Contest, was married on 11 October to Miss Winnie Clarke. The couple are now residing in Iran where GI3CDF hopes to obtain an EP3 call.

Glasgow University RC. The inaugural meeting was held on 14 October with an attendance of about 35, and a club was formed. The first ordinary meeting was held on 7 November with an attendance of about 33 and Ian McDougall of the BBC gave a most interesting address and demonstration on Mono and Stereo recording. The attendance and enthusiasm at these first two meetings has been most encouraging and the Committee is planning Morse practice sessions, tutorial sessions for those studying for the RAE, visits to local places of interest including Glasgow Airport and many other club activities. Meetings are held on the second Wednesday of the month at 7.30 p.m. in the Engineering Building of the University, and an open invitation is extended to anyone interested in Amateur Radio and Electronics in all aspects to attend. A Junk Sale will form the main item at the next meeting on 14 December. Further details from Colin Weston, GM3VAP, Engineering Library, Glasgow University, Glasgow, W2.

Gloucester ARC has had a change of venue and now meets at "The Lamb Inn," Market Parade, the next meeting being on 15 December commencing at 7.45 p.m. *G3MA.*

Grafton RS held its twenty-first AGM on 7 October, and is justifiably proud of the long service given by the club to its members. Meetings in December will be on 9th and 16th. The clubroom opens at 7.30 p.m. and canteen refreshments are available from 8 p.m. The evening's programme commences at 8.30 p.m. and to which visitors are always most welcome. *G3SIL.*

Harlow and District RS held its AGM on 15 November and is now settling down to another year of progress. *G3TLJ.*

Harrow Radio Society hopes shortly to publish its first edition of *QZZ.* Various winter projects are well under way and include a miniature 160/80m transmitter, a 4m or 2m transmitter and a transistor 70cm converter at present being developed by G3HBW. A welcome return visitor was Bob Palmer, G5PP, whose lecture on mobile Amateur Radio was well received.

Havering and District ARC meets on alternate Wednesdays. More classes are under way, taking place at every other meeting. Full details from *G3TTB.*

Hull and District ARS has been busily engaged in painting and decorating the new club premises, and reports that the lecture room is now ready. Much work has been done on the second room which will function as the "shack." A welcome is extended to all radio enthusiasts in Hull and district who may care to visit the club which meets on Friday evenings at 8 p.m. *G3MVO.*

Irish RTS is delighted to have two YLs and an XYL attending classes in their Region 1. Thanks to a lecture by EI7R, and many pointed analogies, the mysteries of the decibel were laid bare, and from which one can be sure that at least those who heard this excellent talk will not be giving any more reports of twenty over nine. *EI6X.*

Liverpool University ARS is very pleased indeed with a large grant which has just been received, which will probably be used for the purchase of equipment for the club station. Morse and RAE classes have started and both show encouraging attendance. The next meeting is on 7 December for a Pie and Ale evening in the Liver Bar starting at 7.30 p.m. *G8AIA.*

Lothians RS reports that there was a good attendance at the visitors' night held recently. There was a good display of home built equipment, and to invite the unwary to part with their hard earned brass, a bottle of Scotch was raffled. *GM3SRV.*

Lymington and District ARS will in future meet at 71 High Street on alternate Thursdays, while the club station will be operated from 77 High Street. The club is eager to increase its membership, and those who do not "belong" are assured of a very cordial welcome. *G3OZT.*

Magnus Grammar School RS is as active as ever now that term has started once again, and during September and October went through an interesting and varied programme. At the moment attention is being given to setting up an s.s.b. station, and once some decorations to the premises are completed, the a.m. station will become operational once again. *G3JNK.*

Mid Herts ARS reports that activities in Welwyn Garden City have gone through some drastic changes lately, the outcome of which is the formation of a new club bearing the name of the old established Mid Herts Net. A full programme of meetings has been arranged for 1966-67. *G3PKV.*

Midland ARS reports that the AGM was the poorest attended on record. Just why is it that when the AGM comes around everybody seems to remember a pressing and long standing engagement which just cannot be put off any longer? *G3JDJ.*

Newark SW Club now has details available of their Robin Hood Award which is to commemorate this renowned gentleman and his Merry Men. Applications for particulars of this award should be made to the call given at the end of this item. To improve the liaison between the committee and the club members, a monthly news sheet is now being issued in addition to *QUA* published quarterly. *G3TWV.*

North Kent RS is in urgent need of a promise of the loan of a 16mm sound film projector for the rather widely spaced occassions library films are shown. Such a promise would do much to conserve the club funds, and this would obviously help the treasurer to enjoy the shows a little more than he perhaps does at the moment. With the adoption of Standard 8mm and magnetic sound by educational establishments—Super 8 didn't get a look in—it is to be hoped that some of the 16mm stock might become available. *G3PUI.*

Northern Heights ARS unloaded a large party on the Communications Exhibition all of whom had a very enjoyable time. Recently, Mary Shaw, G3OMM, gave an interesting and enthralling talk and demonstration of the transmission of sound on a light beam. A special note should be made of 4 January when G6EKE/T will be describing Amateur TV. *G3MDW.*

Peterborough and District ARS meets in the Old Windmill behind the Peacock Inn on the London Road every Friday evening. Visitors are always welcome, and prospective members given the red carpet treatment. *G3KPO.*

Plymouth RC seem to be plagued with book members only. That is to say, they are on the books, but not often at the meetings. Indeed matters are so bad that unless there is a

Members of the Maidenhead and District Amateur Radio Club recently enjoyed a visit to the GPO Radio Station at Beasley, near Stratford-on-Avon. In the background are a number of rhombic aerials which give 360° propagation.

A gathering of 4m amateurs from the Manchester and London areas. Left to right, G3PLX, G3PSH, G3TEY, G3OUF, SWL Vincent, G3POI, G3OHH, G3SKR, and G3SHK.
(Photo by G3PMJ)

marked and rapid improvement, the club may collapse through sheer lack of support. Your conductor cannot imagine that this is really what the local enthusiasts want, but unless support can be given, this may be the outcome. No club can exist without active members, and since a club exists to serve, if it is not serving in the right way then it is up to the members to say so—and quick. *G3SVZ.*

Purley and District RC will be meeting on 16 December for a talk, accompanied by slides, of the recent ten week visit to the USA by G3RKK. The following day, the 17th, Purley will be combining with the South London Mobile Club and the Wimbledon Club for a Grand Christmas Party to be held in the St. John's Ambulance Hall, Merton Road, Wimbledon. *G3FTQ.*

Reading ARC reports increasing attendances at meetings which continue to provide something for everyone. Red letter day is 20 December when the AGM is being held. All members are asked to make a very special effort to attend. Don't forget that this is your meeting, and the meeting at which, through the elected committee, the pattern for the ensuing year is decided. *G2FQR.*

Reigate ATS had a talk on 17 November by G3JKV on "Panoramic Reception." The society will be participating in the multi-operator section of the 7 Mc/s c.w. contest as well as the MCC event. *G3NKS.*

Royal Signal ARS reports that due to the increasing pressure on call-signs by German Nationals, as the existing Service DL2 call-signs waste out, call-signs will in future be issued in the series DL4AA to DL5ZZ, these being specifically reserved for members of foreign forces stationed in the Federal Republic. *G3EJF.*

Salop ARS who meet at the Old Post Office Hotel, Milk Street, Shrewsbury had their AGM in mid October, and with a new committee elected are looking forward to another year of progress. Meetings are held on the 2nd and 4th Thursday in each month. *G4LU.*

Saltash and District ARC is another club with its AGM past. Highlight of this meeting was the Treasurer's Report which showed that the club had made a handsome gain of income over expenditure over the year. From *Tamar Pegasus* we learn the G9BO continues on his way, has found G9BF on board, but has not yet tumbled to the fact that in the next cabin to his is Alec D. Vance working on his new communications system which, we understand, removes the remaining sideband of s.s.b. *G2DFH.*

Southgate RC asks all members to note that the AGM will be held on 8 December, and to make a very special effort to attend. If there are any grievances, but better still, constructive suggestions, don't miss this yearly opportunity to voice them. The opinions of members are vital to the elected committee as they set the broad pattern for the ensuing year. *G3TDM.*

South Birmingham RS is as active as ever with a widely varied programme planned for the coming year. As always, visitors and prospective members are welcome to attend meetings. *G3JFL.*

South Dorset Radio Society invited members of the Wessex Amateur Radio Group to coffee and sandwiches on 4 November, when G3VPC gave a talk on direction finding. Other Wessex members, expert hares and hounds, contributed to a very interesting evening.

Stockport RS has its red letter day on 14 December which is the date of the AGM. All members are urged to make a special effort to attend. *G3FYE.*

Stratford-upon-Avon and District RC has found a more suitable meeting place for the hard winter months to come. Plans are now being discussed for the 1967 NFD. The new rule concerning p.a. power rating, although meaning some new equipment, generally finds favour in Stratford. The next meeting will be on 15 December for a pre-Christmas get-together. *G3RPJ.*

Surrey Radio Contact Club will be holding its Christmas Social on 20 December. Although only costing 19s. 6d.—and lets face it the humble pound doesn't buy much these days—tickets are slow to go, and this seems a pity. So how about it? The recent W1BB recorded lecture went down well—helped, no doubt, by the comfortable new room at the Blue Anchor. *G3KGA.*

Sutton Coldfield RS is now meeting at the Fox Inn, Walmley, on the second Monday and the fourth Wednesday in each month. Net nights are Monday and Friday at 21.30Z, between 1910 kc/s and 1920 kc/s. *G3GLQ.*

Swindon and District ARC, we gather, had a night-to-remember on 5 November when those who should know better pretended that they shouldn't, and joined in a rockets and bangers party. The last date for booking your reservation for the Annual Dinner is at the club meeting on 14 December. Don't miss this. *G3LLZ.*

Thames Valley ARTS will be meeting on 7 December for a symposium on microwave bands led by G3UFW, and on 4 January will be held the important AGM. Preparations for next year's NFD are well under way, and in fact the equipment constructed by G3ATF for use at the B station has recently won the Caernarvon Constructional Contest. *G3JKA.*

Torbay ARS. The December meeting will be the annual quiz with visiting Plymouth RC plus a Christmas Draw and a few high jinks. At this meeting it is hoped that as many wives YL's and friends as possible will join in the festivities. *G3LKJ.*

Verulam (St. Albans) ARC is holding its AGM on 21 December at The Cavalier Hall, Watford Road, assembling at 7.30 p.m. for a sharp start to business at 8 p.m. The present committee hopes that as many members as possible will attend this all important meeting, at which guidance can be given by members to the new committee on the activities they would like to see planned for the coming year. Of especial interest at a recent meeting were short lectures on the Davco transistor communications receiver, and the HA350. *G3GJX.*

West Kent ARS is meeting on 16 December for an informal natter night, and during which plans will be made for the Christmas celebrations. The meeting will take place at the usual venue: The Adult Education Centre, Monson Road. *G3SSE.*

Wimbledon and District RS is another club having slight difficulty in securing contributions for its newsletter. Perhaps slight is a masterpiece of understatement in view of the editor's forthright comments. An editor has an unenviable job at the best of times, and while he may be thick skinned enough to shrug off the brickbats, it's hardly fair to expect him to be a magician into the bargain. Why not give him a real fright and everybody send in a contribution—you included? *G3EPU.*

Wirral ARS has recently seen their Hon. Editor safely married, and the committee felt that the least that they could do was to let him off preparing the October Newsletter. *G3PXX.*

Worcester and District ARC is holding its Annual Dinner at the Dolphin on 9 December and is looking forward to an enjoyable time. The club meets each Saturday at 8 p.m. at 35 Perdiswell Park, Droitwich Road, and visitors are assured of being most welcome. *G3NUE.*

Wolverhampton ARS will be meeting on 19 December for a discussion "Junk vs Surplus" with demonstrations. This should be a pretty interesting evening since, in the case of your humble conductor, most of his junk is surplus, and most of his surplus junk. On 2 January a New Year Party will be held at the Black Horse. *G3UBX.*

Worthing and District ARC has at last hit the jackpot, and after 20 years has managed to secure a club workshop. Very good news indeed. In future the club will be meeting weekly at the Rose Wilmot Centre, Worthing. A group constructional project is under way with about 12 members interested in a transistorized g.d.o. *G3LQI.*

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.

Clock Time		Call-sign		Mc/s		Town
Sundays						
09.30	†	G3KZZ / G3TNF		1·920		South Shields, Co. Durham
09.30		G3HZL		1·940		Isleworth, Middlesex
09.45		G3USK		1·975		Mablethorpe, Lincs.
10.00		G3TTK		1·860		Coalville, Leics.
10.15		G3CGD		1·875		Cheltenham
10.30		G3SFO		1·850		Doncaster, Yorks.
10.30		GI3JEX		1·860		Belfast
11.00		G2FXA		1·900		Stockton-on-Tees
12.00		G3VNC		1·825		Hertford
12.00		GM3HBY		1·832		Glasgow
12.00		G3SVD		1·870		Reading, Berks.
12.00		G3HVI		1·890		Stoke-on-Trent
20.30		G3UQL		1·915		Brentwood, Essex
20.45		G3IFF		1·992		Havant, Hants.
Mondays						
18.00		G3SWR		1·980		Middlesbro', Yorks.
18.30		G3NCZ		1·920		Blackburn, Lancs.
19.00		G3JKY		29·500		Beckenham, Kent
19.00		G3NNW		433·080		Rochdale, Lancs.
19.30		G3VBI		1·910		Goole, Yorks.
20.00		G3CZA		1·975		Ely, Cambs.
20.00		G3USK		1·975		Mablethorpe, Lincs.
20.00		G3HJG		1·980		Manchester
20.00		G3IBJ		1·910		Southampton, Hants.
20.15		G3SAZ		1·845		Ashford, Middx.
20.30		G3TOF		1·915		Harlow, Essex
20.45		G3IFF		1·992		Havant, Hants.
21.30		G3SVD		1·870		Reading, Berks.
Tuesdays						
19.00		G3UPA		1·850		Sutton Coldfield, Warks.
19.00		G3PXX		1·875		Neston, Wirral
19.30		G5UF		1·970		Dorchester, Dorset
19.30		G3SWP		1·850		Doncaster, Yorks.
20.00		G3TPV		1·910		Hythe, Hants.
20.30		G2ABC		1·915		Woodford, Essex
20.45		G3IFF		1·992		Havant, Hants.
22.00		G3HZM		1·925		Manchester
Wednesdays						
18.30		G2FXA		1·900		Stockton-on-Tees
19.00		G3NNW		433·080		Rochdale, Lancs.
19.30		GM3HBY		1·832		Glasgow

Clock Time		Call-sign		Mc/s		Town
20.00		G8QU		1·970		London N22
20.00		G3OWA		432·520 to North		Coulsdon, Surrey
20.30		G3KGU		1·915		Theydon Bois, Essex
20·30		G3SJE		1·870		Harrow, Middlesex
20.45		G3IFF		1·992		Havant, Hants.
21.00		G3HVI		1·890		Stoke-on-Trent
21.00		G3RIS		1·980		Cromer, Norfolk
Thursdays						
18.00		G3SWR		1·980		Middlesbro', Yorks.
18.30		G3NC		1·968		Swindon
19.00		G3LGK		434·326 to South-West		Ilkeston, Derbys.
19.45		G3LGK		434·326 to South-East		Ilkeston, Derbys.
20.30		G3HZL		1·845		Isleworth, Middx.
20.30	†	G3ROE / G3TIQ		1·915		Harlow, Essex
20.30		G3LGK		434·326 to North-West		Ilkeston, Derbys.
20.45		G3IFF		1·992		Havant, Hants.
Fridays						
18.30		G3NCZ		1·920		Blackburn, Lancs.
19.30		G5UF		1·970		Dorchester, Dorset
20.15		G3SAZ		1·845		Ashford, Middx.
20.30	†	G3TLF / G3TXI		1·925		Harlow / Nazing, Essex
20.45		G3IFF		1·992		Havant, Hants.
21.00		G3RIS		1·980		Cromer, Norfolk
21.30	†	G3UCZ / G3SUU		1·915		Pudsey, Yorks. / Bradford, Yorks.
Saturdays						
10.00		G3TTK		1·860		Coalville, Leics.
13.00		G2FXA		1·900		Stockton-on-Tees
14.00		GI3JEX		1·860		Belfast
20.00		G3KPO		1·980		Peterborough
20.30		G3TLJ		1·925		Roydon, Essex
20.45		G3IFF		1·992		Havant, Hants.
Every evening, 19 December to 3 January inclusive:						
19.00		G3UEG		1·980		West Bridgford, Notts.

† Alternately

Channel Islands, Northern Ireland, Scotland and Wales are inadequately covered by this service to the SWL. The Hon. Organizer would be pleased to hear from any member in these areas or any other part of the British Isles, who would be willing to make regular Slow Morse Practice transmissions.

Forthcoming Events

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

REGION 1

Ainsdale (ARS).—14, 28 December, 8 p.m., 77 Clifton Road, Southport.

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

Ashton-under-Lyne (AUL & DARS).—16, 30 December, 8 p.m., Ashton-under-Lyne Technical College.

Blackburn (ELARC).—5 January, 7.30 p.m., YMCA, Limbrick, Blackburn.

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

Bury (B & RRS).—13 December (AGM), 10 January (Subject to be announced), 8 p.m., Old Boars Head Hotel (private room), Crompton Street.

Chester (C & DARS).—Tuesdays, except first in month, 8 p.m., YMCA.

Crewe & District.—2 January, 8 p.m., Earl of Crewe Hotel, Nantwich Road.

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

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

(ULARS).—19 December, 2 January, 7.30 p.m., Students' Union, 2 Bedford Street North, Liverpool 7.

Macclesfield (M & DARS).—20 December, 3 January, 8 p.m., 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.—7 December, 4 January, 125 Regent Road.

Preston (PARS).—13 December, 10 January, 7.30 p.m., St. Paul's School, Pole Street.

St. Helens (SES).—13 December (Electronic Music—Tape Lecture), 27 December (no meeting), 10 January, 7.30 p.m., IVS Centre, 55 College Street.

Southport (SRS).—Wednesdays, 8 p.m., and Sundays 4 p.m., 7 December (Single Sideband Equipment—G3OIE), 11 January (Getting Mobile—G3KXC), Sea Cadets Camp, The Esplanade.

Stockport.—14, 28 December, 11 January, The Blossoms Hotel, Buxton Road.

Wirral (WARS).—7 December, 21 December (no meeting), 4 January, 8 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley (B & DARC).—9 December ("Transistor Power Supplies," by Jack Ward, G4JJ), 23 December (no meeting), 7.30 p.m., King George Hotel, Peel Street.

Bradford (BRS).—13 December (Quiz night by Mr L. A. F. Stockley, G6EKE/T), 3 January ("S.S.B. for beginners," by A. W. Walmsley, G3ADQ), 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford.

Northern Heights.—7 December (Annual Dinner), 21 December (Ragchew), 4 January ("Amateur TV," by Mr L. A. F. Stockley, G6EKE/T), 7.45 p.m., Sportsman's Inn, Ogden, Halifax.

Scarborough (SARS).—Thursdays, 7.30 p.m., rear No 3 Trinity Road, Scarborough.

South Shields (SS & DARC).—6 January (Colour slide show of Club events and local shacks), 8 p.m., Trinity House Social Centre, Laygate, South Shields.

York (YARS).—15 December (Tape Lectures "The Human Machine as a Radio Operator"), 5 January (Film), Thursdays, 8 p.m., 61 Micklegate, York.

REGION 3

Dudley (ARC).—16, 30 December, 8 p.m., Art Gallery, Dudley.

Stratford-upon-Avon (SuA & DRC).—15 December, 8 p.m., Hall's Croft.

REGION 4

Derby (D & DARS).—7 December (Surplus sale by auction), 11 December (G5YY Trophy Contest), 14 December (Constructors' Contest for Founder Members' Trophy), 21 December (Annual Christmas Party), 28 December (The year in retrospect—Members' films and slides), 7.30 p.m., Room 4, 119 Green Lane, Derby.

Heanor (H & DARS).—13 December (Annual Dinner—details later), 17 December (Children's Christmas Party—provisional), 7.30 p.m., Room 14, South East Derbyshire College of Further Education, Ilkeston Road, Heanor.

Leicester (ARS).—Mondays, 7.30 p.m. (Slow Morse Practice), Sundays 10.30 a.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.

Loughborough (LARC).—Fridays, 8 p.m., Club Rooms, Bleach Yard, Wards End, Loughborough.

Melton Mowbray (ARS).—15 December (Safe Electrical Wiring—D. W. Lilley, C. Eng., A.M.I.E.E., G3FDF), 7.30 p.m., St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

Newark (NSWC).—Mondays, Thursdays, 7.30 p.m., The Hall, Guildhall Street, Newark.

Nottingham (ARCN).—Tuesdays, Thursdays, 7.30 p.m., Room 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.

Peterborough (F & DARS).—Fridays, 8 p.m., Old Windmill behind The Peacock Inn, London Road (opposite Murkitts Garage).

Worksop (NNARS).—Tuesdays (RAE Class), Thursdays (Lecture Night), 7.30 p.m., Club Room, 13 Gateford Road, Worksop.

REGION 5

Bedford (B & DARC).—15 December (Junk Sale), 7.45 p.m., Westfield School, Queen's Road, Bedford.

Cambridge (C & DARC).—Fridays, 9 December (Activity Evening), 16 December (Talk by Brian Armstrong G3EDD), No further meetings in December, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.

(CUWS).—Alternate Tuesdays during Term, 8 p.m., Psychology Department, Downing Site.

Luton (L & DARS).—13 December (AGM), 20 December ("Ham" burger Supper), Tuesdays 8 p.m., ATC Headquarters, Crescent Road, Luton, Bedfordshire.

March (M & DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, March, Isle of Ely.

Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Hertfordshire.

Shefford (S & DARS).—8 December (Any Questions), 15 December ("Getting re-started on the Amateur Bands," by G3IXG), 22 December (Natter Evening & Junk Sale), 7.45 p.m., Church Hall, High Street, Shefford, Bedfordshire.

REGION 6

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

Gloucester RC.—15 December, The Lamb Inn, Market Parade, Gloucester.

REGION 7

Acton, Brentford & Chiswick (ABCRC).—20 December, ("Holiday Slides") 7.30 p.m., AEU Club, 66 High Road, Chiswick.

Ashford (Middx.) (EARS).—14, 28 December, 7.30 p.m., Links Hotel, Ashford.

Bexley Heath (NKRS).—8 December (AVO Demonstration), 20 December (EGM), 7.30 p.m., Congregational Church Hall, Chapel Road, Bexley Heath.

Chingford (SRC).—Fridays (except first in month), 23 December (Christmas Dinner & Dance), 8 p.m., Friday Hill House, Simmons Lane, Chingford, E4.

Croydon (SRCC).—17 January, 7.30 p.m., Blue Anchor, South Croydon.

Dorking (D & DRS).—20 December (Formal Meeting), 8 p.m., Star & Garter, Dorking.

East Ham.—First and third Tuesdays, 7.30 p.m., 12 Leigh High Road, East Ham.

East London.—18 December (AGM & Discussion on RAEN by W. J. Perkins, G3PFL), 2.30 p.m., Wanstead House, The Green, Wanstead, E11.

East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.

Edgware & Hendon (EADRS).—12 December, (Members' Holiday slides and films), 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.

Gravesend (GRS).—Third Wednesday each month, 7.30 p.m., RAFTA Club, Overcliff Road.

Guildford (G & DRS).—10 December (Annual Dinner), Prince of Wales, Woodbridge Road, 8, 22 December, 8 p.m., Guildford Model Engineering Society, Stoke Park.

Harlow (DRS).—Tuesdays, Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.

Harrow (RSH).—9 December (Junk Sale), 16 December (Christmas Party), 23 December (no meeting), 30 December (Practical, Morse, RAE), 8 p.m., Roxeth Manor School, Eastcote Lane.

Havering (H & DARC).—14, 28 December, Romford.

High Wycombe (CARC).—15 December, 8 p.m., (Christmas Party), British Legion, St. Mary Street, High Wycombe.

Holloway (GRS).—Mondays, (RAE) 7 p.m. Wednesdays (Morse) 7.30 p.m., Fridays (Club) 7.30 p.m., Montem School, Hornsey Road.

Hounslow (HADRS).—12 December, Canteen, Mogden Main Drainage Department, Modgden Works, Isleworth.

Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford, Essex.

Kingston.—Fortnightly, 8, 22 December, 8 p.m., YMCA, Eden Street, Fridays (Morse classes), 2 Sunray Avenue, Tolworth.

Leyton & Walthamstow.—13, 27 December, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E10.

London U.H.F. Group.—5 January (Technical Films), 7.30 p.m., Bull & Mouth, Bloomsbury Way, Holborn.

Loughton.—16, 30 December, 7.30 p.m., Meeting alternate Fridays, Loughton Hall (Nr. Debden Station).

Maidenhead (M & DARC).—20 December, 7.30 p.m., Victory Hall, Cox Green, Maidenhead.

New Cross.—Wednesdays & Fridays, 8 p.m., 225 New Cross Road, SE14.

Norwood & South London (CP&DRS).—17 December, CD Centre, Catford, London, SE6.

Paddington (P & DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W2.

Purley (P & DRC).—16 December, 8 p.m., Railwaymen's Hall, Side Entrance, 58 Whytecliffe Road, Purley.

Reigate (RATS).—15 December (Construction Contest), 8 p.m., George & Dragon, Cromwell Road, Redhill.

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

Science Museum (CSRS).—First and third Tuesdays, 6 p.m., Science Museum, South Kensington.

Scout ARS.—15 December (Christmas Social Evening), 7.15 p.m., Baden Powell House, Queens Gate, South Kensington, SW7.

Sidcup (CVRS).—5 January, 7.30 p.m., Congregational Church Hall, Court Road, Eltham.

Slough (SDR Group).—First Wednesday every month, 8 p.m., United Services Club, Wellington Street.

South London Mobile Club.—17 December (Christmas Party), 8 p.m., Clapham Manor Baths, SW4.
Southgate & District.—8 December, 7.30 p.m., Parkwood Girls' School, (behind Wood Green Town Hall).
St. Albans (Verulam ARC).—21 December (Christmas Festival), 7.30 p.m., Cavalier Hall, Watford Road, St. Albans.
Sutton & Cheam (SCRS).—20 December, 8 p.m., The Harrow Inn, High Street, Cheam.
Welwyn Garden City.—8 December (" Design for an S.S.B. Rig," by G3AAZ), 8 p.m., Backhouse Room, Handside Lane.
Wimbledon (W&DRS).—9 December, 8 p.m., Community Centre, St. George's Road, Wimbledon, SW19.
Wembley (GECARS).—Thursdays, 7 p.m., (This club is now open to non-employees of GEC by invitation. Ring ARNold 1262 first), Sports Club, St. Augustines Avenue, Wembley.

REGION 8

Crawley (CARC).—14 December (AGM), 8 p.m., Trinity Congregational Church Hall, Ifield.
Haywards Heath (M-SARS).—4 January (" Transistorized S.S.B. Transmitter " by G3RMY), 18 January (AGM), 8 p.m., Lindfield Primary School, nr. Haywards Heath.

REGION 9

Bath.—16 December, 7.30 p.m., RNR Training Centre, James Street West, Bath.
Bristol.—16 December, 7.15 p.m., New Lecture Theatre G44, Royal Fort, Bristol University, Woodland Road, Bristol 8.
Bristol (BARC).—Mondays and Thursdays, 7.30 p.m., 43 Ducie Road, Barton Hill, Bristol 5.
Burnham-on-Sea (BoSARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street.
Camborne (CRAC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, Near Camborne.
(CRAC V.H.F. Group).—First Thursday in each month, 7.30 p.m., The Coach and Horses, Ryder Street, Truro.
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 (S & DARC).—16 December (Mullard Film), 30 December (Constructor's Evening), 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.
South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walks, Dorchester.
Taunton.—Alternate Thursdays 7 p.m., Lecture Theatre, Taunton Technical College.
Torquay (TARS).—31 December (Social Evening & Draw; Quiz—TARS v. PRC), 7.30 p.m., Club HQ, Belgrave Road, Torquay.
Wells (WARS).—Mondays, 8 p.m., EMIE (Wells) Sports and Social Club, Chamberlain Street, Wells, Somerset.
Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Blackwood.—9, 16 December, Classes for RAE candidates, 7.30 p.m., Blanche Cottage, off High Street, Blackwood, Mon.
Cardiff.—12 December, 7.30 p.m. (Christmas informal meeting), TA Centre, Park Street, Cardiff.
Port Talbot.—8 December, South Wales U.H.F. Group, 7.30 p.m., 20 Austin Avenue, Newton, Porthcawl, Glam., 13 December, 7.30 p.m., Trefelin Club & Institute, 8-10 Jersey Street, Port Talbot, Glam.

REGION 11

Llandudno (CVARC).—10 December (Annual Dinner), Colwyn Bay Hotel, 15 December (Quiz Evening CVARC v. FRS), Cross Keys, Madoc Street, Llandudno.

REGION 13

Edinburgh (LRS).—8 December (" Graphics by Computer," by A. L. Davidson), 22 December (" Christmas Quiz "), 7.30 p.m., YMCA, South St. Andrew Street, Edinburgh.

REGION 14

Ayrshire RSGB Group.—First and third Wednesdays of the month, 7.30 p.m., Park Hotel, Monkton.
Auchenharvie & District (A&DARC).—Tuesdays and Thursdays, 7.30 p.m., Auchenharvie Community Centre, Stevenston.
North Ayrshire (NAARC).—First Sunday of the month, 7.30 p.m., Ardrossan ATC, The Academy, Ardrossan.
Glasgow RSGB Group.—Second and fourth Fridays of the month, 7.30 p.m., Christian Institute, Bothwell Street, Glasgow.
Glasgow University (GURC).—Second Wednesday of the month, 7.30 p.m., Engineering North Building, University of Glasgow, Glasgow.
Greenock & District (G&DARC).—9 December, 7.30 p.m., Arts' Guild, Campbell Street, Greenock.
Motherwell RSGB Group.—Third Friday of the month, 7.30 p.m., Carfin Hall, Motherwell Road, New Stevenston, By Motherwell.

REGION 15

Belfast and District RSGB Group.—Third Friday in each month, 8 p.m., War Memorial Building, Waring Street, Belfast.

REGION 16

Basildon (BDARS).—22 December (Social Evening), 8 p.m., Bullseye Hotel.
Great Yarmouth (GYRC).—Fridays, 7.30 p.m., The Manager's Office, the Old Power Station, Swanstons Road, Great Yarmouth.
Ipswich (IRC).—28 December, 7.30 p.m., Red Cross HQ, Gippeswyk Hall, Ipswich.
Norwich (NARC).—12 December (Business Meeting), 19 December (Christmas Party), Old Lakenham Hall, Mansfield Lane, Norwich.

REGION 17

Maidenhead (M & DARC).—20 December (Informal Meeting), 7.30 p.m., Victory Hall, Cox Green, Maidenhead.

Can You Help?

● J. G. Owen, 15078, Llwyn-Fryn, Penmynydd Road, Llangefni, Anglesey, who wishes to purchase or borrow information on a Radio Transmitter Type BC625A?

● V. P. Magry, VK6ZCM, 1 Susan Street, South Perth, Western Australia, who requires the handbook and/or alignment information for the Marconi CR150 receiver?

Farewell to Cliff Waterman, G3NKX

Loughton & DRS recently combined a Ladies' Night and farewell party at the Rainbow and Dove Inn, Hastingwood, when presentations were made to G3NKX and his wife who were moving QTH to Perth, Western Australia, and due to sail on Sunday, 13 November. Cliff, a founder member and the society's first Chairman, is a keen c.w. operator and he has actively participated in the RSGB slow Morse transmissions in recent years; a stalwart supporter of NFD and V.H.F. contests, he could always be relied upon to contribute the more exotic pieces of equipment to the club's various rallies and junk sales. Amongst an assortment of gear he is taking with him is an excellent G2DAF receiver which he recently completed, and Cliff hopes to contact many of his old G friends when he settles down in VK6 land on the premise that if you can hear 'em, you can work 'em. He will operate initially c.w. on 80 and 20m, crystal controlled, and later, on all bands with s.s.b. In presenting him with a suitably inscribed microphone, the Chairman, G3JBS, on behalf of the Society, thanked him for his many services and wished him and his family bon voyage, every success and happiness in the new life ahead.

LOOKING AHEAD

9 December.—RSGB Annual General Meeting.
17 January, 1967.—Presidential Installation and Social Evening.
22 February, 1967.—RSGB Lecture at IEE, London.
13 May, 1967.—RSGB Annual V.H.F. Convention.
18 June, 1967.—ARMS Mobile Rally.

HT-46 TRANSMITTER

A new light weight compact quartz filter SSB-CW transmitter employing new single conversion signal path circuitry of advanced design.

FEATURES

- Transceive Operation (when used with SX-146)
- 175 watts input SSB, 150 watts input CW
- Crystal Filter (9mc)
- 500 kc bands 80 meters through 10 meters (1-10 mtr Xtal supplied 28.5-29.0) others plug-in at user's option
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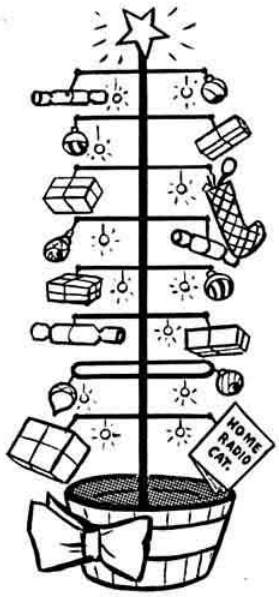

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