Short Wave Magazine

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FEBRUARY 1989

REVIEWED INSIDE THIS ISSUE...
GRUNDIG SATELLIT INTERNATIONAL 400

plus... ANTENNAS part 2
DX Letter from America... and lots, lots more

For The Radio Listener

SWM SWM SWM SWM SWM SWM SWM

ICOM

Count on us!

IC-R7000, 25-2000 MHz, Commercial quality scanning receiver

ICOM introduces the IC-R7000, advanced technology, continous coverage communications receiver. With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25kHz. The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall freqencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected freqency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attentuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.

IC-R71E, General coverage receiver.

The ICOM IC-R71E 100KHz to 30MHz general coverage receiver features keyboard freqency entry and infra-red remote controller (optional) with 32 programmable memory channels, SSB, AM, RTTY, CW and optional VFOs scanning, selectable AGC, noise blanker, pass band tuning and a deep notch filter. With a direct entry keyboard frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency is altered without changing the main tuning control. Options include FM, voice synthesizer, RC-11 infra-red controller, CK70 DC adaptor for 12 volt operation, mobile mounting bracket, CW filters and a high stability crystal filter.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.
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ON SALE JANUARY 26th

MARCH ISSUE ON SALE
FEBRUARY 23

|20| **Grundig Setellit Internetional 400 Receiver.**

Cover John Waite puts this receiver through its paces.

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Short Wave Magazine

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SEEN & HEARD

GOOD LISTENING

A WORD IN EDGEWAYS

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS USED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE.

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines.

Sir

With regard to R. Bradley's query in the Sept SWM, I hope the following will be of interest:

The PCR receiver was manufactured in fairly large numbers for the British Army by Pye and Philips. It was designed as a general coverage broadcast band receiver. Four versions exist, namely PCR, PCR1, PCR2 and PCR3. No manuals were ever officially released.

The PCR has six Octal valves and includes an r.f. stage, two i.f. stages and a 6V6 output stage. There is a 5in internal speaker and coverage is 850-2000, 200-550 metres and 6-18MHz. An external power unit is required to give 12 and 250V d.c. but some are fitted with internal a.c. mains power units.

The PCR first came on the market in large quantities in late 1961, reconditioned by REME and sold at £9 with power supply. The PCR1 came on the market in 1966 at £11 including a.c. power unit, in grade two condition. The PCR2 was released at the same time as the PCR, priced between £5 and £7 without power units. There was no internal speaker.

The PCR3, the one photographed, came on the market in 1966, in grade one condition at £11 with a.c. p.s.u. There was no internal speaker and coverage was 200-550 metres, 2.5-7 and 7-23MHz.

Basically, the only difference between the various models were the exact band coverage and the provision of an internal speaker. The last one I handled was a PCR back in 1966, battered but still performaing well.

GORDON BENNETT
BRAMHALL
CHESHIRE

Sir

In these days when commercial performance often falls far below the level of service which the customer can rightly expect, it is a pleasure to be able to praise a firm for its service and care of the customers.

I have had some very unsatisfactory experiences - waiting perhaps a month even for a catalogue, lists without prices and other frustrating factors. But now I can honestly praise one firm: Messrs. Johnson's Sound Service of Worcester.

Not only does one get personal service from the proprietor, but that service is speedy and accompanied by a goodhumoured politeness, even when, as in my case, the customer is not the brightest citizen around. Likewise, their product which I purchased, the Tatung TMR-7602, is remarkably good value.

So, well done, Johnsons.

W. J. TAYLOR
BARNSTAPLE
NORTH DEVON

Sir

I would like to bring to the attention of your readers the formation of a new Amateur Radio Society in Sevenoaks, Kent.

Meetings are being held initially in the Emergency Control Centre, Sevenoaks District Council Offices, Sevenoaks, Kent starting at 8.00 p.m. on the 3rd Monday in each month. The subscription has been fixed at £10 per year (£5 for students) plus 50p per meeting. Application forms can be had from The Secretary, Barry Leggett G7CIC, SADARS, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

The Society has been formed following an initiative by the District Council to train members of staff to become licensed radio amateurs after experiencing the valuable assistance afforded by RAYNET in the October 87 storm, The hope is that the staff and others involved will not only gain from the exchange of information, etc., but will be able to assist the Council and RAYNET in any future emergencies.

BARRY LEGGETT G7CIC
SECRETARY, SEVENOAKS & DISTRICT ARS

Sir

With the death, on 28 December 1988, of Ronald Hooper G3SCW, amateur radio has lost one of its more colourful characters. One time Sation Master at Tavistock, Devon, Ronnie bought his railway station to live in when the railway closed the line in the '60s. It was typical of his keen sense of humour that he renamed his QTH "Beeching's Folly" and established his amateur radio station there. I recall that some years ago Short Wave Magazine featured Ronnie's station in the series "The Other Man's Station".

As a founder member and Chairman of the British Rail Amateur Radio Society for 20 years, Ronnie made a host of friends, not only in the UK but also throughout Europe as a result of the affiliation of the Society to the International Federation of Railway Radio Amateurs.

On giving up the Chairmanship in 1986 Ronnie was elected Life Vice-President of the Society.

His cheery outlook on life and infectious personality will be greatly missed by us all, both at home and overseas.

F. J. T. TUCKFIELD G2HOX
PRESIDENT, BRITISH RAIL AMATEUR RADIO SOCIETY

Sir

I wonder if anyone can help me by providing the QSL information for 3W8DX? Unfortunately, I was called away for lunch before I could obtain the vital info.

DAVID BURTON
BRIGHTON
SUSSEX

WHAT'S NEW

Ratchet Driver

Freetrade (TEP) Ltd have announced a new ratchet driver set from Rodeo for comfortable and efficient tightening and removal of screws and nuts.

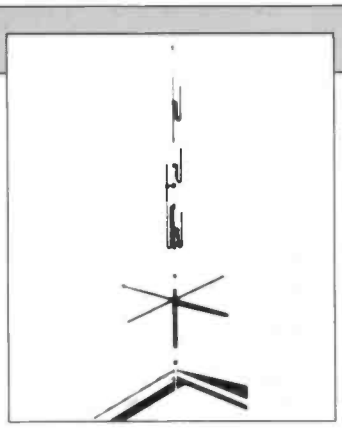
The tool (part number 323244) comes complete with four screwdriver bits to fit straight-slot and cross-head (Posidrive) screw heads. These are made from high-quality steel and designed for long life. In addition six sockets are included covering most popular sizes from 4 to 10mm.

The ratchet driver set costs £2.93. **Freetrade (TEP) Ltd, Unit 15, Avery Industrial Park, Garrison Lane, Bordesley Green, Birmingham B9 4QE. Tel: 021-766 6142**

Butternut

The Butternut SC-3000 has a frequency range of 30 - 12MHz, with gains of up to 7dB for u.h.f. and up to 3dB for v.h.f. The height of the antenna is 3.4m.

The design uses "trombone" phasing sections. There are no coils or internal connects that can break. The entire radiator system consists of telescopic section of drawn alloy tubing operating at d.c. ground potential for maximum lightning protection. It is fed by means of an adjustable gamma match to give the lowest s.w.r. at the required frequency. Resonant radials decouple the radiator and its supporting structure and feedline



to suppress unwanted high-angle radiation. All hardware is stainless steel.

The Butternut SC-3000 costs £63.99 and you can get more details on the Butternut range of antennas from: **HRS Electronics plc, Garretts Green Lane, Birmingham B33 0UE.**

WHAT'S NEW

Catalogues

One unusual catalogue to arrive on my desk was *The Modern Book Co. Computer Catalogue*. There are 51-pages of books listed, catalogued by language (there are eleven major ones plus the miscellaneous ones), by topic (e.g. graphics, word processing, etc.) and by machine (Apple, Amstrad, IBM, etc.). Books can be ordered by credit card, FAX or by post and as most books are kept in stock they are sent by return, those that have to be ordered take 2-3 weeks. You can write or telephone for a free copy of the catalogue from: **The Modern Book Co. 19-21 Praed Street, London W2 1NP. Tel: 01-402 9176.**

Continuing with the book theme, Camden Miniature Steam Services have sent me a copy of their latest *Camden Book News*. If, like me, you enjoy reading books on any aspect of engineering be it electrical, mechanical or any other branch, then this free list will really fire your imagination. I really had to padlock my cheque book otherwise I would have been heavily into the red!

Included among the books listed are some very interesting reprints in Lindsay Publications' "Lost Technology Series", of nineteenth century and early twentieth century American books on a variety of electrical subjects including Tesla Coils, Wimshurst machines, and other delightful lightning bolt producers. Each book in the list is described in a manner that makes interesting and amusing reading in itself. **Camden Miniature Steam Services, 13 High Street, Rode, Somerset BA3 6NZ. Tel: (0373) 830151.**

The *C. M. Howes Communications Catalogue* for 1989 contains details of receiving equipment, transmitting equipment and station accessories. There are also five new kits; a marine band receiver, h.f. air band receiver, 80/160m "phone" and c.w. transmitter, a microphone amplifier and an active antenna amplifier, a sample of which is currently being constructed for review in a future issue of *SWM*. For more details, contact: **C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: (0327) 60178.**

Unitel has recently undertaken a considerable expansion of the range of pot cores, RM cores, E cores, toroids and accessories stocked. The full range is now covered in an 8-page, 4-colour catalogue. Not only will you find the full technical details in the catalogue, but also a useful applications guide. **Unitel Ltd., Unitel House Fishers Green Road, Stevenage Herts SG1 2PT.**

A new technical leaflet from A.F. Bulgin & Co features the extensive range of robust Buccaneer connectors. Twelve fully illustrated pages detail the various options which are available. Copies of the leaflet are available, on request, from **A. F. Bulgin & Co plc, Bypass Road, Barking, Essex IG11 0AZ. Tel: 01-594 5588.**

Harris Electronics (London) Ltd have a wide range of panel meters both analogue and digital and to help you select a suitable model they have produced a catalogue showing full-size front views, together with mounting details of each analogue meter in their range. For digital panel meters the information is given in tabular form.
Harris Electronics (London) Ltd., Unit 3, GEC Estate, East Lane, Wembley, Middlesex HA9 7PJ. Tel: 01-908 3355.

Technicad, who represent Emmerich of W. Germany, have just published a short form catalogue which outlines the design and performance features of the standard 1.2V NiCad cell and the unique double and triple cells of 2.4 and 3.6V. Included are details of their extensive range of high-capacity button cells, memory buffer batteries and batteries with standard solder tags, single as well as double p.c.b. pins. For further details contact **Technicad Ltd., Unit 4C, Sunrise Business Park, Blandford, Dorset DT11 8ST. Tel: (0258) 59581.**

Electromail have just sent me a copy of their November 88 to February 89 catalogue. If you are into home construction this is the catalogue to have. Make sure, however, that your bookshelves are reinforced as this book is heavy - the numbered pages stop at 1137, while the index sections and the pages provided for notes are thicker than most other catalogues! It also gives extremely detailed technical details of each item and as such provides you with a very useful reference work.
This catalogue gives you access, on a strictly cash or credit card number with order, to the enormous range of components, tools and instruments stocked by RS Components at competitive prices, with no minimum order charge and even discounts for larger volumes. Your own copy will set you back £4.95 plus £2.00 post and packing direct from **Electromail, PO Box 33, Birchington Road, Corby, Northants NN17 9EL. Tel: (0536) 204555.**

Arrow and Ten-Tec

The Ten-Tec range of transceivers is now available from Arrow Electronics Ltd. The latest model, the Paragon, was recently on display at the Leicester Show and is now available from stock.
The Ten-Tec range will be on display at their showrooms in Chelmsford and Glasgow, with sales and service available from Arrow Agents in Anglesey, Wigan and Leicester. Apparently, due to the prompt availability of spares and service back-up in the UK from the previous sole agents, Arrow are able to guarantee their usual level of service support. **Arrow Electronics Ltd,.5 The Stret, Hatfield Peverel, Chelmsford, Essex. Tel: (0245) 381626.**

Old Service Manuals

Are you looking for service manuals for old or obscure equipment?
Then Mauritron Electronics think they may be able to help. They have a library of over 100 000 different makes and models of equipment with an extensive section on amateur and vintage radio. They produce a catalogue that is being constantly updated, so for details of this and their other services, contact: **Mauritron Electronics Ltd, 8 Cherry Tree Road, Chinnor, Oxfordshire OX9 4QY. Tel: (0844) 51694.**

Morsum Magnificat

The Autumn 1988 issue of *Morsum Magnificat* .proved interesting reading, as always. There is a really interesting article on Earth Current Telegraphy, some brilliant cartoons by GW3COI (whose work is sometimes seen in *SWM*) as well as interesting snippets and articles. There is much in more the issue, but space isn't available here to give more details.
Morsum Magnificat was first published in Holland in 1983 by Rinus Hellemons PA0BFN. Now published in London, it provides international coverage of all aspects of Morse telegraphy, past, present and future. It's for all Morse enthusiasts and a year's subscription costs £6.50 (UK); £7 for Europe (including Eire); £7 surface mail and £8.50 air mails for other countries. Contact **Tony Smith G4FAI, 1 Tash Place, London N11 1PA.**

Illegal Radio Car Alarms

Quite apart from saving you from the worry and inconvenience of having your car stolen, fitting it with an alarm might seem a good way to help beat crime. But, the DTI warns, if the alarm you have chosen is one which uses radio, and it is not approved, you could be breaking the law yourself.

A large number of illegal devices are now being advertised and sold, most of them imported, and their use could land you with a prosecution and a fine on conviction of up to £2000, three months imprisonment - or both.
There are two types of car alarms which use radio: the "car theft paging alarm" and the "radio key". It's mainly the former which could cause the trouble. If you car is tampered with, they will alert you by transmitting a radio signal which is picked up by a small receiver you are wearing. But, for such alarms to be legal they have to be type approved.
To be on the safe side the only alarm of this type at the moment that is legal is the "Page-Alarm", made by C-COM International.
All approved alarms must be marked to show that they are type approved and conform to the DTI specification. The "radio key" type uses infra-red and ultrasonics and so are not tied by the same restrictions.

WHAT'S NEW

GoldStar Counters

Alpha Electronics have available the first of a series of frequency counters from GoldStar. The model FC7011 is an 8-digit, single-channel, counter which measures directly from 1Hz to 100MHz.
An 8-digit l.e.d. display is enhanced by switchable manual or automatic ranging and the ability to hold the last measured value. Direct measurements from 1Hz to 100MHz have resolutions of 0.1, 1.0, 10 and 100 seconds and a basic input sensitivity of 10mV.
Housed in an ABS plastics case and fitted with an adjustable tilt stand/carry handle, the 7011 has an input impedance greater than 1MΩ that can accept up to 150V r.m.s.
The FC7011 has a 10MHz crystal reference oscillator with less than 5 p.p.m. stability and an ageing rate of less than 5p.p.m./

year. The models 7012 and 7013 are both fitted with temperature compensated crystal oscillators with better than 1 p.p.m. temperature stability and ageing rate per year. The case material for the 7012 is ABS plastics and aluminium for the 7013. The 7011 model costs £98 excluding VAT.
Alpha Electronics Ltd, Unit 5, Linstock Trading Estate, Wigan Road, Atherton, Manchester M29 0QA.Tel: (0942) 873434

IRTS Yearbook

The Irish Radio Transmitters Society (IRTS) is the national society for radio amateurs and experimenters in Ireland. As such, it represents the interests of all Irish radio amateurs through the promotion of activities of interest to members and through the representation on amateur radio matters to the Department of Communication.
The IRTS Amateur Radio Yearbook contains all kinds of information: IRTS official's names, a repeater map and the EI callbook listings for 1988. So if you regularly work EI land, this book will probably be of use to you. The cover price is £2, but contact IRTS about postage rates.
IRTS Book Sales Manager, Mr D. Peyton, 123 Springhill Avenue, Blackrock, Co. Dublin, Eire.

GB75CIS

The activities of GB75CIS on the Isle of Sark, from 17 - 20 July 1988, resulted in donations totalling £136.22, which has now been forwarded to the BBC's "Children in Need" appeal.
Total operating time was 31 hours 38 minutes, 417 QSOs took place and in all, 38 DXCC countries were worked.
The rig used was an IC-735 kindly loaned by Icom and the antennas were a 3.5MHz dipole and a 7MHz Delta Loop.
Bob G3UTX and Tudor GW4OYD would like to thank all operators for their forbearance and they regret that they were unable to make contact with all those who called due to the heavy pile-up. QSLs have now been despatched, but should any be outstanding, please forward details, together with an s.a.e., to **Bob Ridley G3UTX, 9 Greenacre, Worlebury, Weston-super-Mare BS22 9SL.**

College History

Are you an ex-student or ex-staff member of the former Wireless College in Colwyn Bay? If so, Alan Twelves GW4ZWG would like to hear from you.
He is looking for historical, descriptive, reflective, illustrative or even nostalgic material. Apparently the Wireless College, overlooking the sea, displayed an amateur callsign - a G2 plus 2 - Alan believes.
All assistance will be acknowledge and followed up says Alan. So, if you think you can help Alan, he is QTHR.

Snippets from Radio Sweden

Alaska: Since November 6, English and Russian programmes from KNLS are as follows. All transmissions are towards the Eastern parts of Asia. The station no longer broadcasts to Europe and the European USSR.

English :	0800-0900 on 6.065MHz
	1500-1700 on 7.355MHz
	1800-1900 on 7.355MHz.
Russian:	0700-0800 on 6.065MHz
	0900-1000 on 6.065MHz
	1200-1300 on 6.100MHz
	1700-1800 on 7.355MHz.

Burma: The Burma Broadcasting Service can be heard with a powerful signal on 5.040MHz 1230 - 1600 and 0100 - 0230. The programmes are partly in English.and this is probably a new transmitter. Frequencies in parallel are 5.985 and 7.185MHz.

Cook Islands: Radio Cook Islands has been noted at 0800 on 11.760MHz, after Cuba closes on this frequency, with programmes in Maori and English.

Greece: The Voice of Greece has begun broadcasting in Swedish at 1540 - 1548 on 11.645, 15.360 and 17.565MHz. This follows the news in English, which now starts at 1530 instead of 1535.

Hong Kong: Radio Television Hong Kong is now broadcasting to Vietnam on 7.290MHz short wave. The transmission times are 1100 - 1300 and 2300 - 0100. Hong Kong has been a rare country on short wave, but according to announcements these transmissions are scheduled until the end of June.
The programmes are to explain the new screening policy for Vietnamese boat people refugees and the transmitter has a power of 30kW.

Hungary: A new 100kW short wave transmitter has recently become operational at Szekesfehervar in western Hungary. This relays Radio Budapest's Home Service Kossuth Radio to people of Hungarian origin in neighbouring countries. The frequency of this outlet is not known, but *WRTH* lists a relay of Kossuth Radio with 250kW on 6.025MHz.

Portugal: Radiodifusao Portugesa has made some changes in its European service. On 9.740 and 11.740MHz, there is Portuguese at 1930-2000, English at 2000-2030, French at 2030-2100 and Italian at 2100-2130.

Publications: A copy of the review of the PC Text Teletext Adaptor can be found in the newly released Update 3.6 of the *DXers' Guide to Computing*, which is available, free of charge, from Radio Sweden. The new update also includes news about the ANARC computer bulletin board and radio clubs for Commodore and Atari users.
The 34-page 3rd Edition of the *DXers' Guide to Computing* itself is still available for £2 or 7IRCs, but update 3.6 and the other updates are free.

Sri Lanka: The Deutsche Welle relay will use 15.300MHz instead of 21.590MHz for German language broadcasts to Asia at 1000-1400.

USSR: Radio Moscow says it will be carrying commercials on its external services. The station says enterprises, organisations and co-operatives can advertise their technology, goods and services in its foreign language broadcasts. Commercials for foreign firms have appeared on Soviet television.

ISWL

Jim May, who was the Honorary Secretary of the International Short Wave League, relinquished this position on 1 January 1989 in order to concentrate on the production of the League's journal *Monitor*.
All correspondence for the ISWL should now be addressed to: **Yvonne Blain, 167 Wombridge Road, Trench, Telford, Shropshire TF2 6QA.**

WHAT'S NEW

Miniature Push-button Switches by Toko

Cirkit have introduce the latest Toko range of miniature push-button switches suitable for use in audio, radio, video and other consumer electronics equipment.

These switches have a short button travel of 2mm and the terminal pins are arranged on a 2.5 x 2.5mm pitch grid intended for direct soldering to p.c.b.s. The contacts are rated at 100mA at 30V d.c. with a maximum contact resistance of 20mΩ and a minimum insulation resistance of 100MΩ. Self-latching, non-latching and interlocking formats are available in 2-pole and 4-pole versions.

For further information and full technical details contact: **Cirkit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 444111**

Revco Taken Over

As from 16 November 1988, Revco Electronics Ltd., has been under new ownership and management following the retirement of the founding directors Dennis and Patricia Reeves.

The new directors are Peter and Mary Longhurst of Startop Communications Ltd - better known by its trading name of **Garex Electronics**.

The takeover marks the culmination of many years of collaboration between the two companies. It is anticipated that the two companies will continue to trade as separate entities, although there will be some logical rationalisation of their activities.

GRASSROOTS

Lorna Mower

Loughton & District ARS meet in Room 20 of Loughton Hall, Rectory Lane, 7.45pm. January 27 is Cellular Radio Update G4FKI and February 10 is Power Supplies Revisited G8DZH. John Ray G8DZH on 01-508 3434 (after 7pm).

Ipswich RC have Steam Engines by Mr. H. N. James on February 8 and a Morse Test at Ipswich on the 9th. Meet at 8pm in the Red Lion, 284 Bramford Road. Jack Toothill G4IFF on Ipswich 464047.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. February 9 is Space Wave Propagation G3MYM, the 16th is Ground Reflection on Radio Waves G3MYM and the 23rd is a Natter Night. David Bailey G1MNM at 7 Thatchem Close, Yeovil BA21 3BS.

Dragon ARC meet 1st & 3rd Mondays, 7.30pm at the Four Crosses, Pentraeth Road, Menai Bridge. February 6 is a Technical Software talk and demo on "what you always wanted to know about those black boxes" and the 20th is a Video evening. Tony Rees on Bethesda 600963.

Maidstone ARS meet in the YMCA Sports Centre, Melrose Close. January 27 is a Rally meeting, February 3/17 are Natter Nights with RAE/CW and the 10th is G3OHP with CW. Paul G0BUW on Maidstone 43317.

Vale of Evesham RAC have a talk on the ZB2 Gibralter Dx-Pedition G4UXE on February 2. 1st & 3rd Thursdays, 7.30pm in the Meb Club, Worcester Road, 1st Thursdays are formal. Mike G4UXC on Evesham 831508.

South East Kent (YMCA) ARC meet in The Dover YMCA, Godwynehurst, Leyburne Road. February 1/16 and Natter Nights, the 8th is Packet Radio, a talk and demo (provisional), and the 23rd is Club Winter Project Update. Des Edwards at 12 East Cliff, Dover, Kent CT16 1LX.

Wirral ARS have a Presidents night on February 1 and Analogue - digital techniques G4EWI on the 15th. 1st & 3rd Wednesdays at Ivy Farm, Arrore Park Road. A. Seed G3FOO at 31 Withert Avenue, Bebington L63 5NE.

Mansfield ARS meet 2nd & 4th Fridays, 7.30pm at the Westfield Folk House, Westfield Lane. On January 27 they have a Junk Sale. Keith Lawson on Mansfield 642719.

G3YMD  G8YMD

South East Kent (YMCA) Amateur Radio Club

Wimbledon & District ARS meet 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Road. January 27 is Homebrew UHF/VHF Yagi Antennae G8IYS and February 10 is a Bring and Buy Booksale. Nick Lawlor G6AJY on 01-330 2703.

Worksop ARS have a Magazine Sale on January 31, Natter Nights on February 7/21 and a Junk Sale on the 14th. Meet Tuesdays, time and place from Carole Gee G4ZUN on Worksop 486614.

Halifax & District ARS have G3TQA/G4XGN Demo Packet on February 21. 1st & 3rd Tuesdays, 7.30pm at the Running Man Public House, Pellon Lane. 1st Tuesdays are Informal Noggin and Natter Nights. David Moss G0DLM on Halifax 202306

Edgware & District RS have Smith Charts by G3SJE on February 9. 2nd & 4th Thursdays, 8pm in the Watling Community Centre, 145 Orange Hill Road, Burnt Oak. Ian Cope G4IUZ on Hatfield 65707.

Todmorden & District ARS have their AGM on February 6. 1st & 3rd Mondays, 8pm at the Queen Hotel. Val Mitchell G1GZB on Todmorden 817572.

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford. January 27 is their Annual Dinner, February 3/17 are Nights on the Air with Morse tuition and the 10th is a Quiz Night. Jonathan Ward G4HHT on Coventry 610408.

Hornsea RC meet Wednesdays, 8pm at The Mill, Atwick Road. February 1 is Morokulien Adventure G4YTV, the 8th is Telegraphic Communication G4IGY, the 15th is 5Z4 Kenya G1TFT and a Natter Night follows on the 22nd. Geoff G4IGY on 0964 533331.

Norfolk ARC have an Informal/Committee meeting on February 1, Mast Planning Problems, Chas Mathews G8NXU of the RSGB Planning Panel on the 8th, an Informal on the 15th and 38 Years with Air Traffic Control G8LGB on the 22nd. Wednesdays, 7.30pm at The Norfolk Dumpling, The Livestock Market, Harford. Craig Joly G0BGD on Norwich 485784.

Southgate ARC meet 2nd & 4th Thursdays, 7.45pm at Holy Trinity Church Hall, Winchmore Hill. February 9 is a Quiz G4UKR. Brian Shelton on 01-360 2453.

Stourbridge & District ARS have a Natter/On-Air Night on February 6 and a Constructors Competition on the 20th. Meetings held twice monthly at the Robin Woods Centre, Beauty Bank. C. Brunn G1WAI on Hagley 885602.

Basingstoke ARC have Packet Radio G1WKK (provisional) on February 6. 1st Mondays, 7.30pm at The Forest Ring Community Centre, Sycamore Way, Winklebury. David Deane G3ZOI on Mortimer 332777 (home).

Taunton & District ARC have a Radio Quiz on February 3 and a talk by member of the first class operators club on the 17th. 1st & 3rd Fridays at the County Hall (Emergency Planning HQ). Peter Robinson G0EYR on Taunton 275973.

Derby & District ARS meet at 119 Green Lane, 7.30pm. February 1 is a Junk Sale, the 8th is an illustrated talk by Martin Byrne of GPT Communications, Beeston on Modern Telephone Exchanges, the 15th is a Night on the Air and the 22nd is Vintage Railway Films - Mick G0FVU. Kevin Jones G4FPY on Derby 669157.

DERBY AND DISTRICT AMATEUR RADIO SOCIETY

CALL-SIGNS: G3ERD, G2DJ, G8DBY

RALLIES

* **January 29:** The NARSA Norbreck Radio and Electronics Exhibition (formerly held at Belle Vue In Manchester) will be held in 1989 at the Norbreck Castle Exhibition Centre, Blackpool. Details can be obtained from: Peter Denton G6CGF. Tel: 051-630 5790.

February 26: The 2nd Taw and Torridge Rally will be held in the BAAC Halls, The Pill, Bideford in North Devon. These premises are larger than last year. The doors open at 10.30am with talk-in available on S22. There will be trade stands, a bring & buy, refreshments and a bar as well as ample parking. More details are available from: G0AYM. Tel: (0805) 23776.

March 4: The Blue Star Radio Rally, organised by the Tyneside Amateur Radio Society, will be held at High Gosforth Park, otherwise known as Newcastle Racecourse. All the usual attractions as well as talk-in. To find out starting time and other details contact Terry G6VEG. Tel: (091) 2648196.

March 5: The Bury Radio Society Annual Hamfeast will be held at the Castle Leisure Centre, Bolton Street, Bury. It's only 3 minutes from the M66 and there will be talk-in on S22. Doors open at 11am and entrance is by programme costing 50p. Refreshments are available. Contact: C.D.W. Marcroft G4JAG, Mosses Centre, Cecil Street, Bury.

* **March 12:** The Trafford Rally, now also being called The Great Northern Rally, organised by the Trafford Amateur Radio Club, is moving to a new venue - G-MEX, the new Greater Manchester Exhibition & Event Centre. All the usual attractions including Free Draw, Bring & Buy, Licensed Bar, Hot & Cold Meals, lots of room on one floor and plenty of Parking. Talk-in on S22. All enquiries on 061-748 9804 or 061-881 3739.

* SWM in attendance

March 19: Wythall Radio Club will be holding their 4th Annual Radio Rally at Wythall Park, Silver Street, Wythall, Worcs. This is on the A345 south of Birmingham. Doors open at 11.30am. There will be three large halls, the usual trade stands, a flea market, a large Bring & Buy, snacks available and a bar. Talk in on S22 with more free parking this year. Admission is 50p For more details contact Chris G0EYO on 021-430 7267.

March 26: The Cunningham & District ARC are starting a new rally at the Magnum Leisure Centre in Irvine to combat the shortage of rallies for Scottish amateurs. Doors open at 10.30am. More details from: Bob Low on (0563) 35738.

May 7: The Southend & District Mobile Rally will be held at Roach Way Youth Centre, Rochford, Essex. Doors open at 10am. More details from: Ted G4TUO. Tel: (0702) 202129.

***May 21:** The "Hobbies Fair" is the first event in the Science Museum's Wroughton 1989 season. As well as radio, this event covers a wide range of interesting hobbies and also offers the rare opportunity to see some of the Science Museum's stock of aircraft and other transport items which are stored in the hangers. Wroughton Airfield is south of Swindon, Wiltshire and easily reached by road.

May 28: The thirteenth annual East Suffolk Wireless Revival will take place at the usual venue of the Civil Service Sportsground, the Hollies, Straight Road, Ipswich - between Bucklesham Road and Felixstowe Road (now the A1156) and adjacent to the Suffolk Showground. There will be plenty of attractions to keep the rest of the family occupied whilst the radio enthusiasts take their time looking round the rally stands. Doors open at 10.00 a.m. Further information from Colin Ranson G8LBS, 100 Stone Lodge Lane West, Ipswich, Sufolk IP2 9HR.

* **June 11:** The Royal Naval Amateur Radio Society's Annual Rally is scheduled to be held at HMS Mercury again this year. More details nearer the date.

* **June 25:** The 32nd Longleat Amateur Radio Rally will be held as usual in the grounds of Longleat House, Warminster, Wiltshire. This rally is always popular as it offers something for the whole family. More details from the Rally Manager, Shaun O'Sullivan G8VPG, 15 Witney Close, Saltford, Bristol BS18 3DX.

* **August 13:** Hamfest '89 will be held at the Flight Refuelling Sports Ground, Wimborne, Dorset. Gates open at 10am and there's free car parking as well as overnight camping facilities. The day will feature radio and electronics trade stands, field displays and a craft and gift fair. More details from: Rob G6DUN. Tel: (0202) 479038.

If you are organising a rally and would like it mentioned in *Short Wave Magazine*, then drop us a line, preferably as soon as you have fixed the date but no latter than 6 weeks in advance (marking your envelope "SWM Rally Calendar") and we'll do the rest. Please make sure that you include all the details including such essential information as the venue, starting time, special features and a contact for further information.

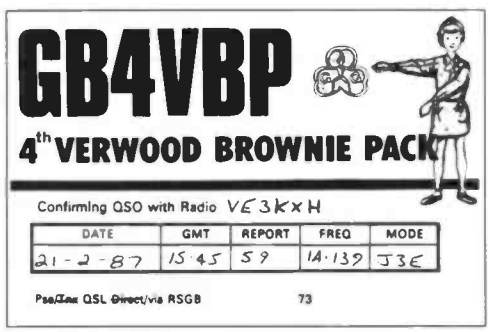
LISTEN OUT FOR

Thinking Day on the Air

The Girl Guides and Brownies celebrate the birthday of founders Lord and Lady Baden-Powell as Thinking Day. For some years now the weekend nearest to Thinking Day has been of special interest to Guides and Brownies interested in amateur radio as many units and packs have activated special event stations as part of a world-wide Thinking Day on the Air event. This year the weekend is February 18 and 19 and it is hoped that there will be more stations on the air than last year when over 70 stations participated in the UK - an increase of 50 per cent over the previous year.

One disappointment last year was the failure to co-ordinate TDOTA with the Canadian "Guides on the Air" particularly as Canada is one of the few countries to which UK Guides and Brownies can speak to others. This year it is hoped to get the act together.

The list of stations participating in TDOTA 89 is not yet known so it is not possible to give a complete run down here. Perhaps for next year any amateurs or guiders who are running a station during Thinking Day on the Air might like to send details for publication in the magazine.



Why not keep an ear open on the amateur bands over the weekend February 17,18 and 19. Many stations run RTTY and FAX as well as phone and many will be aiming for contacts on h.f. with Canada, USA, The Falklands and Australia so that the Guides and Brownies can exchange messages in person.

GB2TOD: The 7th Todmorden Brownies will have to be active during Thinking Day on the Air - their Brown Owl is none other than Jennifer Jackson G8WWO who is the Co-ordinator for TDOTA!

GB4VBP: This station will be on the air during the weekend of February 18/19 to celebrate "Thinking Day on the Air". The 4th Verwood Brownie Pack, assisted by *Short Wave Magazine* staff, hope to be talking to Brownies and Guides the world over. A special QSL card is available for all contacts and reports.

DX LETTER FROM AMERICA

Gerry L. Dexter.

Such was the case late last year when listeners suddenly discovered signals from a station calling itself Radio Patria Libre, which proved to be a new Colombian clandestine becming a message opposing the current government there. Initially, at least, the station was holding to a brief but regular schedule of 0030-0100 on a quite variable 6.766.

The all-Spanish programme includes announcements mentioning FARC - the Colombian Revolutionary Army Force so it is believed that this group is behind the operation. However, other sources say the station is the Voice of the National Liberation Army (ERN), and at about the same time Patria Libre appeared, so did schedules for the Voice of the Resistance, supposedly also operated by FARC. The station first surfaced in early1988 but due to its apparent very low power, was barely heard in North America, and little more was even heard about this station until the time Patria Libre appeared. So there may indeed be two FARC-supported stations or Patria Libre may be part of another group with connections to FARC.

At any rate, Patria Libre, which is very well heard in much of North America, sounds a great deal like the El Salvador resistance stations, Radio Venceremos and Radio Farabundo Marti. Some DXers here have even wondered if Patria Libre might have had some assistance from that particular quarter. The station is announcing as the Voice of New Colombia (La Voz de la Nueva Colombia) and quite reliable direction finding efforts have placed the transmitter in Cordoba Province, about 280km north of the city of Medellin. So far, no information has turned up in the way of an address to which reception reports may be sent.

A mention was made last time as to the pending arrival on the scene of three new stations from Venezuela. So far, only one of them has showed. Radio Continental in Barinas has begun broadcasting on 4.937 (listed for 4.940) with 1kW and Spanish language programming running to around 0400 close down. The mailing address is: Av. Margues del Pumar, Barinas. Though we continue to wait for the other two, another station is noted on 5.049. There is a lot of Latin American activity on 5.050 including Radio Jesus del Gran Poder in Ecuador and the Colombian, La Voz de Yopal.

For short wave listeners who enjoy a little mystery and a dash of intrigue with their radio receptions there is nothing quite like the sudden appearance of a new clandestine station on the short wave bands.

Meantime, it seems that the on-again, off-again foreign service of Radio Nacional Venezuela is on again. It's been spotted at around 1115 in English, announcing that the broadcasts are for Latin America and "the rest of the world". The frequency is 9.540.

Another reactivated station is Radio Casino in Puerto Limon, Costa Rica, one of the relative few commercial stations in Central America still active on short wave and a station that has been around for a long while. Limon is on Costa Rica's Atlantic Coast and sits on the spot where Colombus landed on his last visit to the New World. At one time, Radio Casino had a regular schedule for English (0400-0600 and 1100-1200) but whether this still exists hasn't yet been determined. Unfortunately, this fine and friendly little station too often finds its signal in a losing battle with those of the big international broadcasters.

Hong Kong is being checked off on more and more want lists these days, even with the BBC relay having been on for sometime now. The appearance of Radio TV Hong Kong, with a regular schedule, enticed many to some early morning listening. The new "Vietnamese" service from RTVHK has been heard by many around 1100 on 7.290.

Jordan, another tough one for many DXers here, has also been entered in a lot of logbooks lately, thanks to the appearance of Radio Jordan's new 500kW signals. North Americans are hearing this one in English at 1500 on 9.560. Bad comes with good, though, as the signal now covers that of the Voice of Ethiopia!

We are still awaiting the appearance of WWCR, the new station due on the air from Nashville, Tennessee and, barring still more delays, it should be on the air by the time you read this. Look for it between 0000-0555 on 7.520 or 1200-2355 on 15.690 with broadcasts to Europe and eastern North America. Reception reports on this staiton go to WWCR, 3314 West End Avenue, Nashville, TN 37203. The format will be largely or entirely religious programming.

Also in the *Department of New USA Short Wave Stations* is WSHB, the third station in the Christian Science Monitor's planned short wave triad. This one, in Cypress Creek, North Carolina, was still scheduled to begin operations early in the year, using a duo of 500kW transmitters. Assuming that it did become operational sometime during the Dec 88 period it should follow this schedule:

0000-0200 on 11.980 and 13.760;
0200-0400 on 9.745 and 13.760;
0400-0800 on 6.005 and 9.455;
0800-1000 on 9.495;
1000-1200 on 6.150 and 9.495;
1200-1300 on 6.150;
1200-1400 on 13.760;
1400-1600 on 11.580 and 17.640;
2000-2200 on 15.225 and 17.750;
2200-0000 on 15.205 and 17.640;

The many North American DXers who use the country list maintained by the North American SW Association consider the once break-away Zairian province of Katanga as a separate radio country. The only target, the station at Lubumbashi, has been a tough one to hear. The 4.751 channel doesn't seem to be active for the morning schedule. Nominal 7.205, actually 7.204, was audible at sign-on for about a minute before being covered by Radio Tirana's sign-on. Recently though, Lubumbashi has slipped down to 7.203 so some logs have been possible, given a wind blowing in the right direction!

Readers who can find an excuse to be in the USA during July should certainly plan to also attend ANARCON-89, the annual convention of the Association of North American Radio Clubs. The affair will be held Friday through to Monday, July 14-17, at the Dolphin Beach Resort which sits facing an 11km long white sand beach on Florida's west coast, near Tampa. Nearby tourist attractions include Disney World/EPCOT Centre, the Kennedy Space Centre, Busch Gardens and Sea World.

A steel band will entertain at a poolside opening night reception sponsored by the *World Radio TV Handbook*. The rest of the weekend will see attendance by several short wave broadcasters, exhibits by clubs, stations, short wave equipment dealers plus seminars and other presentations on a wide range of DX topics. The annual banquet on Saturday evening, award presentations and the always popular *WRTH* Quiz will also be part of the weekend.

Full details and registration information can be had by writing to ANARC-89, PO Box 272301, Tampa, FL 33688, USA.

That will do for this time. As usual, your comments, sent care of the Editorial Offices in Poole, are always welcome.

Best wishes from North America. □

The foreign service of Radio Nacional Venezuela is back on the air. The station was sending out this QSL back in 1983.

When you are ready to graduate to real listening Look to Lowe

The R-2000 from Kenwood
150kHz-30MHz. SSB/AM/CW/FM
VC-10 converter 118-174 MHz
R-2000 . . . . £595
VC-10 . . . . £162

The R-5000 from Kenwood
100kHz-30MHz. SSB/AM/CW/FM/FSK
VC-10 converter 118-174 MHz
R-5000 . . . . £875
VC-20 . . . . £167

The NRD-525 from JRC
Simply the best receiver you could buy . . . **£1095**

What do I mean by "When you are ready to graduate"? Well, like all hobbies or pastimes, short wave listening is a progressive hobby, and many people come to it almost by accident when they hear an unusual broadcast station on their ordinary domestic radio, particularly if the radio has a short wave band. Interest is aroused, and before long the listener begins to wonder why there are some signals he cannot resolve. He may well turn to the pages of Short Wave Magazine for advice, and become familiar with terms such as SSB, RTTY, selectivity, propagation, and so on.

It is at this point that our worthy listener takes his first step in upgrading his equipment, and comes out of primary education into more advanced listening. Many people at this same point rush along to their nearest High Street multiple retail store and buy what they are told is a "Short Wave Radio", bristling with push buttons and coloured knobs. Sadly, the so-called "Short Wave Radio" is often no more than a domestic portable with a fancy front panel, and the performance when used for anything other than casual listening is no better than the old radio with which he started — in fact it's often worse.

So — these push button portables are excellent for taking on holiday, or carrying to the river bank during a fishing trip, but for real listening — no, no, no.

Our listener is about to graduate from the University of Short Wave Listening, and armed with the knowledge of what he really needs for his hobby will proceed to find a suitable receiver for his purposes. Now it is true that the cost of a properly designed short wave receiver will be higher than the domestic portables; but not so much higher as to be prohibitive, and by going to a specialist (and I mean a true specialist, not someone who talks about "Tranny Radios"), the listener will get good advice based on years of experience in the field, and access to not only new receivers but usually a range of guaranteed second hand units as well. The specialist will also stock and sell a full range of necessary accessories, ranging from simple aerial insulators to complex morse and RTTY decoders for more advanced enthusiasts.

You may get the impression that I am referring to Lowe Electronics when I talk about a specialist dealer, and of course I am. After 25 years of specialising, it is generally accepted that we are without equal, and this is re-inforced by the fact that we have been appointed by so many leading manufacturers to represent their products. As a final point, how many other companies in the UK have designed, built, and sold a real short wave receiver to 17 countries around the world. WE HAVE.

The receivers shown on this page are representative of the best in the world, and are on show at all our branches and at selected dealers throughout the UK. For full information on how to choose your short wave radio, just send off for our "Listeners Guide" (details below), or call and ask. We are happy to help, and we know what we are talking about.

FREE

Send £1 to cover the postage and we will send you, by return of post, your FREE copy of "THE LISTENER'S GUIDE" (2nd edition), a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in a "good read" but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

LOWE ELECTRONICS LIMITED

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482

25 YEARS IN SHORTWAVE

I don't think there has been a more exciting time for the VHF listener than right now. With the leading manufacturers making VHF and UHF receivers, and using microprocessor control which would have been impossible even five years ago, the dedicated listener can literally carry in his pocket the kind of receiving power that used to take up a nineteen inch rack, and consume enough electricity to light a small house.

We at Lowe Electronics have made it our task to seek out the best manufacturers of these amazing radios, and bring them to you at attractive prices. We are the sole factory appointed importer for Signal, AOR, and WIN; all of whom represent the very best in scanning monitor receiver design and manufacture, and we show a small selection on this page. Not only do we stock and sell all these radios, we also offer you the best advice in the business, and we carry a full range of listeners' accessories from a humble egg insulator to RTTY and Morse decoders (and incidentally, we know our subject extremely well).

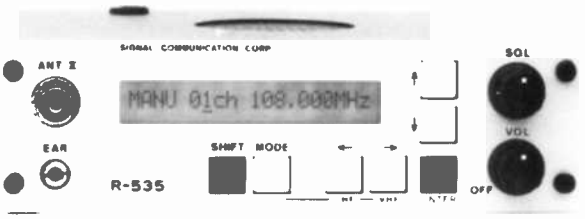
Let's start with what is acknowledged to be the finest wide range monitor receiver ever made; the AR-2002 from AOR. This receives in all modes, on frequencies from 25 to 550MHz, and also from 800 to 1300MHz, so there isn't much you cannot receive: airband both VHF and UHF, marine, amateur, FM broadcasts and TV sound, cellular radio, land mobile radio and so on. The AR-2002 is in use in professional installations all over the world, but is available at a price that the amateur can afford.

AR-2002..... £487

Also from the AOR stable is the handheld AR-800 scanning receiver, which brings hand held convenience at an attractive price. AM and FM reception from 75 to 105MHz, 118 to 174MHz, 406 to 495MHz, and that oft requested band 850 to 950MHz. Full range of scanning and searching facilities, and all in a small hand held package.

AR-800..... £199

Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the Signal range is the R-535, which covers not only the VHF airband from 108 to 136MHz (also 136 to 143MHz), but also the UHF airband from 220 to 380MHz. No less than 60 memory channels can store any frequency within the range of the receiver, and scanning takes place at very high speed, so you don't miss any of the action.



R-535..... £249

Signal also make the ideal starter receiver, the R-537S, which combines fully tunable operation for seaching around the VHF band and two channel crystal control for spot-on accuracy when you need it. A special version of the R-537S is in use by most parachute clubs where the instructor can talk directly to a falling pupil — helps to advise them that they should have opened the 'chute.

Our most successful airband receiver has been without doubt the WIN-108. Designed to incorporate all the features asked for by UK users over the years, the WIN-108 is the most convenient, powerful, and feature packed dedicated VHF airband receiver ever made available. Simply cannot be described in this space, but details of the WIN-108 and all our other models are available on request, enclosing £1 to cover post and packing. You will also receive our "Listeners' Guide" and "Airband Guide" free of charge.

Send right away, and see why you should "look to Lowe" for all your listening requirements.

R-537..... £69.51

WIN-108..... £175

25th Anniversary Prize Draw

Anyone making a purchase of more than £5 during this month will have the chance to win our "Gift of the Month" from the following: — TM-221E, R-535, AR-800, HF-125, TH-215E. All mail orders are automatically included. All shop sales will be recorded on cards, given to you by the manager.

Shops in **GLASGOW** Telephone 041-945 2626, **DARLINGTON** Telephone 0325 486121, **CAMBRIDGE** Telephone 0223 311230, **CARDIFF** Telephone 0222 464154, **LONDON** Telephone 01-429 3256, **BOURNEMOUTH** Telephone 0202 577760
All branches are closed all day Monday.

INTRODUCTION TO DX-TV

Keith Hamer & Garry Smith

Part 16

Sporadic-E provides the TV DXer with signals which have travelled impressive distances, some a thousand miles or more. Receiving Australia is the ultimate ambition of most enthusiasts. The next peak in the eleven-year solar cycle is rapidly approaching and Australian reception could be a reality!

F2-Layer Reception

Long-distance television reception via the F2-layer is possible only during periods of high solar activity which reaches a peak at 10 to 11 year intervals. Magnetic storms within the sun's photosphere radiate a tremendous amount of energy which is responsible for ionisation of the F2-layer. When sufficiently ionised, this layer is capable of refracting signals back to Earth. Such storms are visible as sunspots and regular observations will indicate whether their number is increasing.

A very high sunspot count indicates intense solar activity and in these circumstances, the reception of broadcast television signals becomes a possibility. The solar cycles are assigned a number; the one that occurred at the end of the seventies was number 21.

Ionisation

The "F" region actually consists of two layers, the F1 and F2, although for all intents and purposes it is the latter one that plays the major role with communication over vast distances.

Located some 350km above the surface of the earth, the F2-layer is the higher of the two. There are some variations in its height depending upon factors such as the time of the year, whether it is day or night, and the actual amount of solar activity.

The ionisation density of the F2-layer is higher during the winter daytime than in summer, when heat causes the gases within the layer to expand, thus reducing its overall density. It is during the winter daytime that the maximum usable frequency (m.u.f.) will reach its highest level with the possibility of long distance television reception.

From the authors' own observations carried out during the last solar cycle, reception was more favourable during October, November and December rather than the first three months of the year. Some of the highest m.u.f.s were encountered during December 1979 and 1981.

F2 is more frequently encountered on the lower Band I channels such as E2 and R1, which are located just below 50MHz. Greater m.u.f.s. can produce television signals on the higher channels in Band I

Skip Distance

Since the height of the F2-layer is much higher than the E-layer, the skip distance will be considerably greater than for sporadic-E refraction. Indeed, the skip distance by F2 propagation can easily exceed 4000km (2500 miles). A comparison of skip distances are shown in Fig. 1.

Phenomenal Distances

So, what reception distances are we likely to encounter during F2 activity? Below are a couple of interesting highlights extracted from reception reports submitted to the authors by other DX-TV enthusiasts during the peak of the last solar cycles which occurred between 1979 and 1980.

This report came from Hugh Cocks who, in 1979, was resident in the UK, "F2 reception has been quite good lately with Australian channel 0 (46.25MHz) on January 10 and February 24. The reception on the 10th was TVQ-0 and ABMN-0 all mixed up. I made a recording of it and the TVQ square identification symbol can be seen. Gwelo (Zimbabwe) on channel E2 was in for two hours today on the chequerboard test card".

Anthony Mann in Western Australia reported the following activity in December 1978, "channels B1 (45MHz) and F2 (the old French channel) reception is becoming commonplace here. There have been some 24 openings so far but the m.u.f. has never reached 45MHz again. The peak period seems to be 0900-1100UTC although the BBC tone has been heard as early as 0843UTC. A couple of openings have continued until 1200-1230UTC and France was heard as late as 1310UTC on November 22.

There were many other instances of amazing TV reception during the last solar cycle, but the two reports given above indicate just what can be achieved by F2 propagation using typical DX-TV equipment.

Characteristics

The quality of the pictures obtained via F2 propagation differ vastly from those experienced due to sporadic-E ionisation. Severe video distortion with multiple images is a characteristic of F2 propagation. At times it is difficult to decide whether a scene is static or moving, let alone be able to decipher captions! It goes without saying that identifying the source of a likely exotic transmission can sometimes prove to be tricky, even for the experienced DXer.

Back Reflection

During periods of high solar activity, a secondary effect known as "backscatter" can occur. This means that transmitters situated fairly close to the reception location may be received from the opposite direction. In 1978, the authors discovered a Czechoslovakian test pattern lurking on channel R1 with the antennas directed to the south west! The signal was weak and distorted with a severe humbar or rambling effect over the picture.

Strong Signals

For most of the time, signals are by no means weak and can attain levels normally associated with sporadic-E reception. Polarisation changes do occur and experience has shown that a vertical antenna can give improved results, with greater picture clarity. During the onset of an F2 opening, signals tend to rapidly build up from zero level to a fairly constant maximum strength within a matter of minutes.

Reception Times

Refraction is most likely to occur when noon is approximately midway between the transmitter and receiving site. This means that signals from the Far East are more likely to be encountered during the early morning from, say, 0700UTC rather

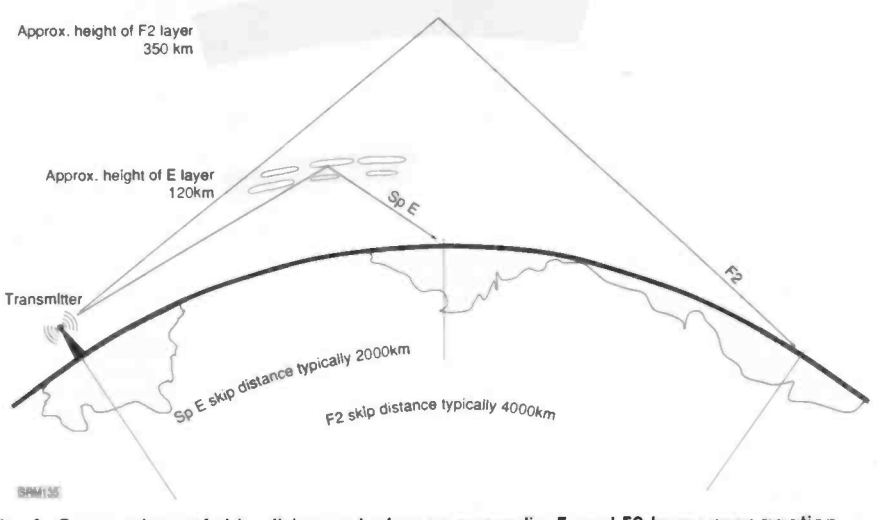


Fig. 1: Comparison of skip distance between sporadic-E and F2 layer propagation.

INTRODUCTION TO DX-TV

than mid-afternoon. Likewise, signals from the West originating in Canada and the USA are more likely to emerge during the afternoon.

Early Observations

Television reception during the solar peak of the 1930s could not be thoroughly assessed since there were very few TV services in existence! The world's first high-definition service did not commence until 2 November 1936. However, there were early experiments into long-distance reception and 405-line receivers were shipped from the UK to North America in the hope of receiving transmissions from the channel 1 transmitter at Alexandra Palace in London (transmissions switched to Crystal Palace on 28 March 1956). The experiment proved a success and at times both sound and vision signals were monitored at 41.25 and 45MHz respectively.

Rhombic Antenna

The signals were studied at Riverhead (Long Island) in New York between 1936 and 1939. The receiving antenna used consisted of a horizontal rhombic some 45ft (14m) above the ground directed toward London. The length of each leg of the antenna was 400ft (122m). The major and minor axes were adjusted to give maximum response to a signal arriving at an angle of 6 degrees. The effective height of the antenna system was about 63ft (20m). Most of the observations took place between 0945 and 1130EST (Eastern Standard Time). This corresponded with the afternoon schedules of the BBC. On numerous occasions the transmissions continued until noon or thereafter.

Results

The images observed appeared to exhibit selective fading as the contrast of the picture would often change between wide extremes. Multi-path propagation would mar the picture in two ways. Firstly, it would cause repetition of the picture content and secondly, it would result in more than one set of horizontal synchronisation pulses making it impossible to obtain a steady picture.

Following Peaks

Three years later on 1 September 1939, the British television service was closed down for reasons of national defence and was not resumed until 7 June 1946, hence there was little opportunity to monitor the effects of F2 propagation during the late 1940s.

There were still very few countries operating a national TV service during that period, so experiences were virtually the domain of amateur radio enthusiasts. The peak of that particular solar cycle occurred during the winter of 1947-48 when m.u.f.s. above 50MHz were encountered. The sunspot count of 150 was considered unusually high at the time - much higher than the previous peak.

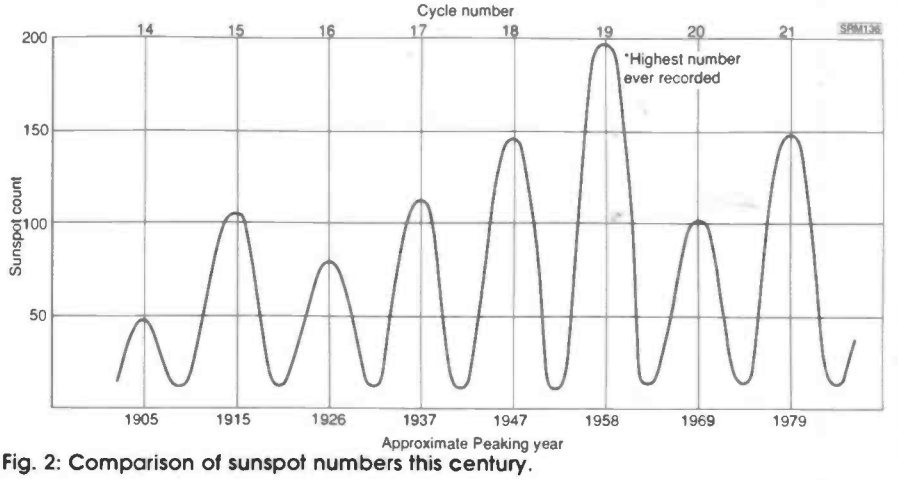


Fig. 2: Comparison of sunspot numbers this century.

Past Records

Sunspot numbers and solar behaviour in general have been carefully studied over the years and records date back over many centuries. The magnitude of the 1947-48 peak suggested that repeat conditions might only occur every 50 years or so. However, the sunspot maximum of the late 1950s proved to be the highest number ever recorded, with a count of almost 200!

Enter the DX-TV Enthusiast

Many countries throughout the world were now operating TV services, many with channels in Band I. Of greater importance was the easier access to television receiving equipment for budding TV DXers to experiment with! Propagation via the F2-layer was a totally new experience as far as television reception was concerned for the novice to experiment with.

Fortunately, the United Kingdom had adopted some of the lowest frequencies for TV broadcasting throughout the world and this virtually guaranteed success. As we mentioned earlier, the UK channel 1 was located just above 40MHz. France also operated a TV channel at the lower frequency end of Band I, but the extremely wide bandwidth chosen for their 819-line transmissions meant that only the sound channel was located close to 40MHz (41.25MHz to be precise), whereas the vision carrier was 52.40MHz! As a result, examples of spectacular long-distance reception occurred regularly with sound and vision signals from the BBC Channel 1 Crystal Palace transmitter being received in Australia and in other parts of the world.

TV on higher Band I frequencies were propagated too, with instances of European stations being received in the USA.

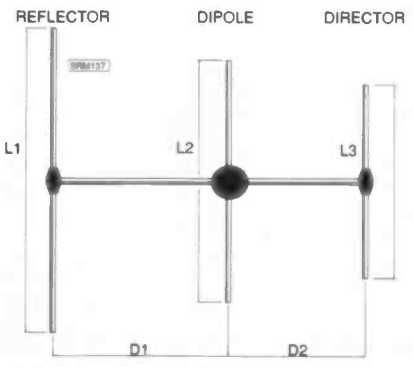


Fig. 3: 3-element array for 45-46MHz vision reception.

Less Spectacular

The sunspot maximum towards the end of the 1960s was less dramatic because the sunspot number count attained a maximum of 100 - only half the number of the previous cycle.

Results were extremely disappointing with fewer instances of long-range TV reception being encountered via this mode of propagation, at least in Europe.

Enthusiasts in other parts of the world scored much better because the lower frequencies used by BBC1 on channel 1 and France on their channel 2 were more readily propagated. Towards the end of 1968, daily reception of France and the United Kingdom was possible over large areas of the USA. In addition to these, Spanish signals emanating from the Madrid transmitter on channel E2 were arriving almost daily in South Africa.

Mega-Spectacular!

Cycle number 21, which peaked during 1979-80, was spectacular to say the least! Although activity spanned four winters (1978-81), the sunspot number count only reached about 150, which is comparable with the 1947-48 peak.

Nevertheless, TV DX logs dating back to that period make nostalgic reading and the excitement of some of the more elusive reception still lingers on. The vast number of DX-TV enthusiasts around the world meant that Band I was being constantly scrutinised for signals.

World Wide Reception

Many UK DXers first stumbled across F2 reception in Band I during October 1978. One of the authors was fortunate enough to be able to recognise a couple of

INTRODUCTION TO DX-TV

Russian test cards that were superimposed on the screen. Although both signals were smeary with resulting poor definition, the features of the two test cards could clearly be discerned.

Signals from the USSR, China, the Middle East, Africa, the USA and Canada were identified at some stage of the cycle. Australia was regularly received in the UK, even the New Zealand channel 1 vision carrier was heard at one stage by an enthusiast using a scanner.

In Finland, transmissions from East Malaysia were received via F2 propagation on channel E2. Reception occurred during November 1980 (the exact date is not known) at approximately 1000UTC. TV DXers in Australia reported F2 propagation occurring during the same months as in Europe.

Signals from BBC1 on channel B1 from Crystal Palace were resolved on numerous occasions with both audio and video present. Pictures from China and the USSR were frequently observed from channel R1 transmitters including that of Vladivostok.

Transmissions from Europe on channel E2 were also in evidence. Via a combination of F2, TE (Trans-Equatorial) and sporadic-E reception, Australians encountered signals from China and Korea.

Latest Cycle

Most TV DXers feared that such incredible reception would never be repeated in any future solar cycle. This seemed to be based on the "you can't have too much of a good thing" principle.

Only a couple of years ago there were pessimistic predictions concerning solar cycle number 22, which, theoretically, should reach its peak around 1990-91. Now the predictions are more optimistic and enthusiasts in the United Kingdom have already received pictures on channels E2 and R1 from unknown transmitters to the East.

So far the following examples of F2 reception have been observed on the lower Band I channels during 1988:

25 October:	Channel E2 weak, smeary programme from the East around 0852UTC
27 October:	Channel R1 USSR test pattern 0850-1012UTC very strong signal
29 October:	Channel E2 unidentified signal very weak 0810-0835UTC Channel E2 unidentified programme with captions very smeary 0850-0910UTC
30 October:	Channel E2 very weak smeary picture around 0900UTC
31 October:	Channel R1 USSR programmes fairly clear at times 1150-1255UTC Channel E2 some form of test pattern/programmes very smeary 1235-1255UTC

It is interesting to note that the signals on 31 October were of an exceptionally strong nature and could easily be misinterpreted as sporadic-E propagation.

Unfortunately, the initial opening phase was missed but the fade-out was a rapid process which took approximately three minutes. Since the 31st, the lower end of Band I has seemed remarkably dead!

In other parts of the world, enthusiasts have been encountering signals since the end of 1987. In India, transmissions from China and Thailand were identified on various dates while in Australia, signals from USSR transmitters on channel R1 were noted last July.

Reception techniques and receiver system requirements are generally more demanding for successful F2 reception than for sporadic-E. Despite their relatively high-cost, scanners covering v.h.f. and u.h.f. frequencies are becoming popular with an increasing number of dedicated enthusiasts.

The extremely high sensitivity and selectivity of a scanner allows the monitoring of sound and vision carriers, which would go undetected by conventional TV receiver systems. Specific frequencies can be entered into its memory and quickly recalled in order to check on prevailing propagation conditions during an opening.

In the past, by carefully monitoring sound channel frequencies, scanners have helped DXers identify the source of extremely weak signals. To help reduce co-channel interference, some transmitters use what are termed as "off-set" frequencies, where the vision and sound carriers are off-set from their nominal frequencies by a few kilohertz. A scanner can resolve this slight difference and by reference to published lists the most likely transmitter can be established with a high degree of accuracy.

Tuner Range

The thought of receiving Australia on ch.0, or New Zealand on ch.1, is no doubt attractive and given the right conditions will occur. Unfortunately, its frequency may lie just outside the lower Band I cut-off range of many Varicap tuners fitted to European receivers.

Over the years, the authors have experimented with a variety of Varicap tuners and the following types are known to have a lower range in Band I which extends down to these channels:

Mullard ELC1042 (v.h.f.)
Mullard ELC2000 (v.h.f. and u.h.f.)
Toshiba EG522F (v.h.f. and u.h.f.)

The "de-luxe" versions of the D-100 DX converter system will tune down to approximately 44-45MHz, although the lowest scale calibration is channel E2.

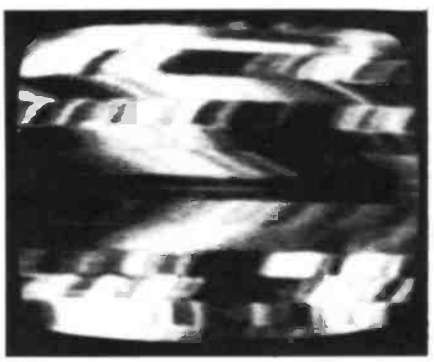
Earlier versions, without Band II channels prior to 1986, were equipped with the NSF 47807 Varicap tuner unit which has a Band I lower limit of approximately 47-48MHz.

If a signal generator is available, it may be advisable to satisfy yourself that your receiving equipment will comfortably tune down to Australian channel 0 in preparation for the big day!

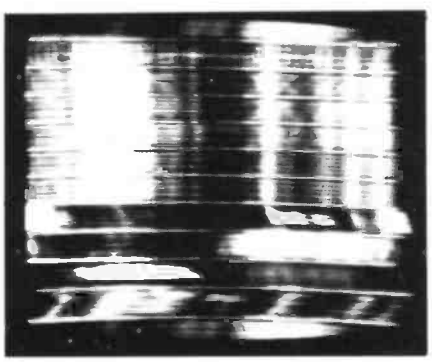
Antennas for F2

Although strong signals can frequently be encountered via F2 propagation, something more ambitious than a dipole is recommended in order to make the most of such a comparatively rare event.

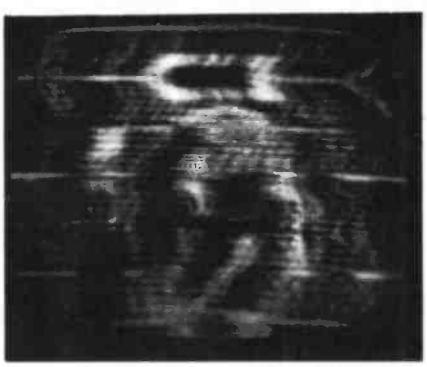
Many wideband arrays in use by enthusiasts have their reflector cut to a frequency just below its lowest intended channel of operation. In most cases, this will be approximately 47MHz. Useful gain will still be available below this frequency ☞22



An unidentified PM5544 received on E2. Although severe multiple images distort the picture information, characteristic features of the test pattern can be clearly made out.



The "EZO" test card from an unidentified transmitter in the USSR. The picture clarity is relatively good by F2 standards.



BBC1 "Test Card F" received in Cape Town, South Africa, during Solar Cycle 21.

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HIGH SEAS & SHORT WAVES

Joan Ham

The idea of intelligence leaving a piece of apparatus in one room, and re-forming in equipment kilometres away, across the world, or even into the unlimited reaches of space by some invisible agency, has fired the imagination and occupied the thoughts of thousands, from school children to scientists, for more than a century.

In 1892, Frederick H. Schnell was born in Chicago, USA. As the nineteenth century drew to its close, scientific curiosity and experimentation was at an exciting phase.

The famous early wireless pioneers, Heinrich Hertz, Edouard Branly, Sir Oliver Lodge and Senatore Guglielmo Marconi were entrenching themselves in wireless history. Young Frederick Schnell went to school and grew up as Marconi formed his Wireless Telegraph and Signal Company, spanned the Atlantic ocean with three Morse dots signifying "S" and had his system adopted for ship-to-shore communication. Valdemar Poulson produced an arc transmitter, J. A. Fleming made a two-electrode valve to detect wireless signals and Lee de Forest added another electrode and patented the first triode amplifier. It was a thrilling time for a scientifically-minded boy and Frederick Schnell became a radio amateur.

The First World War found him, a Naval reservist, at the transcontinental receiving staton at Belmar, where in 1917, he copied the first message from Italy to President Woodrow Wilson. Later in the Naval Communications Office in Washington DC, he copied during his watch period, the Armistice acceptance message from Nauen, the German station which had sent a Morse signal over 2494km in 1913. Schnell transmitted the very first message to Germany after the war, and was Chief on the *George Washington* carrying the President to the peace conference. Returned once again to the peace-time Naval Reserve, Lt. Schnell was traffic manager of ARRL at Hartford, managing the transcontinental relays and establishing a 6½ minute record round trip for a message. He was the first American amateur to make trans-Atlantic contact with Nice, France and to copy the South American amateurs.

Since the electrical noise of the first raucous spark was interrupted to transmit a Morse signal, amateurs have exhibited a healthy scientific interest in the transmission and behaviour of radio signals.

The American Navy, meanwhile, was dragging its anchors over fleet communications. Although the Secretary of the Navy reported that it had "cognizance over all methods of communications in vessels of the fleet, including radio, visual, sound and carrier pigeons" and an extensive shore system, fleet communications were a very different story. "Though funds allocated there to have permitted but few improvements in material, progress has been due to greater and more satisfactory results obtained by operating personnal, with the old and sometimes obsolete material."

Skyborne Naval Unit

In 1924, the dirigible *USS Shenandoah* was built and fitted out with some high-frequency radio made at the Naval Research Laboratory. Her shake-down cruise was across America and back, and one can only imagine the reaction of people in middle America at seeing a sky-born Naval Unit! The Naval authorities found that her 3.2MHz transmissions could keep in reliable touch with the laboratory, although frequency stability left much to be desired. At San Diego, her transmissions were copied by the *USS Canopus* some 6758km away, and delighted amateurs throughout the country notched up highly desirable contacts. At the same time, communications with shore stations and those units on lower frequencies, using the usual fleet equipment were disappointingly unsuccessful. The radio officers were more interested in the high-frequency radio, probably contributing to the poor performance of the regular equipment. This was noted by an unsympathetic Commander-in-Chief US Fleet, who commented acidly that it was necessary for dirigibles assigned to fleet units to be able to communicate on standard frequencies, not to act as airborn laboratories! It was, however, the first time that high-frequency radio had been used in the fleet and it was still felt officially that it was of no use to the Navy.

Pacific Cruise

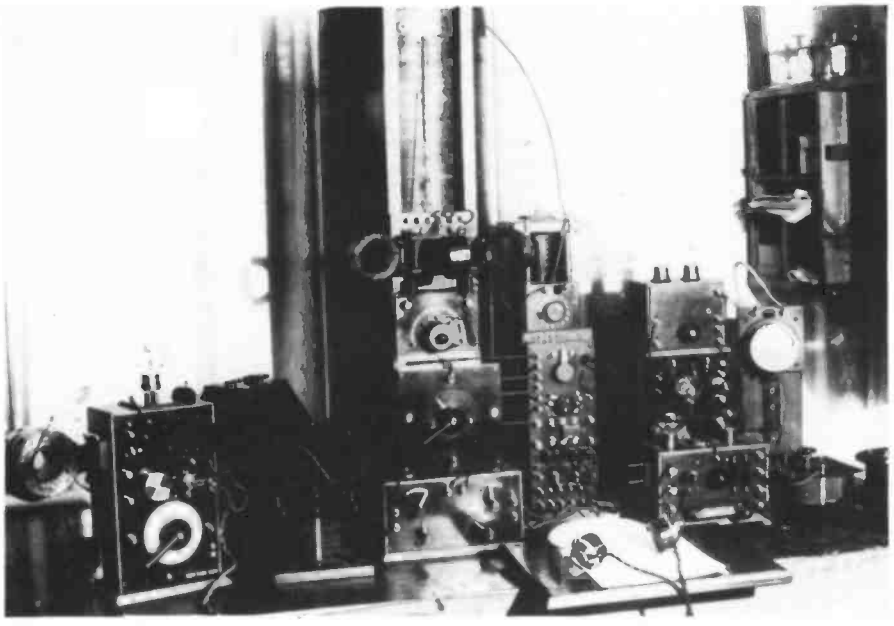
In 1925, the fleet was preparing for a Pacific cruise to Australia and New Zealand. The Fleet Radio Officer, Commander S. C. Hooper, was among those doubting the use of shorter wavelengths for Naval traffic, and there was little interest among radio officers generally, so Frederick Schnell was borrowed from ARRL and assigned to active duty to conduct experiments. Aboard the flagship *USS Seattle*, was a 5.7MHz laboratory transmitter and RG receiver: in addition, Lt. Schnell was "permitted to install his personal transmitter which covered a wide frequency band." The ARRL arranged for world-wide co-operation by amateurs; official traffic was to be handled at the Naval Research Laboratory. During the entire period of the cruise, Lt. Schnell maintained satisfactory night-time communications between the flagship and the Laboratory, convincing the Commander-in-Chief that high-frequency equipment should be installed in capital ships. During that voyage, the Kennelly-Heaviside theory was also confirmed, and despite the recommendation that higher frequencies than 9MHz "not be utilised", the Laboratory realised that day-time frequencies needed to be higher. It was a turning-point in radio communication in the US fleet, but some interesting amateur achievements were also recorded, which will be mentioned later.

After the successful cruise, Frederick Schnell was elevated to the rank of Lt. Commander. A civilian reservist once more, he put his considerable talents at the disposal of the Chicago Police Depart-

Rare Photograph of Frederick Schnell (centre) in naval uniform.

HIGH SEAS & SHORT WAVES

Part 1



The station of 20D at Gerrards Cross.

ment as their Radio Engineer. Many old QSL cards of the period list among their station equipment "Schnell 0-V-2 RX", evidence of the popularity of his circuit design in the amateur radio world.

During the second World War, Capt. Fred H. Schnell (one of the few US Naval Reserve Officers to attain that rank), served the Ninth Naval District headquarters as District Communications Officer.

Gerald Marcuse

A contemporary of Frederick Schnell, born in 1896 in Sutton, Surrey, was Gerald E. Marcuse. He, too, became a radio amateur before WWI, and "EGX" was the proud possessor of a spark coil and crystal detector. Radio signals in those distant days were few and eagerly sought, and like most others of his time, Gerald listened to ship-to-shore stations and the Eiffel Tower time signals. He could send to a distance of 8km and greatly envied such stations as MSX, who could communicate over 161km with kilowatts of spark. The outbreak of the war was noticed when he heard Norddeitch comment that "the greatest excitement prevails in Germany". The next piece of excitement was a Post Office van which collected all his precious apparatus, and Gerald went off to war service.

1919 saw the return of his equipment and the beginning of one of the most famous callsigns wherever the British flag flew, 2NM which was soon listening via a "wonderful" valved receiver. Gerald, then an engineer in Bristol, combed Government Service depots, trying to obtain "oddments suitable for our purpose", and obtained permission to carry out tests on 300kHz on both c.w. and telephony. The demands of aircraft soon pushed him up to 680MHz, and by this time, he had become ensnared by long-distance broadcasting. A newspaper article by him on the use of short wave peered into the future.

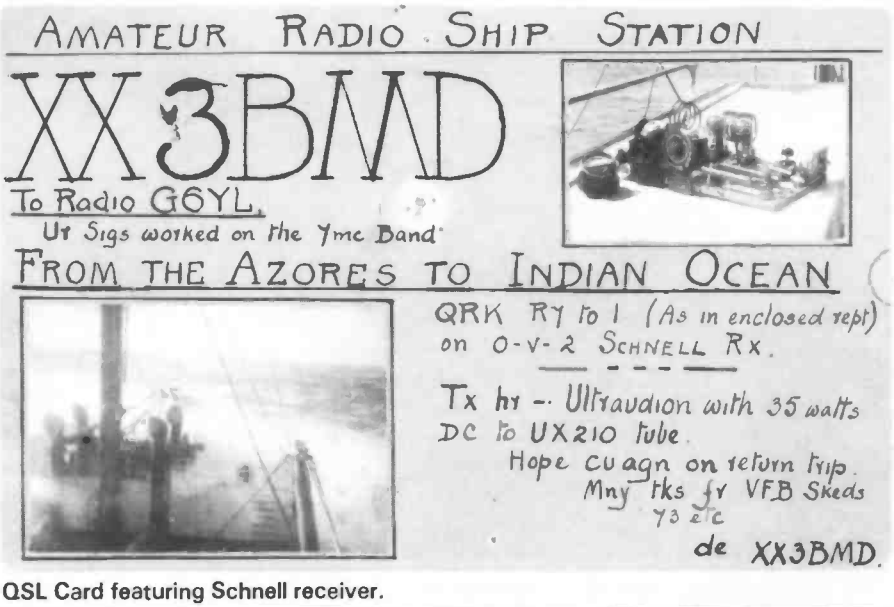
"If we come to consider telephony, the question becomes more interesting and in the last two years it would seem to have been definitely established that by the use of short wave lengths the only real means of transoceanic radiocasting will be found, with ultra short waves it may yet be possible regularly to hear radiocast programmes from Australia, and judging from the success which my own station has attained I am confident that in the near future we shall be able to enjoy world radiocasting."

He now knew that they must look to frequencies of over 6MHz for such transmissions, and recognised that "we are at the beginning of a new era."

Amateurs concentrated their experimental work on short wave as a world wide method of communicating during the early 1920s with some notable trailblazers. The Atlantic was bridged by amateurs, and in 1922 under the auspices of the RSGB, a special station, 5WS, was the first 1.5MHz British callsign to be verified in the USA. The following year, Mr Deloy in Nice arranged 3MHz tests with the ARRL, and his strong signals were received in Hartford, USA. Two-way contact on this frequency was established by Mr J. A. Partridge 2KF, London, with IMO at Hartford, USA on 8 December 1923 and his was the first British station to do so. By March of 1924, British amateurs were received on the Pacific coast of America, and before the end of that momentous year, 20D at Gerrards Cross successfully sent a signal to Mr Bell 4AA, in Waehemo, New Zealand above 3MHz. In 1925, two-way communication was established between Great Britain (20D) and Mr Maclurcan of Sydney, Australia, on 14MHz, and on this same frequency, NKF, the United States Naval Research station at Anacosta was working several amateurs in the UK.

Intrepid Explorers

Gerald Marcuse's world-probing signals crossed oceans to the Antipodes and reached into regions where only intrepid explorers had been able to go. The newspapers in 1924 reported his successful link with the Hamilton-Rice Expedition, many kilometres into the Amazon jungle and long out of touch with their sponsers, the Royal Geographic Society. It was the first time a field expedition had enjoyed direct communication with base, and Gerald could not resist sending the message, "Wireless one second — Post nine weeks." That one second, as far as the expedition was concerned, was achieved despite drying out equipment



QSL Card featuring Schnell receiver.

from overturned canoes, a small generator that could only deliver 500V to plates rated at 1000V, the reduction by various accidents to a mere one valve, and an antenna input of 13W to "a one wire 'T' antenna, 12m in length and 15m in height in dense primeval forest". This short wave "stuff" is truly remarkable." Gerald was able to convey an official report from the expedition leader to the Royal Geographic Society, and transmit their reply to Hamilton-Rice.

It was during a QSO with Jack Orbell in New Zealand, that he was asked, "have you heard Schnell on American Pacific Fleet NRRL? He's very good here and is using a crystal controlled outfit on 7.8MHz approximately".

World Record

Gerald needed little prompting, and soon established contact with the *USS Seattle*. His world record telephony conversation with Fred Schnell, then 1287km distant, was praised around the globe, from the American Department of Commerce radio expert, to the world's Press: but he had only just begun a remarkable series of contacts. World broadcasting at that time was his overriding enthusiasm, and the next feat was a concert programme broadcast to the *Seattle* from 2NM. The warship was in Wellington harbour, New Zealand, but records of Caruso, Heifetz and jazz were "all heard excellently aboard the American warship" boasted the *New York Times*. So successful was the utilisation of the short wave path, that a spontaneous press conference was held between Commander Crosse on the *Seattle* and reporters at 2NM in Caterham. Contact was established in less than a minute, and a mere 0.5kW of power carried the signals across the 22526km of land and oceans for this very first long-distance interview. It was unbelievable at the time that clear two-way voice communication could be conducted over such a vast distance. Commander Crosse did not at first believe he was listening to a signal originating 29km South East of London, and thought a New Zealand amateur was playing tricks. He was not the only doubter. Gerald was aroused from his bed by a belligerant American during that week, who told him plainly that he did not believe that he had been in communication with the *Seattle*, and if he cared to prove it, would he ask the ship four questions. The doubting American was conducted to the shack, where 2NM called Schnell, asked the questions and immediately received the answers! As Gerald put it, "the Yankee faded back to town!"

Lt. Schnell sent a message to the *Evening News*, "The tremendous strides and progress of amateur radio are clearly shown by the successful transmission of voice and music which has been received for the past five days aboard the *Seattle* in Washington Harbour, NZ. Hearty Congratulations to G2NM."

Another 1925 Marine test was carried out by A. E. Hay G2KG, and H. T. Longuehaye G2KC, aboard the *RMMS Aorangi* GDVB, of the Canadian-Australian R. M. Line. She had experimental equipment aboard for working 6 to 16.6MHz. G2NM was frequently heard in the Pacific by the operators, who sent him a card and a request for a QSO.

Like the American Navy, the Royal Navy was not enamoured of the short waves, "they were so prone to fading and disappearing. They did not believe in them." Gerald recalled. One man, later Chief Engineer at Rugby, told him, "my station will keep communication with the world long after you have finished with short waves." How wrong he was! One visionary, however, was Admiral Sommerville at the Admiralty, who was also interested in amateur radio. Stonecutters wireless telegraphy station at Hong Kong had trouble at times in getting their signals out in spite of "great racks" of equipment, 2NM amazed them with his ability to make contact with them using small valves and equipment. In July 1926, W. G. H. Miles wrote from Hong Kong that he had "got stuck", as he had perfect communication with Horsea on 8.5MHz during the hours of darkness, and perfect communication with Singapore and *HM* ships on station for 4 hours in the evening, but was having technical problems. He could not hear many English or American stations, and could not read 2NM, although *HMS Ambrose* at Singapore had received him well. He sketched the 2-valve receiver the ship was using and said he intended to build it. He had been trying to listen on a Naval B5X, which he also drew. This was a more complex receiver with different antenna coupling and an inter-valve filter circuit. A new set built to the simpler circuit used by *HMS Ambrose* improved matters, but there was still no reception of G2NM. Mr Miles asked Gerald to arrange a schedule and convey the message via Commander Murray.

Experiments were carried out with the Admiralty and the cruiser *Yarmouth* on her voyage out to Hong Kong, and as a result, Gerald built a transmitter and receiver and shipped them out to Mr Miles.

"Your set continues to prove a great success", he wrote, "and it certainly made the Signal School experts open their eyes when they saw it, it is about a tenth of the size they consider necessary and yet gives results at least as good as, if not better than Cleethorpes. I recently got a reply back from the Admiralty to a message of theirs within 1hr 20mins of their time of origin, and they sent out a special message of congratulations." Apart from official traffic with the UK, which was much better, he had contacted Singapore during the daytime on 12 and 14.6MHz and at night on 8.5MHz, and also Aden, Malta, Gibraltar and Australia at night. He had worked amateurs in all countries, and told 2NM that "short wave has been invaluable to me for handling traffic on the China station, as we have fitted all our ships – particularly during the Wansien show, when we couldn't have looked at handling it on long wave".

Gerald despatched another receiver on the *Durban* and Mr Miles was very much looking forward to taking delivery. He sent logs of all the traffic handled by Stonecutters over a period of two years for detailed analysis. Gerald was to recall in later years, "used to keep on night sched. with Stonecutters every night around 6.6-9.3MHz. Never failed. There was no QRM. No interference. All to yourself."

World exploration was what gripped the puplic imagination in those days, and far-off expeditions were an irresistable lure to those exploring the spectrum and the ionosphere with their wireless equipment. In 1925, Capt. Donald R. MacMillan led an expedition to the Arctic. Radio went too and once again the professionals looked to the amateurs to provide the expert John L. Reinartz of Connecticut was chief

QSL card to G2NM from *RMMS Aorangi* confirming the 1925 Marine tests.

electrician at a silk factory. He and M. J. Lee had already co-operated with the Naval Research Laboratory in studies of skip distances, resulting in the modifying of existing wave propagation theorie by Drs. A. H. Taylor and E. O. Hulbert of the Laboratory. Explaining his choice of Reinartz for expedition radio operator to the Associated Press, Capt. MacMillan said, "Reinartz was an expert in radio and he as an amateur was familiar with the short wave lengths which are to be employed, but which have been little used professionally. On our last trip we were cut off from the world, because the sunlight at the North Pole killed our radio. We have found that the short wave lengths to which the amateurs were restricted seem to penetrate the sunlight better than the long waves which have been in professional use. Hitherto 1.6MHz has been considered fairly short; we shall use 14 and 7MHz lengths. For a time they were used only at night. This spring, the amateurs demonstrated they could get Europe and Australia at mid-day with the short waves." The professionals were represented by the Naval Station at Great Lakes and broadcasting on high frequency was from Bellevue Laboratory, Washington.

Evidence of the interest of ships' radio operators in receiving amateur reports and vice versa, is to be found in the QRA section of the August 1927 *T and R Bulletin*.

"Mr C. R. Ponting MRS28, writes me that he has been in communication with the Radio Operator of KDQ *SS Esparta*, a ship belonging to the United Fruit Company USA and running between New York, South America and the West Indies. This ship operates on 9MHz and is regularly in communication with amateur stations, and the operator is particularly anxious to achieve contact with Europe.

There are two vessels of the same line who are hoping to get in touch with amateurs. They are:

SS Zacupu, radio call KLE

SS Carillo, radio call KDE

Mr Ponting is also the first station to report signals from NN1NIC (ex NNM3Y). This is a US Naval Station in Nicaragua, the QRA is Capt. F. E. Pierce, US Marine Corps. Observation Squadron no. 1, 2nd Brigade Marines, Managua, Nicaragua. Capt. Pierce's station operates on 9.06MHz and he called England every Sunday during July. Did anyone hear him? He is anxious to receive reports from England and is looking forward to a QSO. There are two coastguard cutters, the *USS Modoc* and the *USS Tampa*. Both of these vessels do ice patrol. When on duty both use the call NIDK, but off patrol the former uses the call NIVD and the latter IITC. Both QSO amateurs."

Amateurs themselves were not slow in taking their sets to sea in order to conduct experiments, In 1926, Eric Megaw GI6MU, obtained the co-operation and help of the directors and officers of the Ulster Steamship Company Limited, to install his experimental short wave station on board the steamers *Lord Antrim* and *Carrigan Head* to investigate transatlantic radio conditions and discover the extent to which low power short wave radio could be relied upon for ship-to-shore communication. He used a Hartley 50W transmitter and "ordinary" 2-valve receiver using PM3 valves. Antennas could not be erected in the available space and would suffer from screening, so the ship's antennas were used. In spite of difficult reception owing to dynamo QRM, schedules were kept successfully all the way over in the *Lord Antrim* and strong American signals were received, with similar results on the return trip on the *Carrigan Head*. Eric concluded that short wave radio was capable of keeping any ship in the north Atlantic in reliable communication with both sides, even under bad conditions, with the single exception of local thunderstorms, "which would render all radio apparatus practically useless." He also noted that 6-10MHz signals travelled better eastwards than westwards. Americans came in better in the UK than powerful European stations in the USA.

In 1927, a notice appeared in the *T & R Bulletin* that an expedition was going out to St. Anthony, Newfoundland, to establish radio communication with posts in Labrador, as the only means of communication owing to bad weather. It would operate on 6.66-6.97MHz using the callsign NU-WTG, and requested British amateurs to listen for it.

The South Pole was equally fascinating to the geographical and short wave explorers. Close to a spot where Captain Scott's ill-fated expedition had passed in the Ross Sea, was a Norwegian whaler, the *Sir James Clark Ross* and further south, the *C. A. Larsen* on which a scientific party were based. The Norwegian fleet were in their usual summer whaling area, and as early as 1925 to 1926, the Norwegian years, the ARRL had carried out experiments with them. The nearest radio station for three months of the year was the 3218km distant Awarua Radio, New Zealand. Awarua, the USA, Phillipines and Australian amateurs worked the Ross Sea. In 1927 at Mill Hill School, Mr C. W. Goyder G2SZ, a schoolboy with a success record of long-distance communication, crowned his achievement one Sunday morning, when working with a crystal controlled transmitter on 9.3MHz with 250W of power. He had been chatting to Christchurch, New Zealand and Melbourne, Australia, when a station identifying as AQE called. Mr Goyder replied and back came the answer, "here Norwegian whaler *Sir James Clark*. You are R7 here. Position here 78 degrees 31 degrees south: 170 degrees west longitude. I say it is fine business your signals here at the end of the world. Fine business old man. Please communicate this to Marconi, Oslo, Norway. Tell them all well OM. Hope to communicate again next Sunday".

The next over brought the information, "yes, position received OK. ARDI a few miles off OM. You are the first strong station heard here, if not the first to communicate with the Antarctic. At any rate the first British station heard you all the way down here." ARDI was the *C. A. Larsen*. The conversation had been overheard by LGN, a Norwegian station, who asked G2SZ to call AQE for him, but the Norwegian was unable to hear the whaler. This record-breaking contact reported to *The Times*, was the 1927 equivalent of the Kettering School's brilliant location of the first Russian Sputnik satellite.

In part 2 Joan Ham continues the story with Barbara Dunn G2YL. □

Barbara Dunn G2YL received this QSL card from *SS Lituania* in 1927. You can read the full story in Part 2.

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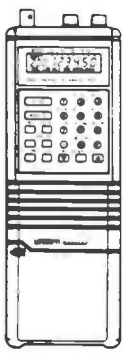

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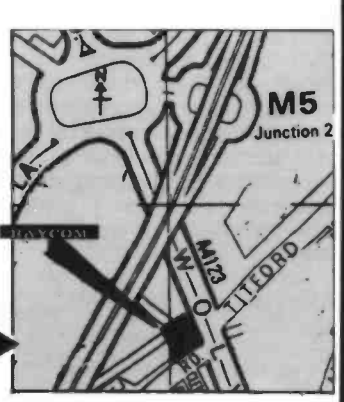

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GRUNDIG SATELLLIT INTERNATIONAL 400

John Waite

Getting Started

The first thing to sort out is the power supply and this is very well catered for. If using mains power there is a built-in power unit which can be set to accept 110 to 240 volts at 50 or 60Hz which should cope with most eventualities both at home and abroad. Alternatively, if you like to operate portable, the International 400 can be powered by six C cells which fit in a neat compartment at the bottom of the set.

The final power option is to use an external 12 volt d.c. supply which is particularly convenient for use in a car or caravan. The connection for the external power source is of the now standard coaxial type. One of the many good features of this set is that both the internal battery condition and the external supply voltage can be checked. This is achieved by pressing the dial light button on the side panel and checking that the reading on the signal strength meter is within the marked limits.

One other power source which must be considered is the memory and clock back-up supply. This comprises three AA cells which are also mounted in the battery compartment in the base of the set. These batteries are required regardless of the main power source of the set as they power the clock and preserve the contents of the memories when the set is switched off. You are probably wondering what happens to the memories when the memory batteries have to be changed? The solution is quite simple, you power the set from the mains whilst the batteries are being changed and this procedure is described in the manual.

Having sorted out the power we now need to consider the antennas. As the International 400 is designed as a portable set it comes equipped with built-in antennas for the whole of its frequency coverage. These comprise a sturdy 1.15m long telescopic antenna for v.h.f. and s.w. reception, the other bands being covered by an internal ferrite rod antenna. These options are fine for portable use, but when operating from a fixed location reception of DX stations can be dramatically improved by using an external antenna. The International 400 handles this situation with an external antenna socket which is mounted on the right hand side panel. The only problem here is that the socket is a 75 ohms type to DIN45325 which is a little unusual, but I understand that they can be obtained from Grundig so this is not a serious problem. One good point about this socket is that when an external antenna is plugged in, the internal antennas are automatically disconnected. This is particularly useful if you are using the set close to sources of interference such as televisions, computers, etc. In addition to these basic connections there are a couple of optional ones which are very useful. The first is a headphone socket for private listening, this comprises a standard 3.5mm stereo jack socket (mono only output) which can drive headphones from 32 to 2000 ohms impedance. The final external connection is a 7 pin DIN AUX socket which can be used either to record signals from the radio or for playback through the audio stages of the International 400. Another use of this socket would be to play the audio output of the International 400 through your hi-fi system with the appropriate lead.

One point to note here is that the output level from the AUX socket is in the region of 2 volts peak-to-peak. This is quite high and may well need attenuating before being suitable for your hi-fi or cassette deck.

> The International 400 represents one of the mid-range communications receivers from this famous marque. It boasts a very wide frequency coverage which, when combined with Grundig's reputation for high audio quality, should prove to be very interesting.

Manual and Extras

The operation manual is a multi-lingual, A5 booklet covering eight languages including German, English, Spanish, Italian and Dutch. Each language ended-up with about ten pages of instructions. Although this may not seem very much it is very well presented and when combined with the logical operation of the controls, proves to be perfectly adequate. There is also good use made of diagrams to illustrate some of the more unusual facilities like the dual time zone clock. A very useful short-form manual is also provided to act as a pocket-sized guide to all the features of the International 400. I thought this was very good and just the right size to pop into your pocket.

It seems to be common practice these days for short wave radio manufacturers to provide some sort of listening guide and Grundig are no exception. They have provided a 42 page, A5 booklet which covers radio right from the microphone in the studio to the listener - quite an ambitious task! At first sight I had a job to find any English but soon realised that each double page had been divided into four columns each containing a different language! The coverage of this little guide is very good indeed and I think they have done extremely well to cover so many topics in such a small space.

Operation

The layout of the International 400 is very hi-tech with lots of push-buttons and subtle flashes of colour. As with a lot of Grundig radios, separate bass and treble controls are provided which gives the user maximum scope for tailoring the sound to suit his or her ear. These two controls, along with the volume control, comprise three sliders positioned in the middle of the front panel. The controls had a very pleasant feel to them and were not at all jerky, which is a common complaint with this type of control. Another common complaint with sliders is that there is often a large slot beneath the knob which attracts dust and ultimately causes the slider to become very noisy. The International 400 uses an ingenious system which results in the gap being at the side of the recess and far less likely to cause any problems.

The power on/off slider switch has three positions instead of the usual two, this is because the internal clock can be used to switch the radio on at a pre-set time. This is a very useful feature, particularly for waking you up in the mornings as it also automatically turns itself off after one hour!

The tuning options are an area where modern microprocessor controlled radios really score and the International 400 is particularly impressive. There are basically three ways of selecting a frequency - manual tuning, direct frequency entry or memory selection.

Taking manual tuning first, this is fairly conventional in that you select the frequency band, i.e. v.h.f., s.w., etc., using one of the five buttons just below the

frequency display. You then tune to the required frequency using the 40mm diameter tuning knob on the right hand side of the radio. This knob is very pleasant to use and even has a small moulded finger-sized indentation which makes fast tuning very positive. As with most digital tuning systems the frequency actually changes in steps as opposed to continuously and the size of these steps was dependent of the band. On v.h.f. the tuning steps are 10kHz whilst on all the other bands they are 1kHz.

The second option, direct frequency entry, is very useful, particularly if you want to tune to a set frequency. With this option you simply type in the required frequency using the smart keypad on the front panel. The microprocessor software is very well sorted as you don't have to enter trailing zeros, i.e., to enter 12.6MHz you only type 12.6 and the radio adds the trailing zeros. The International 400 will also automatically change bands for you, for example if you are tuned to 10.1MHz on short wave and want to change to 88.4MHz on v.h.f., you simply punch in 88.4 and the band and frequency change as if by magic.

Another short-cut that's available is to jump straight to a short wave broadcast band. If you are tuned to 88.4MHz v.h.f. and you want to look for stations on the 30m broadcast band you just type 30 and the microprocessor does the rest! Once you have selected a frequency using the direct entry method you can do any fine tuning using the manual tuning control as this is always enabled.

The final tuning option is to use the 24 memories, which are ideal for storing your favourite frequencies, as they are retained even when the radio is turned off. Entering frequencies into the memories is very easy only requiring a couple of operations to store the displayed frequency. Recall is equally easy as you simply type the memory number. One of the particularly good points about the memories is that you are clearly told whether a memory is free or not. This is achieved by either showing the frequency if the memory is in use or the word FREE if is empty. Also, if you want to locate a free memory you simply press a button on the front panel marked FREE and the display cycles through all the free memories.

Once frequencies have been stored in the memories you can easily step through them by using the SCAN buttons on the front panel. These enable you to either step up or down through all the occupied memories and saves having to enter digits. As with direct frequency entry, once a memory has been selected you can tune around using the manual control.

One last tuning feature is the up and down SEARCH which is enabled by pressing the appropriate search button on the front panel. This facility sets-up an automatic station search which stops as soon as a reasonably strong signal is received. The facility operates on all bands, but on short wave, where it is a little impractical, each press of the SEARCH buttons steps the frequency to the next highest or lowest broadcast band.

For the utility station enthusiast the International 400 is fitted with a variable beat frequency oscillator (b.f.o.). This is essential for resolving c.w. and RTTY, etc. The b.f.o. is only available on short wave and is operated by pressing a small button on the right hand edge of the radio. The tuning for the b.f.o. comprises a 12mm diameter knob also on the side panel, which turned out to be quite easy to use.

The clock on the International 400 is quite interesting as it is capable of displaying two different time zones, known as TI and TII. It was rather like having two separate clocks sharing the same display. As mentioned earlier you can also use the internal clock to switch the radio on at a preselected time for a period of one hour.

On The Air

I was fortunate to have the International 400 on review for quite a long time and during that period it became very popular, particularly for broadcast station monitoring.

By far and away my favourite aspect of the radio was the frequency selection options which were a joy to use, I think a few other manufacturers could take a lesson or two from Grundig here. I found I was able to quickly move about the bands without having to refer to instruction books to find my way around. There were also some features I haven't mentioned yet that eased operation. First of all there is a useful chart on the top panel which shows the world time zones and the frequency ranges of the short wave broadcast bands. There is also a very neat pull-out plastics stand at the back which allows the radio to be laid back at about 30 degrees which is ideal for table or desk top operation. The only slight snag here is that the liquid crystal frequency display seems to be designed to be viewed either head-on or from above as the image is rather faded when viewing with the set tipped back. This is a shame as the display was otherwise very clear indeed.

I used the International 400 with an external antenna and had great success. One problem that sometimes occurs with predominantly plastics-cased radios is that they can be rather susceptible to interference. I'm glad to say the Grundig has no problems in this respect and works perfectly satisfactorily right next to my computer and printer, providing an external antenna is used. I am fortunate in that I have room for a good sized external antenna but this can sometimes bring its own problems in the form of overload of the receiver. Fortunately the International 400 is fitted with an attenuator which is activated by switching from DX to LOCAL using the switch on the side of the radio. This attenuator proved to be very effective at reducing strong signals to manageable proportions.

Now to the audio performance, which on v.h.f. is superb and could easily be adjusted to suit a wide range of individual preferences. On short wave I thought that the audio had rather too much bass, even with the treble set to maximum and the bass to minimum. This is only really a problem when listening to DX stations but nevertheless worth noting. The medium and long wave performance is, again, rather muffled but this is not really a serious problem.

As the International 400 is fitted with a b.f.o., I decided to try out s.s.b. and some of the utility modes. Starting with s.s.b. the b.f.o. took some getting used to as the large, 1kHz, main tuning steps meant that the stations are fine-tuned by the b.f.o.. It is actually quite easy to jump either side of a station and often difficult to hit just the right tuning. The problem is particularly noticeable when trying to resolve very weak signals. Another problem with the reception of weak s.s.b. signals is that the resolved audio had a warbling or watery sound which is quite difficult to listen to for

GRUNDIG SATELLLIT INTERNATIONAL 400

any period. Fortunately both of these problem are significantly reduced if the signal is strong.

Moving on to utility modes I started with RTTY reception where, not surprisingly, I hit the same problems as with s.s.b. I tried receiving both amateur and commercial RTTY/AMTOR broadcasts with the general result that wide-shift (425Hz or greater) signals were fine whilst narrow-shift (170Hz) signals required a fair amount of patience to resolve successfully. Reception of c.w. signals is quite satisfactory but as with all the utility modes the bandwidth of the International 400 is optimised for broadcast stations and utility modes are generally narrow band modes so you tend to receive several stations at the same time.

Summary

The International 400 proved to be a very popular radio about the house, as it is most successful as a broadcast station receiver. The ability to resolve s.s.b. and utility stations is obviously an advantage even if the performance could be slightly better. I would like to see the facility to select a wide/narrow bandwidth which would probably improve the short wave reception.

At the risk of repeating myself the real selling point of this radio must be the frequency selection options which rate among the best I have seen and are very well thought out. Overall then this is a good receiver which should find favour with anyone interested in broadcast reception.

The Grundig Satellit International 400 is available from any Grundig dealer price £199.99. My thanks to **Grundig UK** for the loan of the review model. □

Abbreviations

AMTOR	Amateur Teleprinter Over Radio
b.f.o.	beat frequency oscillator
c.w.	continuous wave (Morse)
d.c.	direct current
DIN	Deutsche Industrie Normen(German Industrial Standards)
Hz	hertz
kHz	kilohertz
MHz	megahertz
m	metre
mm	millimetre
RTTY	RadioTeleTYpe
s.s.b.	single sideband
s.w.	short wave
v.h.f.	very high frequency

Specifications

Frequency Range:	l.w. 148kHz - 353kHz m.w. 513kHz - 1611kHz s.w. 1.612MHz - 30MHz f.m. 87.5 - 108MHz
Tuning Steps:	l.w., m.w. and s.w. 1kHz f.m. 10kHz
Antennas:	Telescopic whip 1.15m long Internal ferrite rod
Audio Output:	6W peak
Power Requirements:	6 x C cells 3 x AA cells (back-up) 220-240V a.c. 110-127V a.c. 50-60Hz External 12V d.c.
Dimensions:	304 x 180 x 70mm.
Weight:	2.15kg without batteries

INTRODUCTION TO DX-TV

☞12

but for anyone wishing to construct an antenna specially for the ch 0 and NZ ch 1 vision carrier frequencies, suggested dimensions are as follows:

Element lengths:
- Reflector (L1) 325mm (128ins)
- Dipole (L2) 310mm (122ins)
- Director (L3) 300mm (118ins)

Spacings:
- Reflector-dipole distance (D1) 100mm (39ins)
- Dipole-director distance (D2) 91mm (36ins)

Due to the greater skip distance associated with F2 reception, signals will arrive at a smaller angle than those refracted by sporadic-E propagation. As a consequence, the height of the antenna does seem to make a difference, especially with extremely weak reception.

Amateur Band Listening

Monitoring the 10-metre amateur band around 28MHz for signs of other continents (such as South America) being worked provides a good indicator that F2 conditions and high m.u.f.s are prevailing.

When F2 activity is present in Band I, various Russian "forward scatter" communication networks can be heard at high strength in the lower portion of the band between 40 and 48MHz. Strange tones and generally lots of weird noises will also be heard around these frequencies.

Unfortunately, the m.u.f. doesn't always rise high enough to cause TV reception on frequencies around 50MHz (namely channels E2 and R1) despite the presence of tones etc, so close to the E2 vision frequency.

In all fairness, there are relatively few channel E2 transmitters in operation when compared with the number of R1 outlets which seem to provide blanket coverage of Russia and China! □

Abbreviations

EST	Eastern Standard Time
km	kilometres
MHz	megahertz
m.u.f.	maximum usable frequency
u.h.f.	ultra high frequency
UTC	Universal Co-ordinated Time (=GMT)
v.h.f.	very high frequency

Tuner Suppliers

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HS Publications, 7 Epping Close, Derby DE3 4FS. Tel: (0332) 381699. (D-100 Converter System and Antenna Hardware, First Class stamp for leaflets).

ANTENNAS

F. C. Judd G2BCX

Part 2

This month Fred Judd develops the "long wire" from the principles of the half-wave linear antenna described in Part 1. He also looks at more basic principles of long, linear antennas and starts to consider some of their operational aspects.

An extension of the λ/2 linear antenna is a linear long enough to be operated primarily as a single half-wave antenna at relatively low frequency in the h.f. spectrum, but which, without changing its original physical length, can become "N" number of half-waves in length when operated at frequencies that are higher but harmonically related to the original (fundamental) frequency.

Long Linear Antennas

Such an antenna containing the equivalent of several half-waves, each having the same current and voltage distribution (see Part 1), is often called a "long wire"; the number of half-waves may be odd or even. Their ability to be used for harmonically related amateur h.f. bands, which may be more easily understood from what follows, makes them popular with radio amateurs.

A λ/2 antenna resonant for, say, the 3.5MHz amateur band may be operated as a single-wavelength antenna on the harmonically related 7MHz band (two half-waves equal one wavelength), as a two-wavelength antenna on 14MHz (four half- waves equal two wavelengths), or as a four-wavelength antenna on 28MHz (eight half-waves equal four wavelengths). The original physical length of the antenna operated as a half-wave on 3.5MHz is about 40m, and this length remains approximately the same for harmonic operation on the other bands.

The current and voltage distribution for long, linear antennas made up of 2, 3, 4, 6 and 8 half-wavelengths is shown in Fig. 2.1. Those marked "**h**" have a direct harmonic relationship with the single half-wave marked "fundamental". Linear antennas intended for harmonic operation can be fed from an open wire 600Ω transmission line, or via a quarter-wave stub from a low impedance transmission line - e.g. 50Ω current-fed coaxial cable.

They may also be directly "end-fed" via a suitable antenna tuner at the transmitter end, although in this case the antenna is "voltage" fed at high impedance. However, if this method is used there is no problem with high r.f. voltage being present in the shack: it is most unlikely to cause BCI or TVI, as is often imagined, but good insulation becomes necessary at the lead-out and, of course, at the far end of the antenna to prevent loss of r.f. The latter point applies even when harmonically operated antennas are used for receiving. In fact they perform quite well in this respect, with the advantage that some "directivity gain" can be obtained when received signals are coming from a direction reciprocal to the direction of maximum amplitude from the main lobes. Readers will no doubt appreciate that harmonically operated antennas can be dimensioned to function for s.w. broadcast bands harmonically related to another at some otherwise fairly low frequency.

There is one important point to remember with linear antennas operated on a harmonic, or fundamental, frequency and when the antenna is functioning with an "electrical length" of two or more half waves: the number of main lobes of radiation will always be four, with the angles these make to the main wire depending on the total number of half waves.

Radiation from Long Linear Antennas

Linear antennas with electrical lengths of one or more wavelengths at the operational frequency have quite complex, but symmetrically similar, radiation patterns. Depending on the overall electrical length, a large number of different horizontal radiation patterns are possible. Those shown in Figs. 2.2, 2.3 and 2.4 are the patterns obtained when a λ/2 linear for an otherwise fairly low fundamental frequency is operated at higher and harmonically related frequencies, as already explained.

At fundamental frequency a λ/2 linear will have the cosine (figure-of-eight) pattern illustrated in Fig. 1.3 (Part 1) and will therefore be bi-directional. Operated at twice the fundamental frequency (2nd harmonic) the horizontal radiation pattern will be as in Fig. 2.2, with four main lobes at the angles indicated by the polar grid and with respect to the axis of the antenna; each polar grid angle equals 10 degrees. There are no side lobes. The pattern in Fig. 2.3 is for the same antenna operated at four times the fundamental frequency: there are still four main lobes, at angles closer to the antenna, and also a number of side lobes. Much the same applies to the pattern in Fig. 2.4, which shows the same antenna operating at eight times the fundamental frequency. It can be said that linear antennas, one or more wavelength long, are multi-directional. The directivity gain from each of the major lobes of a linear antenna varies from about 1dBd for an electrical length of one wavelength, rising to 7 or 8dBd for 8 wavelengths (dBd = gain relative to a dipole).

Long Linear Antennas

The physical length of multiple half-wave linear antennas operating at a specified fundamental frequency, or harmonically, is not quite the same as the electrical length, not only because of the velocity factor (see Part 1) but also "end effect". The latter is due to insulators and supporting masts, or other structures, at each end of the antenna. The necessary shortening required to offset end effect

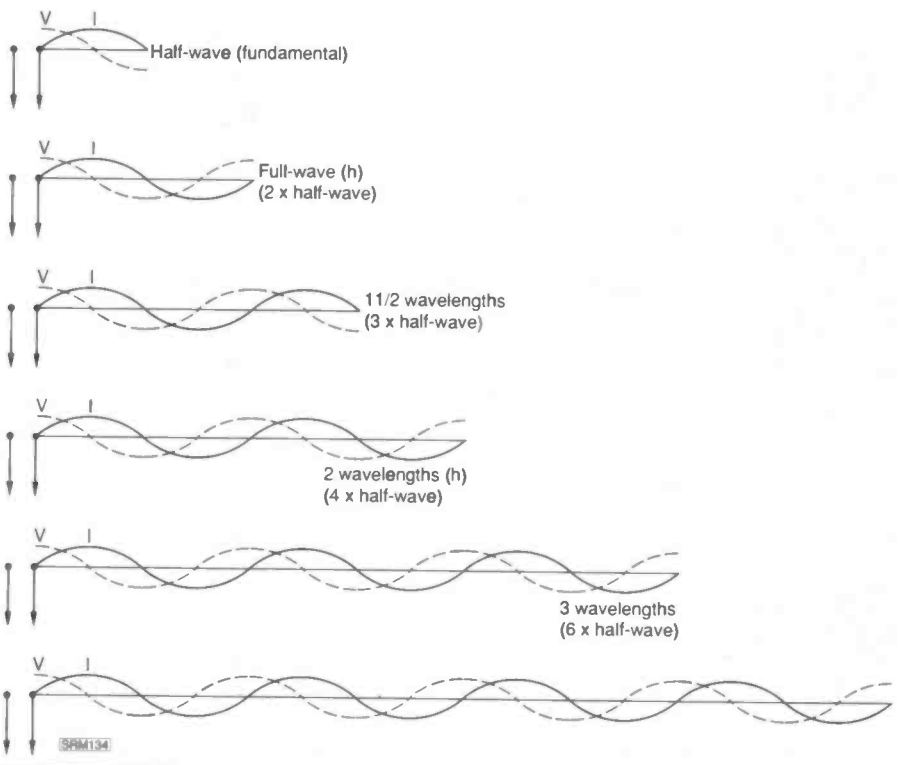

Fig. 2.1: Current and voltage distribution for a linear antenna operated at a fundamental frequency, or at frequencies harmonically related to a fairly low fundamental frequency, e.g. 3.5MHz.

applies only to the half-wave sections at each end of the whole antenna. This is taken into account when one of the following equations is used for determining the total length of a multi-half-wave linear antenna:
Length in feet = 492 x (N - 0.05)/f(MHz), or
Length in metres = 150 x (N - 0.05)/f(MHz),
where "N" is the number of half-waves in the antenna.

For example, the length of conductor needed to operate as an 8l/2 (4l) antenna at 28MHz will be: 492 x (8 - 0.05)/28 = 139.6ft. Whilst this is correct for 28MHz, it would be a little too long for the 28MHz (10m) amateur band for which the "centre frequency" is 29.7MHz, so the antenna length should be: 492 x (8 - 0.05)/29.7 = 131.6ft; or, 150 x (8 - 0.05)/29.7 = 40.15m.

Vertical Radiation Patterns

In order to achieve optimum DX ranges on the h.f. bands via ionospheric propagation, maximum vertical radiation from the antenna should, ideally, occur at the lowest possible angle(s) with respect to ground(1). Note that the pattern of vertical radiation from any horizontal antenna depends on its height above ground in fractions of, or a small number of whole, wavelengths relative to the frequency of operation. However, few radio amateurs, or indeed s.w.l.s, can erect antenna systems for the lower portion of the h.f. spectrum at heights that would ensure reasonably low-angle vertical radiation. For instance, at 7MHz a good height would be between 0.5 and 0.625 of a wavelength, which means a physical height of between about 20 and 25m. From a practical point of view, and to avoid invoking the wrath of unsympathetic neighbours or getting a "take it down" order from the local planning authorities, a more likely height would be in the region of 10m; and even that height might be frowned upon. Fortunately, the effective height, in wavelengths or fractions thereof, increases as the frequency of operation is increased - even though the physical height remains the same. But there has to be a compromise as far as the lower frequencies are concerned, i.e. between about 2 and 7MHz

Patterns of the overall radiation from v.h.f. and u.h.f. antennas can be plotted directly with reasonable accuracy, but in the case of h.f. antennas this would be extremely difficult. The alternative is to plot such patterns using appropriate equations, a long and laborious task - but one which a computer can cope with very quickly and accurately (without getting a headache!). Apart from displaying a radiation pattern on its v.d.u., it will also provide a printed copy (as those used in these articles)(2).

An accurately produced pattern provides a much better idea of how the vertical radiation from an antenna operating within the h.f. spectrum is affected by the ground beneath. As far as v.h.f. and u.h.f. are concerned we are more fortunate. Even though the physical height may be only 9m or so, the "electrical height" could be several

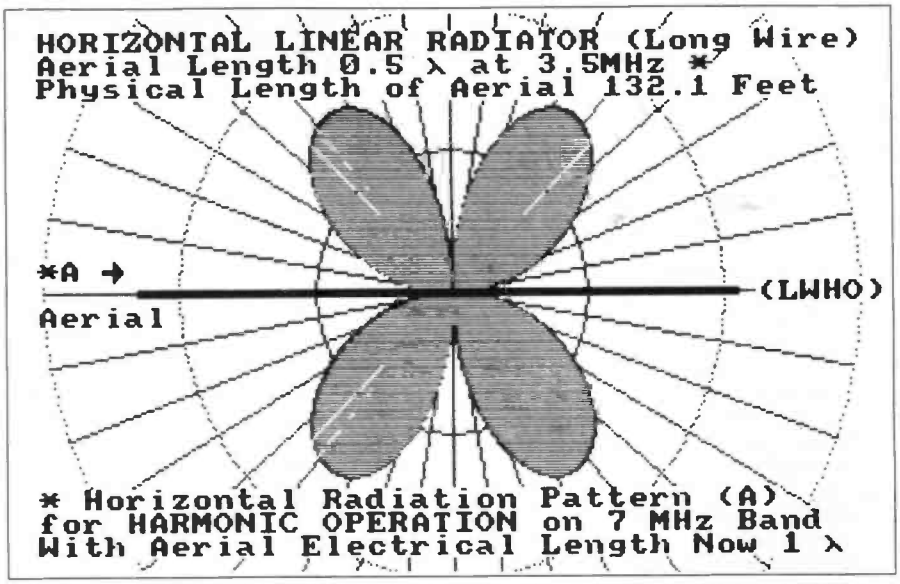

Fig. 2.2: Horizontal radiation pattern for a linear antenna operated harmonically as indicated by the annotations.

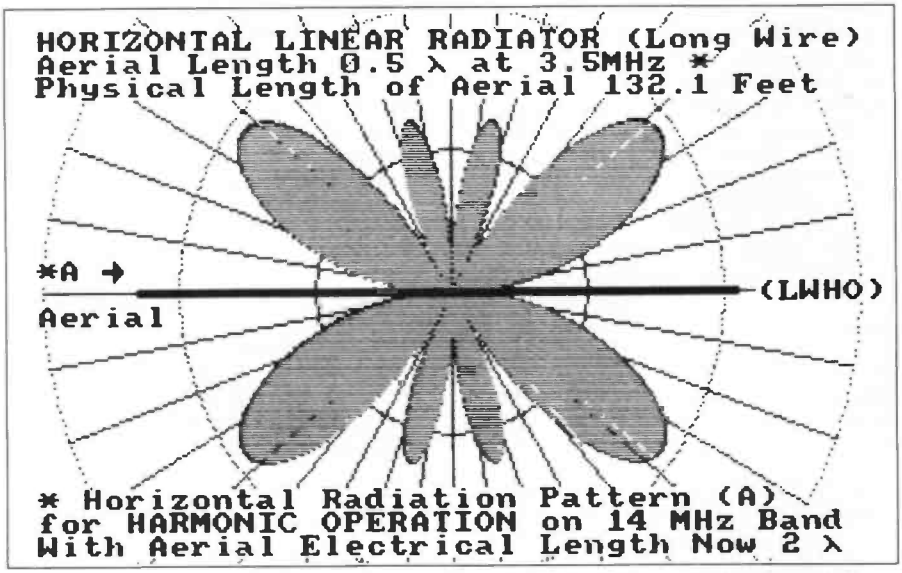

Fig. 2.3: As Fig. 2.2, but for harmonic operation at 14MHz (4 times the fundamental).

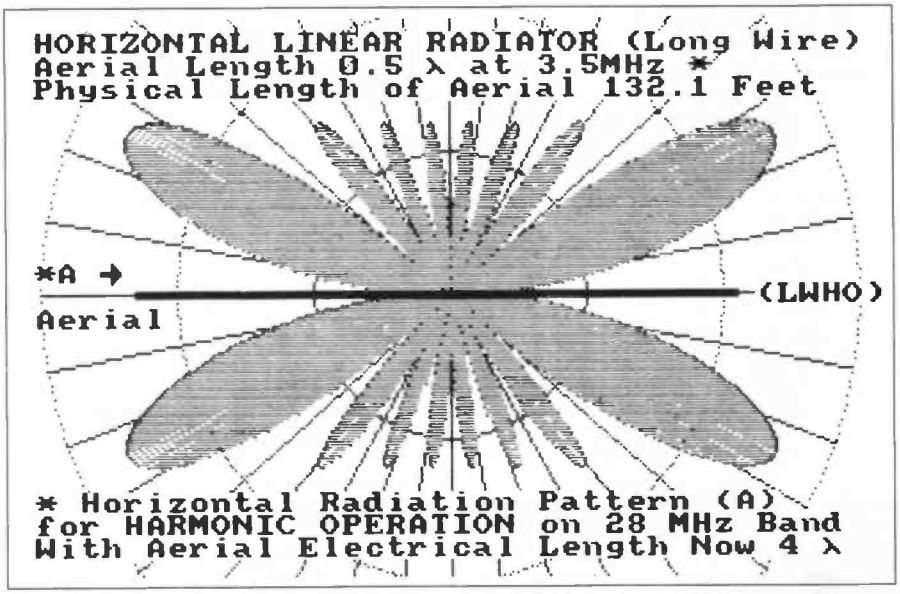

Fig. 2.4: As Fig. 2.2, but for harmonic operation at 28MHz (8 times the fundamental).

wavelengths at the frequency of operation: a near free-space condition with vertical radiation at an angle virtually parallel to ground, which is ideal for point-to-point communication over ground.

Antenna Height - Operating Frequency

As already mentioned, the electrical height of an antenna is effectively increased as the frequency of operation becomes higher, even though its physical height is constant. A physical height of 10m becomes an electrical height of about 0.125 wavelength at 3.5MHz, 0.25 wavelength at 7MHz and 0.5 wavelength at 14MHz. It is the electrical height above ground of a horizontal antenna that determines both the magnitude and the angle(s) of the vertical radiation with respect to ground.

The vertical radiation pattern for a horizontal λ/2 antenna at an electrical height of 0.125 (one-eighth) wavelength above ground, and operating at a frequency of 3.5MHz, is shown in Fig. 2.5. The overall vertical radiation is, however, considerably attenuated and is maximum at 90 degrees with respect to ground. Although most of the radiation is going skyward, the magnitude is still great enough at angles between 60 and 80 degrees to produce good signals, even at relatively long distances, when propagation is via the ionosphere. To obtain a much higher overall magnitude of radiation at lower angles it would be necessary to raise the height of this antenna to about 30m. The electrical height would then be 0.375 wavelength and the vertical radiation pattern the same as that in Fig. 2.6. The same pattern would, however, be obtained from a horizontal λ/2 antenna operating at 7MHz and having a physical height of 40 x 0.375 = 15m. At this frequency an acceptable performance could still be obtained with the antenna at a height of 10m, although the vertical radiation pattern would be different.

The vertical radiation pattern shown in Fig. 2.7 is for an antenna at an electrical height of 0.5 wavelength above ground, with the angles of maximum vertical radiation at approximately 30 degrees - i.e. with the 2 main lobes at 30 and 150 degrees respectively. At an operational frequency of 14MHz the physical height of the antenna would be in the region of 10m. To obtain the same pattern for 7MHz this height would have to be raised to about 20m.

The examples given apply generally to the vertical radiation from long wire antennas for the h.f. spectrum and operated harmonically. Therefore when there is some restriction on physical height at which an antenna, or antennas, can be erected, so the magnitude and angles of vertical radiation will be bound by that height. The fact that the electrical height becomes greater as the frequency of operation is increased is an advantage as far as the higher frequency bands are concerned, as the lower angles of radiation allow longer skip distances when

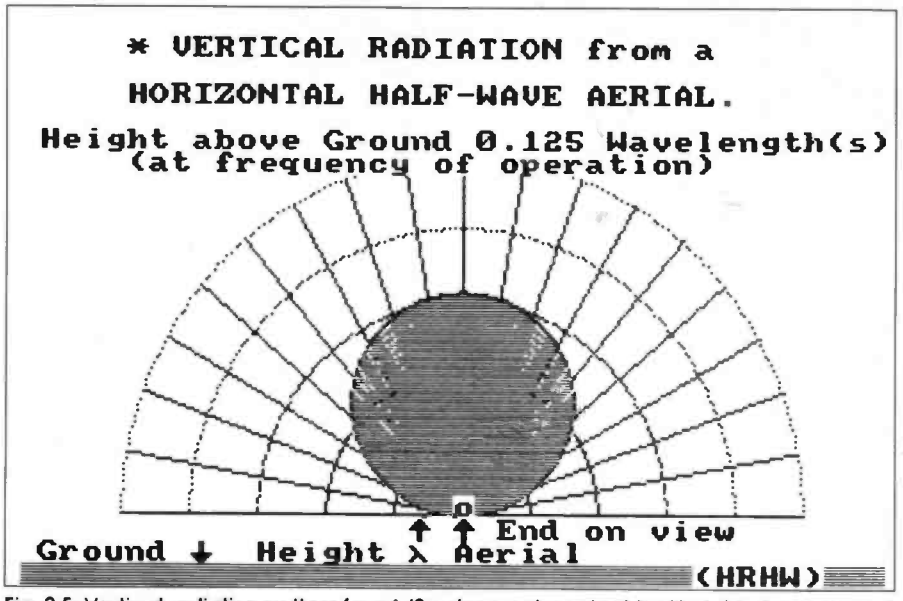

Fig. 2.5: Vertical radiation pattern for a λ/2 antenna at an electrical height above ground of λ/8 at operational frequency.

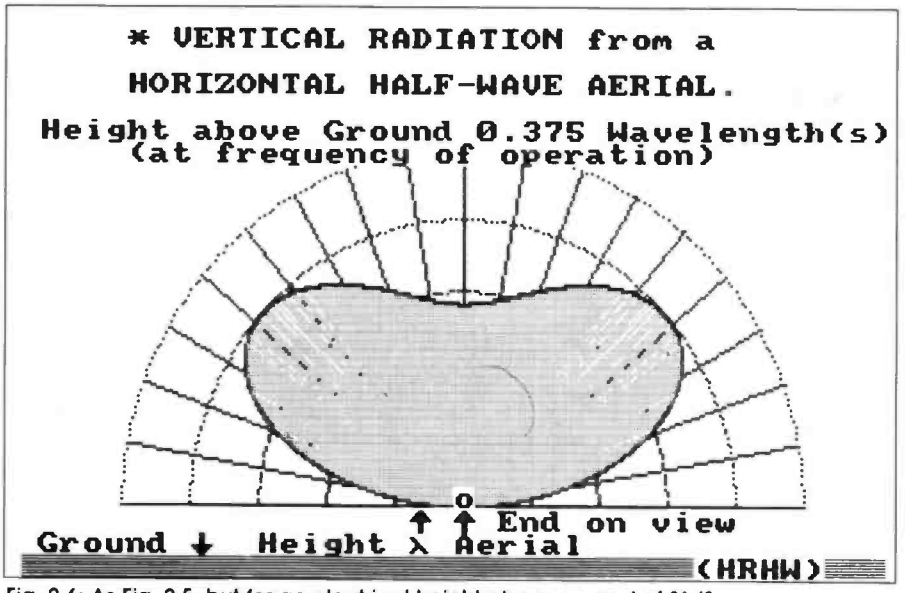

Fig. 2.6: As Fig. 2.5, but for an electrical height above ground of 3λ/8.

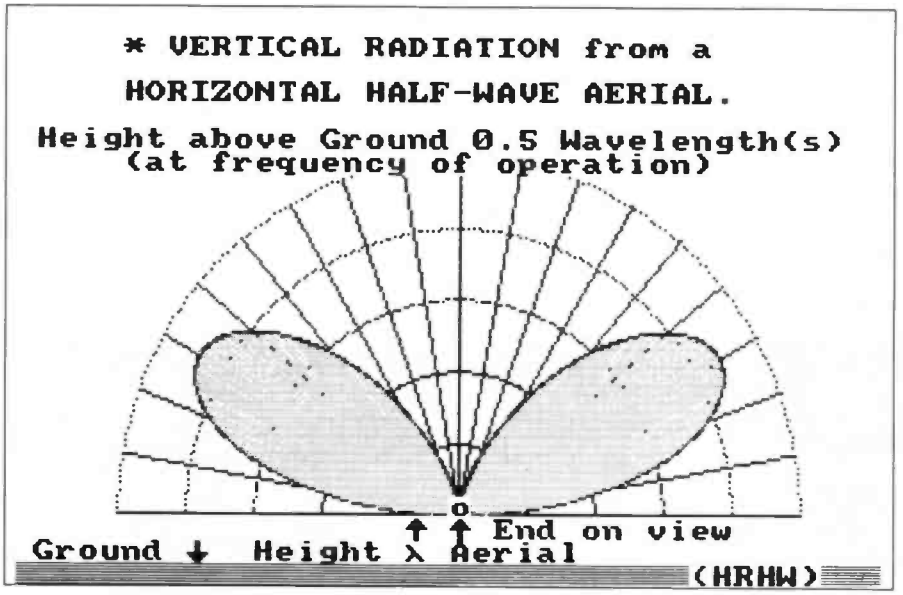

Fig. 2.7: As Fig. 2.5, but for an electrical height above ground of λ/2. See text for details.

☞38

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Harrods Ltd., Radio & TV Dept., Brompton Road, Knightsbridge, London SW1X 7XL.

Knightsbridge Electronics, 155 Knightsbridge, London SW1 7PA.

LeSet Ltd., 115 Fulham Road, London SW3.

PNR Audio Vision, 28 Tottenham Court Road, London W1P 9RB.

Welbeck Video Ltd., 26 Tottenham Court Road, London W1.

Selfridges Ltd., Radio & TV Dept., 400 Oxford Street, London W1A 1AB.

Wallace Heaton Ltd., New Bond Street, London W1.

Berrys of Holborn, 37-39 High Holborn, London WC1.

Westminster Audio, 169 Piccadilly, London W1.

Galaxy, 230 Tottenham Court Road, London W1.

Spatial Audio & Video, 29 Tottenham Court Road, London W1P 9RE.

Massey Radio Ltd., 117 Chiswick High Road, Chiswick, London W4.

David Ingram (Hi-Fi Centre), 42-43 Lower Marsh, Waterloo, London SE1.

Alvabond, 70 Ballards Lane, Finchley, London N3.

Goodwins, 7 The Broadway, High Road, Wood Green, London N22.

Southern England: Suttons Limited, Bournemouth Sony Centre, The Quadrant, Bournemouth BA1 2AB.

Milton's Audio Visual Ltd., Southampton Sony Centre, 29 London Road, Southampton, Hants. SO1 2AD.

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J. O. R. Gilbert, 35a High Street, Baldock, Herts.

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Videovision, Kingston Sony Centre, 40 Fife Road, Kingston upon Thames, Surrey.

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Whomes Centre Limited, 32 The Mall, High Street, Bromley, Kent BR1 1TR.

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R. Jones Ltd., 60 High Street, Whitton, Middlesex.

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Gerald Giles Sony Centre, 37 St. Stephens Street, Norwich, Norfolk NR1 3QN.

R. N. French, 16 Queens Parade, Hastings, East Sussex.

Manns Radio, 52 St. James St. Brighton, East Sussex.

Malcolm Audio & TV Ltd., 12 South Street, Chichester, Sussex PO19 1EH.

South Midlands Communications, SM House, School Close, Chandlers Ford Ind. Estate, Eastleigh, Hants. SO5 3BY.

Barretts of Canterbury, 1 Rose Lane, Canterbury, Kent.

Paul Dogra & Sons, 6 High Street, Slough, Berks.

Allders Dept. Store, Radio & TV Dept., North End, Croydon, Surrey.

Tru-Fi Sound & Vision, 2 Central Parade, London Road, Redhill, Surrey.

Tru-Fi Sound & Vision, 10-12 Grosvenor Road, Aldershot, Hants.

Tru-Fi Sound & Vision, 10 Church Street, Leatherhead, Surrey.

Lyles (Worthing) Ltd., 224 Findon Road, Findon, Worthing, Sussex.

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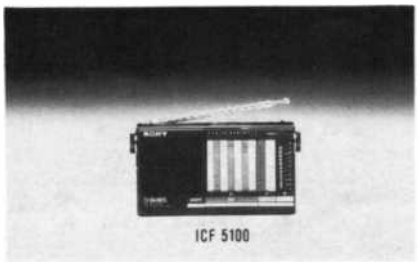

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Loughton Photographic Limited, Chelmsford Sony Centre, 1-4 West Square, High Chelmer, Chelmsford, Essex CM1 1XS.

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Waters & Stanton Electronics, 12 North Street, Hornchurch, Essex.

Merrow Sound, 34 West Street, Horsham Sussex.

Merrow Sound, 45 Commercial Way, Woking, Surrey.

Merrow Sound, 22 Tunsgate, Guildford, Surrey.

Merrow Sound, 5 High Street, Epsom, Surrey.

South West England: Ron Millard, 31 Southgate Street, Bath, Avon BA1 1TP.

Tape Recorder & Hi-Fi Limited, Bristol Sony Centre, 8-10 Bond Street, Broadmead, Bristol BS1 3LU.

Tape Recorder & Hi-Fi Limited, Weston Sony Centre, 4 Waterloo Street, Weston-Super-Mare, Avon.

C. F. Loader, Plymouth Sony Centre, 20 Armada Centre, Armada Way, Plymouth, Devon PL1 1LE.

Hickmans Limited, Swindon Sony Centre, 39b Havelock Street, Swindon, Wiltshire SN1 1SD.

J. P. Williams Limited, Exeter Sony Centre, 15 Paris Street, Exeter EX1 2JB.

J. P. Williams Limited, Barnstaple Sony Centre, Holland Walk, Barnstaple, N. Devon EX31 1DW.

Battarbee's Limited, Taunton Sony Centre, County Walk, Taunton, Somerset TA1 3TZ.

Bee-Jay Television Ltd., 22 Clifton Down Shopping Centre, Whiteladies Road, Clifton, Bristol BS8 2NN.

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Visibly Sounder, 100 Union Street, Torquay, Devon.

Moss of Bath, 45 St. James Parade, Bath BA1 1UQ.

Upton Electronics, 31 Torquay Road, Paignton, Devon TQ3 3DT.

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C.T.S., 3 Regent Grove, Leamington spa, Warwickshire CV32 4NN.

C.T.S., 58 Evesham Walk, Kingfisher Centre, Redditch, Worcester B97 4HA.

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Stuart Westmoreland Limited, Derby Sony Centre, 2c Albert Street, Derby DE1 2DS.

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Witney Audio Centre, 29 High Street, Witney, Oxon.

David Buswell, 5 Talisman Square, Kenilworth, Warwickshire.

Russell Acott, 124 High Street, Oxford, Oxon.

S. May (Leicester) Ltd., 27 Churchgate, Leicester.

Seymour Chemist Limited, 5 High Street, High Wycombe, Bucks. HP11 2AZ.

Fenway TV, 8 Victoria Way, Newmarket, Suffolk.

University Audio, Peas Hill, Cambridge.

Ringjay Electronics Limited, Coventry Sony Centre, 73 Lower Precinct, Coventry, West Midlands CV1 1DS.

R. C. Snelling, Blofield, Nr. Norwich.

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Ray Withers Communications, International House, 963 Wolverhampton Road, Oldbury, W. Midlands.

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E. W. Hewitt Limited, Warrington Sony Centre, 48 The Mall, Golden Square, Warrington, Lancashire, WA1 1QE.

Peter Bamford Limited, Hull Sony Centre, 42 Paragon Street, Hull, North Humberside HU1 3ND.

Jones of Oakwood Limited, Leeds Sony Centre, 103 Vicar Lane, Leeds LS1 6PJ.

Jones of Oakwood Limited, Wakefield Sony Centre, 35 Cross Square, Wakefield, W. Yorks.

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Whiteleys, Deansgate, Blackpool.

Ball Bros., Bacup Road, Rossendale, Lancs.

J. G. Windows, 1-7 Central Arcade, Newcastle-upon-Tyne.

Goodrights Limited, Preston Sony Centre, 98/100 Fishergate Walk, St. Georges Centre, Preston, Lancs. PR1 2NR.

Fenhams, 119 Grainger Street, Newcastle-upon-Tyne.

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Radiocraft Sonus Ltd., 231 High Street, Swansea SA1 1NY.

Tele-Electrical Services, 9 The Brackla Street Centre, Bridgend, Mid. Glamorgan CF31 1DD.

Northern Ireland: F. Rea & Co., 24-30 Chichester Street, Belfast, Northern Ireland.

Laser Electrical Ltd., Unit 3, Abbey Trading Estate, Newton Abbey, Northern Ireland.

Audio Times, 85 Royal Avenue, Belfast, Northern Ireland.

Channel Islands: Reg Mauger (Sales) Ltd., 20 Halkett Place, St. Helier, Jersey, C.I.

Soundtrack, 1 Church Square, St. Peter Port, Guernsey, C.I.

C. R. Regent, 49 Halkett Road, St. Helier, Jersey, C.I.

SCANNING

Alan Gardener

Icom Modifications

I wonder if ARE Communications got the idea for the ICR-7000 h.f. after "scanning" the July column in which I described the use of convertors? Well whatever gave them the idea, the end result - a receiver with a frequency coverage of d.c. (almost) to 2GHz is worthy of further mention. The extended frequency coverage is provided by an internally fitted convertor and some clever switching circuitry. The new range is selected by pressing what was originally the display dimmer switch (the display is now permanently on full brightness). This changes the display to show the correct frequency and the speech synthesiser, if you have it fitted, also speaks it correctly. The modification also selects a new bank of 100 memories and additionally switches the h.f. antenna socket into use, originally the rear panel "spare" phono socket.

Performance is reported to be good with little overloading on strong signals being evident. Another common problem also seems to have been minimised by careful design - that is one of the signals present in the frequency range used at the output of the convertor "leaking through" and causing interference to the wanted signals. This is particularly important as part of the f.m. broadcast band is used in the conversion process and could otherwise cause problems if you live near a high power f.m. transmitting station.

The only slight problem with this modification becomes noticeable when you enter frequencies directly using the keyboard. To do this you have to remember to add one hundred to the wanted frequency. ARE Communications ease this problem, if it really is one, by programming the first 30 memories to cover the range 0-30MHz. The nearest MHz to the wanted frequency is then selected with the memory knob and fine tuning achieved by use of the main dial.

If you already own an R7000, ARE Communications offer a modification service, so this could be a cheap way of obtaining a good quality general coverage receiver with features normally only present in more up-market models. Contact ARE Communications Ltd, 6 Royal Parade, Hanger Lane, Ealing, London W5A 1ET. or ring 01-997 4476 for further details.

My spies have been busy again, this time they have spotted an interesting looking scanner in one of the Japanese amateur radio magazines. The receiver is being advertised under the Standard name, and is believed to be one of the first scanners to be produced by this company, normally known for its range of amateur radio equipment.

Reading between the lines, or in this case the rows of Japanese script, it would seem to include all the usual features including frequency coverage of 50-905MHz along with one rather novel feature. This is a small l.c.d. display which gives a panoramic frequency display centred on the received frequency. It is not clear what sort of resolution the display can give but a span of 1MHz seems a reasonable assumption. Just the thing if you want to keep an eye on activity over a small frequency range - an amateur band for example.

I am not too hopeful with regard to its introduction into this country, as so many products which appear on the Japanese home market never make it to these shores, the Japanese first testing the product before deciding on large scale production. However, on the plus side it may give an indication to the trends we are likely to see when the next range of super-scanners become available.

Rather a mixed selection of items this month starting with a quick look at new products, followed by some useful information on what you can hear in the frequency band 25 to 54MHz and ending with some answers to readers' problems.

What Can I Hear?

This is a question that I am frequently asked so I thought that each month it would be a good idea to examine various portions of the frequency spectrum and see who or what occupies each part. This month I take a look at the range 25 to 54MHz which happens to be the lowest frequency band on many popular scanners.

At first sight, this band of frequencies may seem a little odd to be included on a scanning receiver for use in this country. You may be thinking that, apart from CB on 27MHz and the odd amateur on 50MHz, you never hear anything on this range. So let's take a closer look - starting at 25MHz and working our way upwards the first group of users are likely to be the CB operators. These are officially limited to a frequency band centred on 27MHz but many illegal operators tend to spread outside these limits using modified equipment in order to avoid the congestion present on most of the official channels.

Although not too much of a problem in the UK you have only to take a quick listen to many of the accents in order to determine which countries have major problems. Mixed amongst the CB channels you may hear the odd sequence of tones or bursts of data, these are generally tone paging systems or model control transmitters. Both of these were allocated to this band in the UK well before the advent of CB and are now gradually being moved to new frequencies as existing equipment is replaced.

Reception of frequencies around 27MHz is very much affected by atmospheric conditions, with low power long distance communications being possible at the height of an eleven-year sunspot cycle. The rest of the time conditions generally only permit local communications, but if you monitor long enough you may hear the occasional surprise.

28MHz marks the lower edge of the 10-metre amateur band, again propagation varies with the sunspot cycle but some form of activity can usually be heard most of the time. The frequencies around 28.2 to 28.3MHz are assigned to beacon stations. These are situated in various locations around the world and continuously transmit a Morse code callsign. By listening to these stations amateur operators are able to quickly check on propagation conditions and by identifying the callsign of the beacon can tell with which countries it is possible to communicate. Most operators on the 10-metre band use Morse code or single-sideband but some narrow band f.m. may be heard around 29.6MHz as many amateurs have taken advantage of cheap CB sets modified to operate on 10 metres. Take a listen for the many n.b.f.m. repeater stations that operate in this section of the band.

Many of the US stations have remote control facilities which allow the operator to speak into a low powered 2-metre handheld transceiver and be cross-patched onto the 10-metre repeater. This allows them to talk to the world whilst walking down the street using just a few hundred milliwatts of power. Quite mind blowing when you first hear it!

The top end of the amateur band is at 29.7MHz. Above this is a strangely silent region where the short wave bands start to behave more like the v.h.f. and u.h.f. bands the scanner user is familiar with. Under good propogation conditions frequencies in the range 30-41MHz can be very interesting with many stations such as US police, fire and taxi services being detectable. Which gives a clue to the reason this range is included on many scanners, as in the US many public service bodies use the low frequency v.h.f. bands for communications. Unlike the UK where 12.5 or 25kHz channel spacings tend to be normal, in the US 10, 15 or 30kHz spacings are used. So to be on the safe side use 5kHz steps when searching this particular band.

Some UK paging signals may be heard around 31.7MHz and a new model control allocation, strictly for model aircraft use only, has been established at 35-35.2MHz, but apart from these two signals, all you are likely to hear most of the time is hash from home computers - which for some reason tends to be more prevalent in this region of the radio spectrum than at the lower frequencies.

Creeping up in frequency still further we encounter the range 41-47MHz. This used to be the lower portion of the old 405-line Band I TV service but has now been withdrawn in the UK. However, many European countries still use the band for TV broadcasting. Tuning around with a.m. selected usually results in either vision carrier buzz or, if you are lucky, TV sound being heard.

One other user of this band you are less

SCANNING

The AOR 2002 scanning receiver is a popular choice for controlling with a home computer.

likely to hear is the military. The frequency range 30-76MHz is allocated internationally for military use, but of course this has to be slotted in-between the other users of the band. Most equipment uses 25kHz channel spacings and narrow band f.m. but careful use of equipment, low power operation, and frequent channel changing, makes detection tricky. The latest generations of equipment in service make this even more difficult by either scrambling the speech or by using some form of frequency hopping system where the operating frequency changes many times a second.

The frequency range 47-50MHz is new allocation in the UK and is designated for use by low power devices which do not require a licence.

Typical of these products are cheap radio controlled models, wireless intercoms and baby alarms, remote car alarms and the handset to base links for cordless telephones. This band is likely to become increasingly active as more products become available.

Another new allocation spanning 50-52MHz is the amateur 6-metre band. This is proving to be popular with many operators as it is in many ways similar to the lower frequency 10-metre band but with a few exciting characteristics of its own. Again, beacons occupy the lower portion of the band with most other activity being either morse, s.s.b. or n.b.f.m. In the UK amateurs using this band have to use relatively low power and horizontally polarised antennas. This is in order to avoid interference with the TV stations in Europe still using this part of the spectrum. As most antennas used with scanning receivers tend to be vertically polarised you may find that the UK stations you hear could be fairly weak. This is due to the cross polarisation loss resulting from the differently polarised antennas. With longer distance stations this becomes less of a problem as the polarisation of the received signals tend to vary as a result of multiple reflections.

Finally, the remaining 52-54MHz. In the US this is a continuation of the 6- metre amateur band but back in the UK its use tends to be the same as the 41-47MHz allocation.

More next month as we venture further upwards in frequency.

Help Wanted

One of the more interesting aspects of writing this column is receiving your letters. These cover a very large range of subjects and often bring to my attention aspects of the hobby which I had not considered before. Many letters ask for further information on particular subjects and although I can help in many cases I am sure that many people reading the column may be able to contribute more knowledge on particular topics - perhaps you may be able to help the following readers. I will of course pass on any information I receive.

D. L. Miles of Ipswich is a keen sailor and was prompted to write to me after reading about the Decca navigation system mentioned in the October column. He uses an Amstrad PCW8256 computer on board his yacht for navigational purposes and wonders if it is possible to use the computer to process the received signals and hence determine bearings. I suspect that a large amount of signal processing would have to be done externally from the computer in order to avoid the plague of computer generated hash - especially at the low frequencies used in the Decca system. Being a "landlubber" myself this question is a bit out of my "depth" but I am sure that one of the many readers of this column may be able to "fathom" out a suitable hardware/software package - if one is not already available.

John Taylor of Twickenham is interested in contacting readers who operate the Aircastle scanner computer or the AOR RC pack in conjunction with an AOR-2002 scanner and BBC computer. John is particularly keen to obtain information relating to software for the RC pack but would be interested in any general comments connected with the operation of either system.

D. H. Pickles of Burnley owns a Bearcat 100XL handheld scanner and wonders if anyone has modified this particular receiver for operation from an external power supply. In addition any way of providing manual a.m./f.m. switching would be appreciated.

Finally anyone who wants to exchange information with other scanner users. If you would like to take part in this scheme - drop me a line giving me an idea of the sort of information you would like to exchange, the scanner you own, plus any additional information you feel may be of interest. Enclose an s.a.e. and when I get a reasonable number of replies I will return a copy of the list to you.

In the interests of crime prevention I am not too keen on including full postal addresses but just giving a phone number may be one solution. As usual all letters to PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - good listening. □

Abbreviations

CB	Citizens Band
f.m.	frequency modulation
GHz	gigahertz
h.f.	high frequency
kHz	kilohertz
l.c.d.	liquid crytal display
MHz	megahertz
n.b.f.m.	narrow band frequency modulation
s.s.b.	single sideband
TV	television
v.h.f.	very high frequency

Frequency Allocations
25-54MHz

Frequency (MHz)	Service
25.000	Illegal international CB operation
26.960	US & New European CB allocation UK Paging & Model control
27.405	Illegal international CB operation
27.600	UK CB allocation
28.000	10-metre amateur band
29.700	International military US Public service
31.725	UK Radio alarms International military US Public service
31.775	International military US Public service
34.925	UK Radio alarms International military US Public service
35.000	UK Aircraft models International military US Public service
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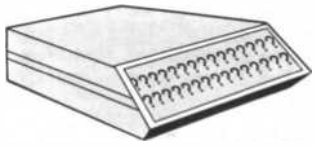

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AIRBAND

Godfrey Manning G4GLM

All the usual news, views and frequencies, together with some useful hints on antennas for airband scanners, as we fly into 1989 with Godfrey.

The first news this month is that conflict alert is planned for use at the London Air Traffic Control Centre (LATCC). This Centre uses a multiple- redundancy IBM 9020D computer system for preparation of repetitive flight plans, printing of flight progress strips (on which the controller records the different stages that each flight has reached) and enhancement of radar displays. This last function includes code - callsign conversion, where the squawk number received from an aircraft's secondary surveillance radar transponder is actually displayed as flight number and destination - only possible if the computer knows which squawks have been allocated to which flights.

Conflict alert is an extra feature that examines the estimated future tracks of known radar traces and raises an alarm if it seems likely that any two aircraft are on a collision course. Unfortunately in the Terminal Manoeuvering Area (t.m.a.) all aircraft descending for the same runway tend to be in conflict with each other, causing too many false alarms! Hence the system has not been implemented until now. Even so, the alert will only be applied to aircraft above FL250, south of the Manchester control zone and north of the London t.m.a. Although "live" date was originally set for 17 November 1988, it seems as though the system will now be switched on later than this.

While on the subject of radar, one more squawk code for your collection is the parachute dropping conspicuity code of 0033. Transponder usage is mandatory above FL100, an altitude from which it is not unknown for parachutists to be dropped.

Lesson of the Month

How does a Max Holste Broussard come to land on a motorway? In common with another accident described in the Department of Transport's Air Accidents Investigation Branch *AAIB Bulletin 11/88* this was caused by oil on the windscreen obscuring the pilot's vision. The cause of the oil leak, in this case loss from the hydraulic propeller pitch change mechanism, also meant that engine power was lost at the same time that visibility became obscured. Safety tip: extraneous oil, on the windscreen or elsewhere, might not look like much of a problem in its own right; but the source of the oil leak could catch you out in mid-air! On the subject of accidents these are investigated by the AAIB and not the Civil Aviation Authority (CAA) since the latter, being a regulatory body, is not considered impartial if there is ever any suggestion that different regulations could have averted the accident.

You Write

From Tamworth, Staffordshire, regular correspondent **Geoffrey Powell** reminds us that any frequency could carry distress traffic in an emergency, and cites 8863kHz as an example. Of course signals on h.f. allocations such as this one could be received over a considerable distance.

Dave Taskis (Romford, Essex) works on some of the *Radio Regulations* by profession. To satisfy **Dave Lawrence's** request (December 1988 "Airband") the Ibsley v.o.r. beacon (IBY: di-dit, dah-di-di-dit, dah-di-dah-dah, 115.9MHz, 50°53'34" N 00°144'40"W) was replaced by the Southampton v.o.r. sometime since 1975 (SAM: di-di-dit, di-dah, dah-dah, 113.35MHz, d.m.e. channel 80Y, 50°57.28'N 001°20.61'W). Airways R8 and R37 are among those passing SAM, but R1 (which overflew IBY) is now too far to the east and goes to Midhurst.

Dave previously reported the electromagnetic incompatibility between different scanners ("Airband" July 1988): his Sony Air-7 was being interfered with by the inner workings of his AR2001. Lining the inside of the latter's plastics case with aluminium foil (using an adhesive which does not dissolve the plastics) did the trick. By the way, congratulations on the addition to your family: hope she takes an interest in aviation too!

When working in Geneva, Dave met one of the International Telecommunications Union staff who ran simulations on a mainframe computer which included calculating the guard band necessary for i.l.s. (see "Airband" December 1988). Dave thinks the h.f. allocations within the 2.85-22.00MHz limits are safe for some time to come.

Antennas seem to be a current problem for **Des Brommage** (Westbury-on- Trym, Bristol). Civil aircraft communicate on two different frequency allocations for which separate antennas are recommended: v.h.f. which uses amplitude modulation, a.m; and h.f. which uses upper sideband (u.s.b. or s.s.b.). I'm not sure what you intend by an "f.m. aerial" as, in a way, there's no such thing; any antenna will receive any mode of modulation on the frequency for which it is designed. It's important to remember that a.m., f.m. and s.s.b. are all different modulation modes and could (theoretically) be applied to any frequency. The modulation is the means of mixing the actual speech information in with the basic radio carrier wave. If it wasn't for speech modulation, the only way that useful information could be sent would be to turn the carrier on and off according to some predetermined regular pattern; this is, of course, how Morse code works.

So, we've decided that there are two main frequency allocations although some receivers, the Sony ICF 2001D included, are capable of tuning to both of these. On v.h.f. signals are limited to line of sight for most of the time, although certain freak "lift" conditions can boost this considerably on some days in the year. Aircraft remain in "line of sight" whilst further away than ground stations because of their altitude above the horizon (simple geometry will confirm this if you'd like to draw it out, remembering that the horizon is apparently where it is due to not being able to see over the curvature of the earth). An ordinary dipole or ground plane, cut roughly for the middle of the band in use, will suffice for v.h.f. In the January 1988 "Airband" there are details of a dipole in which each half is 562mm long. Install it as high as possible, outdoors being better than the loft.

How about h.f.? Propagation is much more variable and depends not only on time of day but also season of the year, phase of the sunspot cycle, other solar activity, etc. Sometimes it's actually easier to hear distant rather than local stations because the ionospheric skip happens to be working that way! Have a look at Brian Oddy's "Starting Out" articles, especially in some of the earlier editions of this magazine. The antenna that you might use here could be a long wire. It probably doesn't matter if it has an odd shape, e.g. with the far end drooping vertically for a

short way. The antenna can be electrically separated from whatever it's tied to by using insulators of the "china egg" or "dog bone" pattern (don't try eating either type!) which are doubtless available from advertisers in this magazine. When not in use, the wire should be earthed as an anti-static precaution.

Alternatively, a permanently connected spark gap can make the earth connection and will not leak any significant amount of wanted signal away. Of course, there is one last piece of equipment to be recommended: an antenna tuning unit. These can be made relatively simply or purchased, in which case remember that you only need a cheap low power device for listening. Transmitting, in which you are not involved, would be a different matter. To answer your question, I was not previously aware of the Ontario DX Association of Canada. Hope all of this is some help.

I also think that some of the foregoing comments will be of interest to **C.R. Wiltshire** (Coulsdon, Surrey). I can't explain why Radio Moscow and Radio Finland break through on the v.h.f. of your ICF 2001D; I assume that you reconfirmed the frequency to which you were tuned and that the antenna connections were all correct. I can only suggest consulting your dealer from where the set was purchased. If the outcome has

implications for all ICF 2001D owners, please tell me so that I can print it here.

Frequency and Operational Changes

Magnetic north is on the move as always and the magnetic headings of some runways have therefore changed. Blackpool's 08/26 is now 07/25; Rochester's 03/21 is now 02/20 and Seething's 07/25 becomes 06/24. London (Stansted) is to have new taxiways on its south side and some holding points have already been redesignated. At Fairoaks 16/34 has been withdrawn; the Brooklands helipad has also gone.

From the frequency point of view, Luton Tower (originally 120.2MHz) is now on 119.975 and the tower at London (City) changes from 119.425 to 118.075MHz. Lastly, the CAA has published one recent change in the *General Aviation Safety Information Leaflet 11/88* : Prestwick has a new ground frequency available of 121.8MHz.

That's it from me; it's parked on the blocks until next month. Thanks to all who write. □

Abbreviations	
a.m.	amplitude modulation
CAA	Civil Aviation Authority
f.m.	frequency modulation
h.f.	high frequency
i.l.s.	instrument landing system
kHz	kilohertz
MHz	megahertz
mm	millimetre
s.s.b.	single sideband
t.m.a.	terminal manoeuvering area
u.s.b.	upper sideband
v.h.f.	very high frequency
v.o.r.	v.h.f. omnidirectional radio range

STARTING OUT

Brian Oddy G3FEX

In the early receivers, the selectivity was in general so poor that listeners encountered little difficulty in tuning them to the wavelength of a station. Poor selectivity was of little consequence because the choice of station was very limited. As the number of stations increased however, the provision of adequate selectivity became an essential requirement and tuning the receivers then became a good deal more critical.

With the advent of the superhetrodyne receiver adequate selectivity could easily be obtained by using sharply tuned low intermediate frequency (i.f.) amplifier stages - see page 31, *SWM* January'88. It then became necessary to tune-in a wanted signal correctly if distortion and adjacent channel interference were to be avoided. Accurate tuning became more difficult when automatic gain control (a.g.c.) systems were incorporated into superhet receiver designs because their automatic compensation in gain for wide variations in signal level tended to mask the correct tuning point.

Tuning Indicators

To ease the problem, receiver manufacturers set about providing some form of tuning indicator. A number of ideas were tried, but one design became especially popular since it required just two inexpensive components, namely a neon bulb and a resistor! The design was based on the fact that the current flowing through an a.g.c. controlled i.f. amplifier falls with an increase in incoming signal level - see **reverse a.g.c.** on page 29, *SWM* November 88. Although this indicator was used in valved receivers from the mid-1930s, the underlying principle still forms the basis of some modern tuning indicators, so let us briefly consider the operation of this simple device.

The basic circuit of an i.f. amplifier using a variable-mu pentode valve is shown in Fig. 1. Resistor (R1) and capacitor (C2) are the normal anode decoupling components. The value of the additional resistor (R2) is chosen so that under no signal conditions the voltage applied to the neon (N) is just below that necessary to make it glow. An incoming signal will result in a negative a.g.c. potential being applied to the control grid of the valve, thereby causing its anode current to fall. The reduction in anode current results in less voltage drop across R1 and a rise in the potential applied to the neon, causing it to glow.

An increase in signal level will further reduce the anode current and raise the potential applied to the neon, causing it to glow more brightly. The correct tuning point is therefore indicated by maximum glow. A special tubular shaped neon called a tuneon, with a cathode in the form of a rod, was used in this circuit in later receivers. The strength of the incoming signal and hence the applied potential determined the extent of the glow up the rod.

A more sensitive and accurate tuning indicator was subsequently developed by valve manufacturers. Known as a magic eye, it consisted of a miniature cathode ray tube combined with a triode valve amplifier in a single glass envelope. A luminous pattern appeared on a circular screen called the "target anode", which was viewed through one end of the valve.

Many listeners experience some difficulty in determining whether or not a receiver is accurately tuned to the frequency of an incoming signal. With this in mind, a number of visual aids have been developed over the years which enable the correct tuning point to be ascertained. The operation of some simpler aids is also described.

Magic eye tuning indicators with side contact bases (EM1) were fitted to a few pre-war receivers, but octal based magic eye indicators (Y63) were produced in large quantities during WW2 and were employed in many post-war domestic sets until a much smaller B9A based magic eye (EM80) was introduced in the late 1950s. In contrast to the earlier types, it was mounted vertically and the display was viewed through the side of the tube. Most of the domestic v.h.f. receivers manufactured for the then new BBC f.m. service included a magic eye (EM80) as an aid to tuning in the broad signal. The production of these receivers continued until the demise of the valve in the mid-1960s.

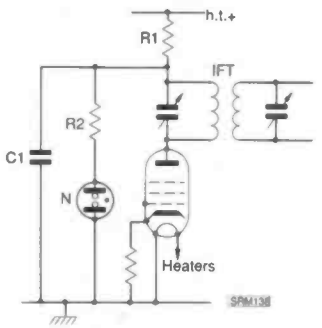

Fig 1.

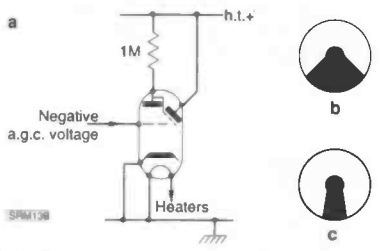

Fig 2.

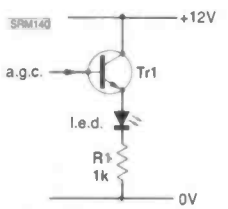

Fig 3.

Quite a number of Dxers still use the famous wartime R1155 RAF communications receiver which included an octal based magic eye (Y63) tuning indicator, so the operation of the magic eye is worth mentioning here. In this device the a.g.c. potential is applied directly to the grid of the triode section of the indicator as a negative bias, thereby controlling the anode current flowing through its very high resistance anode load (R1) - see Fig. 2a. The voltage drop across R1, hence the triode anode potential, therefore varies with incoming signal strength.

In the display section the electrons from the cathode are accelerated by the positive potential applied to the target anode and cause the fluorescent material on its surface to glow. A special control electrode placed between the cathode and the target is connected to the triode anode. It causes a shadow with sharp edges to appear on the screen, the extent of which can be varied by altering the electrode potential. The absence of an incoming signal results in little or no bias on the triode grid, so its anode current rises, the anode potential falls and a wide shadow appears on the screen - see Fig. 2b. When a signal is received, the bias increases, the anode current falls, the anode potential rises and the width of the shadow is reduced - see Fig. 2c. In contrast, a fan-shaped display appears on the target anode of the later (EM80) miniature magic eye. The display extends vertically upwards by an amount related to the level of the incoming signal, reaching the top of the target at maximum signal input.

Present day transistorised receivers frequently employ a light emitting diode (l.e.d.) as the tuning indicator. An l.e.d. consists of a *p-n* junction of crystal material made from gallium arsenide (GaAs), gallium phosphide (GaP), or a combination of them (GaAsP). When a forward bias is applied to the diode a luminous glow appears around the junction, the colour of which is determined by the type of crystal material employed - red, green and yellow diodes are currently being manufactured. The intensity of the glow is largely determined by the current flowing through the junction, typically 10mA at maximum brilliance. Provided the maximum current is not exceeded, the life of an l.e.d. is likely to be in excess of 50 years.

In some types of l.e.d. the *p-n* junction is mounted in a small tubular plastic container. The two connections are brought out at one end and the light is emitted at the opposite end through a domed shaped cap. In a later type the junction is encapsulated within a rectangular diffused epoxy package, which provides a uniform lighted surface area measuring just 2mm by 5mm. The basic circuit of a simple tuning indicator

STARTING OUT

employing an l.e.d. is shown in Fig. 3. The emitter follower configuration has been adopted for the transistor (Tr1) because it offers a high input impedance which may be connected directly across the receiver a.g.c. line. It also provides a low impedance current source for the l.e.d. The resistor (R1) limits the maximum emitter current to a safe value for both the l.e.d. and the transistor when the latter is being biased hard into conduction.

The presence of an incoming signal will result in a potential on the a.g.c. line which will be applied as a bias to the base of Tr1 bias and cause it to conduct. The level of incoming signal and hence the resulting emitter current may be sufficient to cause the l.e.d. to glow. A rise in incoming signal level will bias Tr1 harder into conduction and the increased emitter current will result in a greater intensity of light from the l.e.d.

In some of the more advanced solid state receivers a series of l.e.d indicators are arranged in the form of a bar graph to display the level of incoming signal. The a.g.c. potential is applied to the base of a series of Darlington pair emitter follower stages in an integrated circuit known as a bar driver which is used to control the point at which each ascending segment of the bar graph is illuminated.

A moving coil micro-ammeter is employed in some of the more expensive designs and in most communication receivers to enable the relative strength of incoming signals to be ascertained. A number of interesting circuits are used and the operation of some of them will be outlined next month. □

Abbreviations	
a.g.c.	automatic gain control
f.m.	frequency modulation
i.f.	intermediate frequency
l.e.d.	light emitting diode
mA	milliampere
mm	millimetre
p-n	*p*-type-*n*-type semiconductor junction

ANTENNAS

☞27

propagation is via the ionospheric "F" region and the prevailing critical frequency is favourable(1).

Vertical Antennas for HF Operation

At the lower frequencies fully resonant verticals - i.e. without inductive loading to maintain the correct electrical length - would be so tall as to be impractical. For example, even a quarter-wave vertical tuned against ground for 1.8MHz would have a physical height in the region of 40m, as would a λ/2 vertical for 3.5MHz. In practice such antennas are inductively loaded so that smaller lengths of open conductor are required, allowing for more practical physical heights with the base of the antenna at ground level.

We will continue with these themes next time. □

References

(1) *Radio Wave Propagation (HF Bands)* by F.C. Judd, Heineman, London. (Available from SWM Book Service)

(2) *Antenna Radiation Patterns Computerized* by Dr L.W. Brown and F.C.Judd, *Practical Wireless*, Feb/March '87.

Abbreviations	
BCI	broadcast interference
dBd	gain relative to a dipole
ft	foot
h.f.	high frequency
λ	wavelength
λ/2	half wavelength
m	metre
MHz	megahertz
r.f.	radio frequency
s.w.	short wave
s.w.l.	short wave listener
TVI	television interference
u.h.f.	ultra high frequency
v.d.u.	visual display unit
v.h.f.	very high frequency

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In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit board for the *SWM* Audio Filter, July '87 issue, is available price £2.75. The printed circuit board for the *SWM* Active Weather Satellite Antenna, June '88 issue, is available price £4.20. Orders to Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Prices of p.c.b.s include VAT and P&P.

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AMATEUR BANDS ROUND-UP

Paul Essery GW3KFE

PO Box 4, Newtown SY16 1ZZ

This is being written while contemplating the damage to the bank balance caused by Christmas; and it provoked the thought, "If I wanted to get started in this s.w.l. game but can't afford one of these expensive new receivers, how do I do it?"

In answer, there are basically two ways. Either build — whether from first principles or by way of a kit — or buy an older used receiver. For a start, be aware that neither of these routes need limit the DX you can hear. As I write, I have on the bench a very basic receiver for 3.5MHz to a published circuit, and the main rig; with a switch in the antenna lead, I have established beyond any doubt that the little basic receiver with no "trimmings" hears everything noted by the main receiver. Perhaps, with somewhat less selectivity, it takes rather longer to be certain you have the DX station under the pile-up; and it is a mite harder on the ears.

What about all those "memories" and things? Most, if you read the instructions carefully, will be found to merely serve to enable you to go back to a frequency and mode you used yesterday, which in earlier years we did by noting-down the frequency, logging scale reading and mode in the log anyway! As for frequency accuracy, with either receiver one can guarantee to come back to a previous frequency without any reference to a digital readout, close enough at worst to be within the audio of the wanted signal.

Such a simple receiver covers just one band of course; so your next step would be to build a converter to cover whatever other ranges take your fancy in the bands up to 30MHz. Converters for v.h.f. and u.h.f. are equally possible. In sensitivity terms you will almost certainly achieve better than the "synthesised" receiver in the ads, if only because of the absence of synthesiser noise — though to be sure this is hardly significant below 30MHz unless the screening is poor; and of course a first essay in home construction will probably be poor in the way of internal screening.

The alternative is the used receiver. Here you must go carefully. Don't even consider it unless it comes at least with the circuit and component values; it would be preferable to have the handbook. If it is a valved receiver, bear in mind that valves are getting hard to come by, and check whether the ones used, or equivalents, can still be obtained. An earlier solid-state receiver, say pre-1975, will probably have some obsolete transistors built into the circuit, so again check into that. In addition it will have a limited dynamic range as compared with a valved receiver of the same vintage. This will make it more prone to blocking effects, countered to a large extent by greater use of the RF Gain control.

You must accept that in use the valved receiver takes a rather longer warm-up time, but you can say most of it will have happened after about twenty minutes; and since you will have a hand on the tuning knob all the time that is hardly a problem anyway; it only becomes a nuisance if you run it alongside a transmitter.

In purely operating terms, the older receivers win hands down. The 1989 vintage have gone overboard for push-buttons and micro-processor operation, while making the receiver ever smaller. Thus you need slimmer fingers, and to be able to memorise the complete instruction book as well.

However, the much older receivers, AR88D, HRO, CR100 and so forth have often been butchered but — make no mistake — they were, when in good nick, well worth keeping in service. Their weakness was usually the simple crystal filter used, which was far from ideal for s.s.b., although with care a suitable adjustment could be achieved. Once you had it set up for lower sideband and then upper sideband and had the positions marked, away you went; no more problem. And of course, one of these old-timers would also receive f.m. signals by "slope detection" — something we found out when a few people tried narrow band f.m. on the h.f. bands as a solution to the TVI problem. And of course to get on to u.h.f. or v.h.f., you can then build or buy a converter. If you have a shack of your own, as against a corner of the living room, you can build up a station that looks highly technical to the uninitiated even if the XYL doesn't like it (!) while knowing that it also is at least as good as the new shiny box of the chap down the road.

However, we must look at the bands and the letters.

The Bands

The winter solstice was on December 21, and marked a low point in the h.f. radio year. This is because the ionisation of the upper atmosphere layers on which we depend occurs thanks to the action of the sun. Thus with the short days, and also the low elevation of the sun at noon, the layers don't get so much done to them by the sun. In addition, in the Southern hemisphere, where it's summer, they are suffering the summer static problem. In essence, that's why the March and September Equinox times tend to be the best — everyone getting a fair crack of the sun and the static!

First a letter from **R. Pearce (Bungay)** who spent £20 and a couple of hours time constructing a two-transistor receiver. With it he logged, on 28MHz, K5RE, TA5C, WD8WED, W1CUX, WA4WDG, K1MBX, KP2A and VE2BYA; on 21MHz there were VK4NPM, K2JFK, K0WVO, W1NED; 14MHz yielded VP5GT, KC3RV, VE3LE, W2SWE, WB9BCL, K4LR, while a move on to Top Band, produced W1WRC. I think that Ron has underlined the message rather well!

Gordon Hudson (Sterling) has been using a Zepp cut for 24MHz for that band, with spectacular results; KD6EU, K6VV, K4II, N4EJK, W1BFT, NM1C, N9FC all calling together, not to mention VK5BJW and 8P9HT. Many DX stations use 24MHz s.s.b. (quite improperly) to work their QSL Managers in the USA. Turning to 21MHz, perhaps the star turn was PY7FNE who had a dipole and five watts, UA0CIM, JA5CV, JA3GCM, UL8CWA, CU3GD and ZS6BUD.

A nice card from **Costas Krallis G7AHN/SV1XV** (London W2) notes that the J42IFT mentioned in the December issue was in fact a special-event station from Thessaloniki, to celebrate the International Exhibition held their each September. Costas was able to operate the station back in September 1985.

Turning to **Ian Wye (BFPO 40)** from Germany, Ian says he wonders where does one get hold of the address of a station from whom you require a QSL. If he is a UK station, your first step is the operating frequency! Stick around the pile-up until he gives his QSL Manager's address or his own, as the case may be. If that doesn't work, you can look in the *UK Call Book* (RSGB) for UK station addresses, or for a foreign station you can turn to the appropriate volume of the *World Call Book*, which is stocked by RSGB and appears in the updated form around each New Year. However, one wouldn't want to bother with direct QSLing unless the chap definitely won't accept Bureau cards. Far better for the run-of-the-mill reports to send them through the Bureau, which means, in effect joining one of the groups which operate one; RSGB, for example, or ISWL. If one sends a QSL direct, with s.a.e., one always has the problem of obtaining foreign stamps to put on the s.a.e.

The majority of DX stations make use of a QSL Manager, to whom all the cards are directed; he receives the logs at intervals from the DX station and then checks the incoming cards against the logs, fills up the details on the outgoing card and shoots them off. Hence the note in a DX column or newssheet saying "A1ABC, QSL via B2DEF" Frankly, unless you are mad keen to obtain QSLs for wallpaper, the cost is excessive unless you use the Bureau.

It is sometimes argued the Bureau is too slow; in fact, no Bureau can afford to be slow, or it chokes in cards! What happens is simply that for example, you hear Joe Blow in BongaBongaland and send him a QSL. It reaches him fairly smartly, but he "sits on it" for weeks or months before sending off the return

card. Alternatively, he fails to keep enough envelopes in his incoming Bureau and the cards therefore have to be ditched. Either way, you haven't lost as much as the chap who encloses an s.a.e. and maybe a donation and still doesn't see his return QSL!

Now turn to **Philip Davies (Market Drayton)**, who refers to the UB5WE/P/RO mentions by D. R. Degg in the December piece. Philip is sure that this suffix said that UB5WE was in fact portable in Moldavia (RO or UO) which only has one Oblast. Had he been in an area where there is more than one Oblast (an Oblast is a sort of Russian version of a county) then he would have suffixed accordingly. In Russian callsigns, the location is explicit; the letters and number detail the Republic, while the first letter after the number tells you which Oblast he is in. Hence, if he is out portable he suffixes his home call with the detail to establish which Oblast he is operating from — rather as, say, an American, out portable adds his call area digit as a suffix — as W6AM/6 for example. The method is quite helpful for the DXer or s.w.l. too — after all, a UB5 is more or less QRM, but a UB5/UA0Z might be classed as rare DX!

Philip's own listening has been quite productive, with YV7EM (Margarita Is), YI0BIF, G4LJF/V2A (Ian does get around!) ZF2AG/ZF8 (Little Cayman Is), VK8AV (Northern Territories), DX1DBT (Manila, Philippines), and YS1EGB in San Salvador. Philip, as G1EMD, has been heard to lift GB3PW on occasion.

This seems as good a place as any to mention that any serious s.w.l. would be well advised to drop a line to Geoff Watts, 62 Belmore Road, Norwich. Geoff produces his well-known *World-wide Prefix List*, and in addition a list of all the Russian oblasts, the relevant prefixes and other useful listenings. All are very cheap, absolutely up-to-date, and invaluable shack aids. If you write an enquiry be sure to enclose an s.a.e.

Your next three deadlines are:
February 13
March 13
April 17

SEEN & HEARD

DECODE

Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS

Readers' Stations

I thought it would be interesting this month to take a look at the kind of equipment different readers are using for decoding. This sort of information can often be useful to the newcomer who has part of their station and wants to know what else to buy.

Starting with **Ian Mason** (Mauchline), he uses a Wavecom 4010 with a Kenwood R5000. One night he left the R500 and the 4010 with a Brother printer switched on tuned to 518kHz to see what would happen. The next morning saw a pile of paper with weather forecasts, positions, etc., and made very interesting reading — all whilst he was getting some sleep!

There are two receivers in operation in the J. Anderson household in Pontefract. There's the Yaesu 9600 Mk5 and the FRG-8800, both used with a wire antenna.

D. Raybould in Hednesford uses a Realistic DX440 at the moment, but hopes to change to the Icom R-71E as the 1kHz tuning increments of the DX440 are rather limiting. The antenna he uses is a half-size G5RV with a MFJ901B a.t.u. The software he has chosen is the Technical Software RX4 program. The set-up obviously works well as the list of c.w. stations included in his log proves.

An Eddystone 730/4 with a BBC-B and G3WHO software is used by **Martin Kessel G4WJX** in Stoke-on-Trent. The biggest problem he has is finding stations to demo RTTY in the evenings when people visit the shack! The most recent purchase has been an SEM QRM Eliminator which Martin describes as "excellent".

Phillys Smith in Ponthpool uses a Yaesu FT-50B receiver along with a Spectrum 48K computer and a long wire antenna. The software involved in this case is the J & P Electronics FAX program and the G1FTU RTTY program. Phillys doesn't run to a printer yet, but hopes to in the near future.

If Father Christmas has done his stuff, John Garnett in Truro will be sporting a new Micro-reader. Apparently he bought it for his wife to give him for Christmas! He found the help he had from ERA and Bill Green over the Micro-reader most helpful. Quite how he will have resisted the temptation to play with the Micro-reader before the 25th I don't know.

Another reader who has received a lot of help from a supplier is Nick Asnby in Wembley. He has recently purchased a TNC220 from Siskin Electronics. After the help they supplied, which included a visit to their London rep, he's got everything up and running now.

The G1FTU software is extremely popular, **Robert Pritchard GI1XPZ** in Co. Down is another user. In his shack is a modified FRG-7 and 48K Spectrum as well as a Realistic 2004 scanner and the FT-290.

I'm not sure where you get the G1FTU software from — if you know of a source could you let me know.

Bob McDonald (Wirral) has an impressive array in the shack. He uses a Telereaders CD660 for RTTY and ARQ modes and an ICS FAX-1 and printer for FAX reception via a Trio R2000 and Datong AD270. Although he does find reception of Offenbach on 134.2kHz is better when he uses a Sony AN-1 active antenna mounted vertically on the roof.

In Iceland, **Einar Suerrir Sandoz** uses the RX4 package from Technical Software with his FRG-7 and long wire antenna. He's looking for a digital readout to add to the FRG-7, so if you can help drop me a line and I'll pass it on. The equipment is working well though, because the log he sent made good reading.

David Aldred has an old Eddystone 940 which has given good service, but is hoping to get the Lowe HF125 soon. He's not quite sure yet which route to go for on the decoding side yet. He's got a 48K Spectrum and monitor so hopefully if he wades through this section he'll get some idea of what's available and in use.

Not many readers mention Tono equipment these days, but that's what **Peter Rowsell G1ULQ** uses. He has the Tono θ5000, an Icom R-71E, an Epson FX80 printer and an extra v.d.u. For tuning, he uses an oscilloscope which in itself is quite unusual these days.

I've had some response to the plea from Chris Swan about dumping FAX pictures from his Spectrum to Brother 1009 printer. **Laurie Patton** has a similar set-up with a Spectrum and Brother 1109 printer as well as G4IDE software. He sent me a photocopy of a screen dump program for the 1009. Apparently it works very well and he uses it for dumping both FAX and SSTV pictures.

All you do is load the machine code dump first before loading the FAX program. If like the G4IDE FAX program there is a print command in the BASIC, you can then alter the RAND USR number to suit the listing. Many thanks for the listing Laurie, I'll pass a copy onto Chris. If anyone else requires a copy, drop me a line with an s.a.e.

I'm not sure about the availability of G4IDE software either — if there is an easily available source I'd like to know about it please.

Ted Avery G3WBB was having great fun experimenting with his PK232. He'd had the equipment less than a week when he wrote and hadn't had much chance to find plain language RTTY news. I hope the frequency list he requested has solved that problem for him.

Another PK232 lives with **Trevor Rowell** at BFPO 58 in Cyprus. That's used with a Sony ICF-7600D receiver, PC Packratt software and a Dressler Active Antenna. Although, Trevor is in the process of upgrading to an FRG-9600 Mk5. He's had some success with news services, but not so much luck with FAX, so he's hoping the 9600 will help on that score.

For the past two years **John Hunt** has been using a home-made receiver for his s.w.l.ing. That's now done on a Matsui MR-4099, a 12m long wire antenna and a home-made a.t.u. John is pleased with this combination and has been rewarded with some very good DX. He's recently been given an IBM PC with double disc drive and a monochrome monitor and is eager to get going on RTTY. Hopefully, the Public Domain Software Library will be able to help with lots of radio software.

Someone else who had advice and help for Chris Swan is **J. D. Pyle**. He uses a FAX-1 decoder from ICS Electronics with a Lowe HF-125 receiver and a Citizen 120-D printer. About four months ago he bought a program from J & P Electronics which enables the user to dump FAX pictures to a printer other than a ZX printer. You have to record the pictures with the main FAX program, then use the other program to dump the pictures.

Mr C. Young is a c.w. fan. He retired four years ago and learnt Morse and is now able to read it at about 22 w.p.m. He uses a PRO2021 programmable scanner for his DXing. Some of the frequencies in the "What to Listen For" section this month will be of interest to all c.w. fans. I'm always interested to hear about more c.w. frequencies that readers find interesting.

In Denmark **Eril Koie OZ3YI** uses a Tono θ7000, a Drake TR7 and a Hygain TH3MU3 antenna. You should see his QSL card somewhere in this month's column.

It seems I've had a letter go astray, **R. Selmes** sent some FAX charts into the Short Wave Magazine Editorial Offices and they haven't surfaced yet. If any readers have items they want to send in for use in the column, don't send them to the Editorial Office, they can't cope with my mail as well as their own. If you could see the office you'd know what I mean!

Hopefully, when they find the letter I can show some of the charts sent in. In his shack, R. Selmes uses a DX302, a Spectrum 48K, an Alphacom printer, G4IDE software as well as Technical Software's RX4 software. He was able to supply some very interesting amateur FAX stations he received during a recent contest.

Simon Evans uses a decoder, home-made a.t.u. half size G5RV, and IC-735 and various computers for his DXing. He uses the computers for data and for logging/control direct from/to the IC-735. He's built a level controller to get the Icom interface to RS232.

Bill Licence runs a MM2001 into a commercial u.h.f. TV via a two-way splitter at the rear of the TV. One side is the converter output, the other side is connected to the TV Yagi. Unfortunately, between the two there seems to be reaction. The Yagi is picking up local manufacturing computer outputs thus mixing things up. Bill is another reader who praises ERA and Bill Green for the Micro-reader.

The last station to be detailed in this marathon belongs to **Andred Keddie**, he also uses an ERA Micro-reader, which he's had for about a month. The log he sent proves it's working well, he also uses a JRC NRD525 receiver fed via a switching unit by a Datong AD270 active antenna mounted in the loft. There is also a 50m long wire antenna available and a Hamgear PMX preselector/a.t.u.

PC-MONITOR

Back in November I mentioned a public domain program for IBM PCs and clones called PC-Monitor. This program is primarily designed to interface and IBM PC to a Yaesu FRG-8800 receiver allowing total control from the computer. I recently received a letter from the author **Simon Collings** announcing the latest enhancements which are included in issue 1.5.

This version is a complete revision of the original program and includes fixes for some of the problems along with some new features, a summary of the changes is shown here.

a) Addition of window routines for the display of messages.
b) Improved cursor control.
c) Improved use of colour (no flicker with CGA).
d) Logbook bug fix.
e) Addition of FAX mode which detunes the receiver by 1.7kHz in u.s.b. as required by some multi-mode terminal units, i.e. PK-232.
f) Secondary channel mode.
g) Addition of BASIC test program from the FRG-8800 service manual.
h) Improved help files.
i) Optional display of S-meter and busy signal (needs additional hardware).
j) Memories expanded to 1000 channels.
k) Improved documentation.

If you would like to obtain a copy of this program it is available from the Public Domain Software Library[1] or direct from Simon[2]. If you order from Simon you will need to supply a formatted double sided double density 5¼ inch disk with a cheque or postal order for £2.50 to cover cost of copying and return postage.

Frequency List

The frequency list of stations heard in the last few months is still available and growing by the week. It's now so large that I must ask readers to send three first or second class stamps, but no envelopes. At this moment in time there

SEEN & HEARD

are over 600 entries in the list, not to mention the ones that have been syphoned off because they haven't been reported for a few months.

If you would like a list send your name and address with the three stamps to me and I'll do my best to send them out return of post.

Halifax Meteo

Back in December I gave some details of the maintenance down-times for this station. Unfortunately I seem to have given the impression that those were the only frequencies used by Halifax which is not true. The full range of frequencies and times are shown here:
122.5kHz 0000UTC to 2400UTC
4.271MHz 0000UTC to 2400UTC
6.330MHz 0000UTC to 2400UTC
10.536MHz 0000UTC to 2400UTC
13.510MHz 1000UTC to 2200UTC

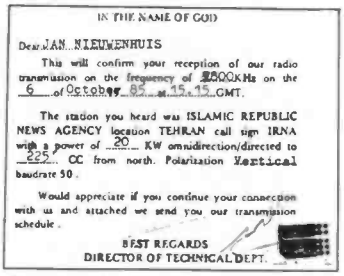
The modes used are alternatively FAX 120/576 and RTTY 75 baud 850Hz shift.

My thanks to Chris Norfolk for pointing out my error.

What to Listen For

The usual format is being used again this month: frequency, mode, speed, callsign, station name and time of logging in UTC.

2.101MHz, FEC, 100/170, ?, ?, 1930
4.001MHz, c.w. ?, NMN, US Navy, 0728
4.251MHz, c.w. ?, PCH20, ?, 1619
4.813MHz, RTTY, 50N, LZA, Sofia Met, 1835
6.3315MHz, RTTY, 50N, UMV, Murmansk (Cyrillic), 1850
5.029MHz, c.w. ?, FDY/FH3AR, French Air, 2113



IN THE NAME OF GOD

Dear JAN NIEUWENHUIS

This will confirm your reception of our radio transmission on the frequency of 25800KHz on the 6 of October 85 at 15.15 GMT.

The station you heard was ISLAMIC REPUBLIC NEWS AGENCY location TEHRAN call sign IRNA with a power of 20 KW omnidirection/directed to 225 CC from north. Polarization Vertical baudrate 50.

Would appreciate if you continue your connection with us and attached we send you our transmission schedule.

BEST REGARDS
DIRECTOR OF TECHNICAL DEPT.

Received by Jan Nieuwenhuis

6.389MHz, c.w. ?, CTP, NATO Portugal, 2226
6.524MHz, c.w. ?, 71XBP, Spanish Naval Station, 2330
7.724MHz, c.w. ?, KRH50, US Embassy London, 1243
8.1305MHz, RTTY, 50N, DFH23L2, D. Welle Cologne/Malta, 1055
11.034MHz, RTTY, 75N, GYA, RN London, 1845
15.95MHz, FAX, 120/576, ?, Moscow Met, 1130
16.34MHz, FAX, 120/576, ?, Auckland Met NZ, 1050
22.321MHz, RTTY, 75N, ?, Kaliningrad (Cyrillic), 1255
24.79MHz, RTTY, 50N, ISX24, ANSA, 0850

1: PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL.
2: S. Collings, Southwold, Harmham Lane, Withington, Cheltenham GL54 4DD.

The next deadlines are: February 13, March 13 & April 17

INFO IN ORBIT

Pat Gowen G3IOR
17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD

More MIR

The Soviet MIR space station has been the main focus of attention again this past month, in both amateur radio and satellite general interest terms. The clear dark early evenings of December provided many opportunities of excellent visual sightings, allowing the chance to update the changing orbital periods to give future forecasting accuracy, whilst radio observation demonstrated that the whole space station crew participated in the amateur radio communications experiment.

Not only did Musa Manarov come on 145MHz f.m. as U2MIR, but so did spacecraft commander Vladimir Titov as U1MIR, as well as the visiting cosmonaut medical doctor Valery Polyakov with the call sign U3MIR. They were very active on many Wednesday and Thursday evening passes and during their week-end relaxation periods. In particular focus was Musa Manarov, who was doing his level best to communicate with the world's amateur radio community as he orbited earth every one and a half hours.

It was very apparent that the same multi-user QRM communication problems hit the MIR amateurs as they did Owen Garriott when he was active from the USA Shuttle as W5LFL, due entirely to the extraordinary high popularity of the event. Whilst over forty South African and fifty eastern European stations were worked in the first two weeks of operation, only some five American, two west Europeans and no Japanese amateurs whatsoever were logged, as the thousands of QSOs that could have evolved were rendered impossible due to the sheer overload of stations calling simultaneously.

The result of masses of f.m. stations in line-of-sight range on the same frequency is to produce a total silence at the receiver. Hence zero readability of all stations except for those who can make use of the capture effect by maximising the gain that can be brought about by using higher power, greater antenna gain, and periods of closer proximity to the spacecraft when it is passing over the highly populated parts of the earth.

This problem (unless one has many local stations calling the spacecraft on the same frequency) does not stop listeners on earth from hearing MIR, as evidenced by so many of you who have reported as having heard the MIR cosmonauts active on the 145MHz band at well over S9, often well over the stations in the area calling up. Those who wish to get a QSL card may do so by sending a short wave listener report to the MIR amateurs via their QSL Manager, Boris Stepanov UW3AX, at PO Box 679, Moscow 107207, USSR.

The new crew consisting of Alexander Volkov and Sergei Krikalov, accompanied by visiting French astronaut Jean-Loup Chretian (on his second trip) went up to MIR as planned via the SOYUZ TM-7 launched at 1550UTC on November 26. The two Soviet cosmonauts relieved the down-coming crew who completed their planned year in space without any apparent ill effects, beating Yuri Romanenko's record 326.5 days on 11 November 1988. They returned to earth on December 21, with the French visitor (but leaving Dr. Polyakov to tend the new crew) after completing two additional orbits in the SOYUZ capsule due to a further bout of computer problems.

On both the upgoing and down-coming SOYUZ missions, many listeners to 121.750MHz narrow band f.m. were able to copy the strong signals despite their being in the middle of the airband surrounded by strong wide band a.m. during their 49 hour 40 minute flight to MIR.

The earlier docking and the events leading to it were observed closely by Chris van den Berg from the Hague, who writes: "During the pass in orbit 15975 (1713 - 1719UTC November 28) radio traffic on 143.625MHz revealed the final phase of the docking operation. At 1714 the distance to MIR from SOYUZ-TM-7 was only 13 metres, and the approach speed was being given in centimetres per second. The roll was reduced to zero. Normally they wait until television communications are established before completing the docking, but on this occasion the flawless approach plus the fact that this would give some extra valuable minutes to the crew, it was not."

"At 1715 it became obvious that docking was imminent, as evidence by such statements as 'we expect contact any moment', 'we attached to the station' and 'we have established mechanical contact'. During the operation Volkov, using the callsign 'Donbas-1', assisted by Krikalov, who was 'Donbas-2', read out the approach and attitude data, with Chretian, callsign 'Donbas-3', also helping. They expressed their joy, and exchanged congratulations. TsUP (the ground command) ordered them to continue their work according to instructions, thus emphasising that the period after docking was still very crucial. Chretian switched off the search lights, and they then wrote down the pressure in the different compartments, which revealed the fact that during the operation the hatch from the 'SA' (Spuskayemly Apparat, or landing module) to the 'BO' (Bytovoy Otsek, or or life compartment) was closed. The pressures differed, being 790 and 850mm, whilst the pressure aboard MIR itself was 690mm."

During the pass in orbit 15976, between 1845 and 1854UTC, both crews waited for the moment at which the last hatch could be opened. Chris continues the story: "Volkov closed his transmissions on 121.750MHz, whilst Titov and Manarov entered the KWANT module to meet the 'Donbasy', Polyakov remaining in the 'RO' (Rabotchiy Otsec or work compartment) on radio watch. After establishing TV contact and adjusting the camera for the usual press session, he joined the crews to exchange greetings to both national Presidents, Gorbachev and Mitterand. On the next pass, Volkov and Titov discussed various related technical matters with TsUP".

Chris found that the crew of SOYUZ TM-7 used the callsign "Donbas", and feels certain that on return Chretian will transfer his callsign "Donbas-3" to Polyakov, as in the period until April 1989 the crew will use "Donbas", whilst Titov, Manarov and Polyakov used the callsign "Okean". In addition to 143.625 and 145.550MHz, he has been monitoring the MIR telemetry on 166.125MHz, which usually appears just before our UK loss of signals to the east, and the SOYUZ telemetry on and around 166.138MHz in several sectors as a very strong signal, probably continuous.

He discovered that MIR was boosted up into a far higher orbit to make a successful rendezvous with the upcoming SOYUZ TM-7 by using the engine of Progress-38, the cargo ship attached to the KWANT aft docking port. After this final use, the Progress was undocked to burn out in earth's atmosphere, so as to make room for the docking of SOYUZ TM-7. It was this big boost into higher orbit that increased the period and brought down the mean motion, so making our long term pass forecast of last month's column even earlier than thought by an additional five minutes!

On December 9 a six hour space walk, (technically known in English as "e.v.a.", short for Extra Vehicular Activity) took place with our French visitor assisting in erecting a new solar cell panel. Although cosmonauts Manarov and Titov have now returned from MIR, hopefully we shall be hearing the new crew under the calls U4MIR and U5MIR on the 145MHz f.m. band when they have finally settled in and find some free time.

Satellite Frequencies

Graham Smith G1JVZ of Nottingham tells us of some more useful space frequencies. Now that the Shuttle programme is "off the ground" again (literally) he advises monitoring 296.800MHz, the primary u.h.f. frequency, 259.700MHz which is the secondary u.h.f. frequency, and 279.000MHz which is used for e.v.a. work. The "MABES" Magnetic Bearing Flywheel Experimental System that was incorporated as part of the third stage which launched the Japanese JAS-1 amateur radio satellite Fuji-Oscar-12 and the previously mentioned and pictured "Mirrorball" is to be heard on 136.112MHz.

For those requiring a good listing of satellite frequencies, only a few of which are we able to give within the restrictions of the length of our monthly column, a comprehensive American paperback is recommended. It is

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Communication Satellites by Larry Van Horn, available in the UK from Interbooks, SM, Stanley, Perth PH1 4QQ, at a price of £13.25 plus £1.25 postage and packing. It has lots of information on amateur, manned, weather and spy satellites, with a frequency range going from 1.5MHz (Explorer-20) up to 563GHz (a USAAF satellite) and everything between.

Weather Satellites

Lawrence Harris of Peverell, near Plymouth has again sent us some fascinating information and some superb pictures, including those promised last month.

He has found that both MET 2/16 and MET 2/17 have been orbiting south-bound into sunlight over the UK, and, as each switches on, the telemetry aperture bars can be seen. A close up of this is shown in Fig. 1, which is such a picture of MET 2/17 taken in November 1988, with the aperture indication bars seen at the right. Lawrence says: "It can be considered as a binary display, with black representing 0 and white as 1, therefore at eclipse the aperture is fully open at setting 00000. Within seconds of entering full sunlight the bars change so you will see the binary read-out change 0 to 1 to 10 to 11 to 100, etc. In the reverse direction, you can see the aperture gradually open to its limit before switch-off. Fig. 1 shows binary values of 0000, 0001, 0010, 0011, 0100, etc."

NOAA-9 gave the picture of the Gulf of Bothnia and Finland as shown in Fig. 2. Lawrence logged a "clock" fault on this weathersat at 1705UTC on November 3, causing the pictures a loss of synchronisation. By November 12 the fault was found to be very bad indeed, and no pictures whatsoever were usable. He found that on November 13 the fault seemed to have fully disappeared, either by self correction or by command, but sadly it returned again on November 17. During late November NOAA-9 and 11 were coinciding, so NOAA-9 was commanded off, leaving NOAA-11 operating normally.

OKEAN-1 was finally picked up after many recording sessions by Lawrence in the early hours of December 4. He reports that it has started a series of daily transmissions using the different formats. Onboard equipment includes a microwave sounder, a sideways looking RADAR and a light imager. Lawrence writes: "I have been getting very good results from this current series of tests, and will forward pictures when they are processed. Images so far recorded include both ocean and land, and what is possibly a store-and-forward picture of the northern polar ice cap."

Evidence of the cracking and melting of this region is shown by our Fig. 3, a photograph taken by **Michael Meerhan GO/PA3BHF** of the University of Surrey UoSAT team, whilst on his recent trip to the North Pole to meet the Polar Ski-Trek team.

Lawrence has been looking for Fen-Yung-1, but despite many searches it has not been heard now for several weeks, and we have to assume that is it still switched off. He sends us pictures he took of other satellites, Fig. 4 being GOES-W as a re-transmission from GOES-E showing the south-west quadrant in visible light. The photograph in Fig. 5 shows a visible light whole disc from METEOSAT taken in November.

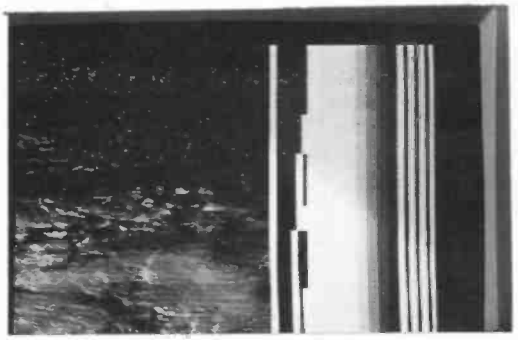

Fig. 1

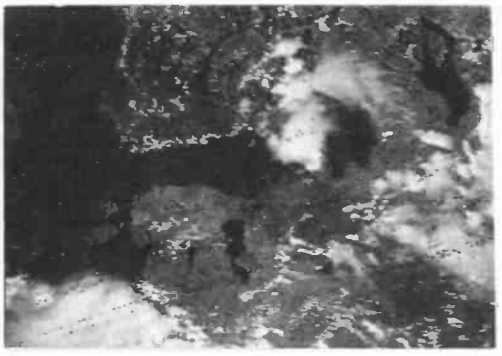

Fig. 2

Fig. 3

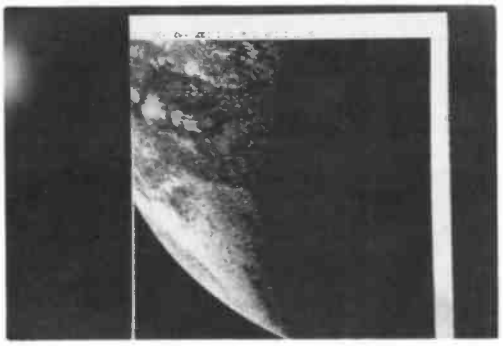

Fig. 4

Fig. 5

Your next three deadlines are February 13, March 13 and April 17.

He send us a summary of current satellite activity with the current frequencies used:

NOAA-9: 137.620MHz. May be off for long spells.
NOAA-10: 137.500MHz. On coninuously.
NOAA-11: 137.620MHz. On continuously.
MET-2/16: 137.400MHz. On in sunlight when the solar illumination level is greater than 90 per cent.
MET-2/17: 137.300MHz. As MET-2/16
OKEAN-1: 137.400MHz. Sometimes on for eastern passes.
FEN-YUNG-1: Currently off, possible permanently.

Finally from Lawrence comes some good advice, which applies to all short wave listeners, and weather satellite enthusiasts in paricular. "Patience is the practice that must be learnt." He demonstrates these words of wisdom with the example of eventually finding MET-3/2 and OKEAN on in the early hours of each morning daily, having spent the night recording 137.850 and 137.400MHz alternatively!

TV Satellites

January 20 should see the commencement of broadcasting from the new ASTRA satellite, which has sixteen channels, six of which have been taken over already. Rupert Murdoch has four, W.H. Smith has two and Robert Maxwell is said to be taking over three channels. The operators of ASTRA have warned that they will "pull the plug" on any operator who does not conform to the official obligations of use.

UoSAT

The University of Surrey announce that until further notice, the schedule for the Whole Orbit Data from UoSAT-2/OSCAR-11 will be:
Sundays: Channels 2 and 61.
Mondays: Channels 1, 2, 3 and 61.
Tuesdays: Channel 19.
Wednesdays: Channel 29.
Thursdays: Channels 1, 2, 3 and 61.

The diary and bulletin board continue to be updated with fresh and interesting information on the latest space related happenings, and a full set of new Keplerian elements are available for computerised tracking.

OSCAR-9, alias UoSAT-1, was seven years old in October 1988, but continues to give excellent service. It has fallen from the original launch altitude of 556km to only 460km, but is expected to last out a further two years before it enters earth's atmosphere to burn up.

Reports on reception, experimentation, utilisation of the current satellites are always welcome, particularly when they are being used for scientific and educational projects.

Help Line

Mr G. J. Barstra, of Schaepmanlaan 39, 9722 NR Groningen, The Netherlands, writes to ask if any of our readers are willing to share their experience in tracking weather satellites using a computer, and, if so, can they can advise him on what computer and programs to get. He finds that the BBC computers are hard to get in Holland, but the Commodore is still on sale.

He is seeing good pictures (particularly Africa) from satellites passing to his south from his window mounted omni-directional antenna, a better system not being possible from his second floor home surrounded by large apartment blocks.

Lawrence Harris, who sends us the regular supply of information and pictures, wonders if any fellow satellite fans are able to help him translate some of the more interesting tapes which he has made of MIR conversations and transmissions. His home address is 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB.

SEEN & HEARD

BAND II DX

Ron Ham
Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

Despite predominantly high pressure, the number and extent of the lifts proved very disappointing.

"Band II DX has been very low at this QTH for the last few weeks," wrote **John Woodcock** from Basingstoke on December 9. "I have checked the bands on most days and found very little about, or perhaps I've been unlucky?" he added.

Our reader/DXer in Botswana, **P. R. Guruprasad** (Molepolole), using a Phllips D1835 receiver, is also interested In the weather. While listening to Radio RSA on November 26 he noted that the temperature in Durban was 22-26 degs. In addition to a variety of programmes, some of BBC origin, he also heard the news and weather reports from Botswana, Lesotho and Swaziland and the current temperatures in South African towns. Around 1915 on the 26th, he logged good signals from the Afrikaans Language Service of Radio RSA and during the day he listened to stereophonic programmes, on f.m., from Gaborone, Radio Botswana and found that the lower one, on 89.9MHz, Fig. 1, was the strongest.

Another weather watcher is **George Garden** (Edinburgh) who noted that the pressure was rising all week-end on December 3/4 and it was very cold with low overnight temperatures. "The usual often ideal wintry conditions associated with high pressure for DX work," thought George. Therefore, on the 5th he took his gear to the top of Cairn O' Mounth and while tuning through Band II he found a fading signal which was very strong on peaks and then waited for an ident. At 1505, after hearing its local news and weather, George added Radio Cumbria, from the Sandale transmitter, near Carlisle, to his DXpedition log.

Fig. 1

Antenna Mods

"Years ago I collected a few old 405-line 'H' and 'X' antennas and stored them away like a magpie," wrote **Mike Bennett** (Slough) who is thoroughly cleaning some of these parts to build a new Band II antenna. I did the same Mike and managed to salvage some rods and insulator blocks in good condition. These have been ideal for making up test-dipoles, one of which was installed on my chimney, Fig. 2, by an old friend and fellow DXer, Peter Penfold. Peter enjoys experimenting with antennas for the v.h.f. and u.h.f. radio and television bands. In addition to his TV gear, Peter's home at Felpham, Sussex, is equipped with JVC3040 and SX200 receivers.

Reports

"The f.m. band continues to bring In interesting signals," wrote **Brian Renforth** (Newcastle-upon-Tyne) who can receive Radio 1 from Black Hill and Holme Moss daily ranging from very weak to reasonable quality under normal conditions.

On October 31 **Andrew Jackson** (Birkenhead) logged Beacon and Viking Radio, Radios Lincolnshire, Nagaeltachta, Norfolk, Shropshire and Radio Telefis Eirann (RTE1/2) and on November 15 he heard Beacon, Pennine and Viking Radio plus RTE2.

Mike Bennett (Slough) reports hearing music, sometimes only bursts, on 83.75MHz on November 18, 19, 20 and 25 and music with English voices on 87.75MHz on days 18, 19, 20, 22, 25, 28 and December 6. These are both television sound frequencies Mike, the former is the Russian Ch. R3 and the latter is the USA's A6. I wonder, are such signals reaching us via the greatly improved "F2" conditions? I hope so.

Fig. 2

At 0900 on the 29th, I counted 11 French stations around 100MHz. 100.5MHz. While operating portable from Arundel car-park on December 8, I heard weak signals from Germany and French stations around 100Mhz. Around 1515 on the 10th, I logged 4 very strong French signals around 98MHz and by evening there were many more throughout the band.

I completed last month's column on November 17, just at the end of a tropospheric opening following a sharp fall in atmospheric pressure from 30.4in (1029mb) at midday on the 16th to 30.1 (1019mb) on the 17th. It was just above 30.0in (1015mb) at 1000 on the 18th however, by 1200 a sharp rise began and by midnight it had settled back at 30.4in, where it remained for 12 hours then fell sharply to 30.0in. The pressure then rose gradually to reach 30.4in again at midnight on the 22nd and fluctuated a little around this figure until it declined sharply on the 28th. The barometer stayed mainly well below 30.0in for the following week when, on December 7, it shot up to 30.5in (1032mb) where it settled for about 10 days.

TELEVISION

Ron Ham
Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

"November's tropo was far from exciting, though summing up for this year's we've a lot to be thankful for with 'Olympic Style' DXing when previous records were broken and new transmitters logged for the first time," wrote **Simon Hamer** (New Radnor). "Not much DX on the TV waves lately," remarked **Mike Bennett** (Slough) on December 12. By then Mike had taken the opportunity to overhaul his equipment and add a D-100 Deluxe converter to his station. At Felpham in Sussex, **Peter Penfold** has modified a 24in Marconiphone receiver and installed 4 stacked Bow-tie antennas for the u.h.f. band and a JVC3040 receiver plus various home-brew arrays are ready for operation in Bands I and III.

Following recent gale damage, **Brian Renforth** (Newcastle-Upon-Tyne) replaced his group C/D array with a Fuba XC343 antenna directed toward Pontop Pike and is delighted with the results. "Ghosting is no longer a problem and the clear line structure is not unlike a 405-line picture on a smaller screen set — its that clear! Being a wideband array we also have the addition of Bilsdale which was unwatchable — the pictures are now almost noise free," said Brian. Another addition to his station is a 12in Tokyo Deluxe 127A mono receiver which will be used alongside a pair of Thorn 1400s and a Labgear up-converter during the forthcoming Sporadic-E season.

In Arbroath, **David Glenday** is giving thought to either building a super antenna with a high gain low noise pre-amplifier for Band III, or importing a good continental job. Whichever you decide upon Dave, we will be pleased to hear about it. Don't forget readers, your fellow DXers are interested in home-brews, new gear and mods, so please let me have the details and I will use what I can.

Band I

During the next few months, while Band I activity is limited to short and often sudden outbreaks of Sporadic-E, it would be unwise to omit a check on the band first thing in the morning. For example **Bob Brooks** (Great Sutton) took an early look on November 17 and from 0835 to 1145 he watched programmes, among them Breakfast TV and *Dynasty*, from Italy (RAI), Portugal (RTP) and Spain (TVE). This opening was also enjoyed by David Glenday and **Garry Smith** (Derby) who wrote, "there were a few Sporadic-E openings in November — the 17th was good for TVE on Chs. E2, 3 and 4". David thinks the Spanish programme he saw was *Dynasty* because he remembers seeing it transmitted at that time back In the summer when TVE was frequently received in the UK.

Bob Brooks and Simon Hamer found some Sporadic-E activity when, between them they logged test cards from Czechoslovakia (RS-KH), Denmark (DR Danmark) Sweden (SVT Kanal 1) and the USSR on November 18, 19, 21, 23 and 29 respectively.

Scandinavian stations, on Ch. E4 were predominant in the log of **Edwina** and **Tony Mancini** (Belper) on November 22, 23, 24, 27, December 4 and 10. Among the Idents they saw on these days were DR Danmark (Denmark), YLE TVI (Finland), PTT NED 1 test-card and their opening caption, (Holland), NRK — Clock Logo and test-cards scribed Bremanger and Kongs-

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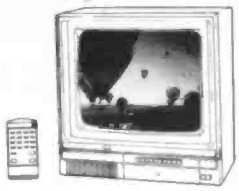

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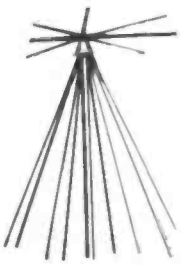

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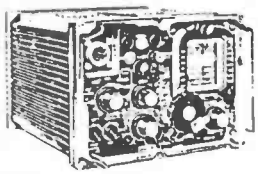

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Fig. 1: Lahore

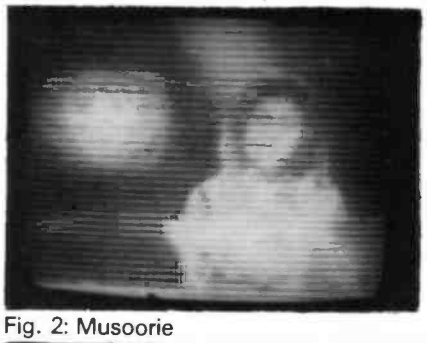

Fig. 2: Musoorie

Fig. 3: Musoorie

Fig. 4: Bhatinda

Fig. 5: Malaya

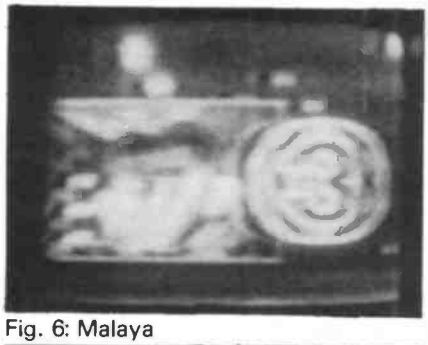

Fig. 6: Malaya

Fig. 7: USSR

Fig. 8: Holland

Fig. 9: West Germany

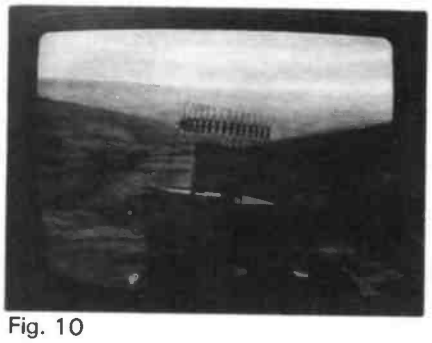

Fig. 10

Fig. 11:

Fig. 12:

berg (Norway), SVT Kanal 1 (Sweden) and a coloured test pattern from the USSR.

Tropospheric

A tropospheric opening took place around November 17 while I was putting the final touches on last month's column, so there was no time to include readers reports of that event. However, this time I have stepped back a bit to use them.

During the opening on November 14, Simon received pictures from Luxembourg (RTL) on Ch. E7 in Band III and Belgium, France, Holland and Ireland on many spots in Bands III, IV and V. Among the captions he saw were BRT1 and RTBF1 (Belgium); A2, CANAL+, TDF, TF1 and FR3 (France); NED 1, 2 and 3 (Holland) and RTE1 and 2 (Ireland). The following day, Andrew Jackson, had a good u.h.f. haul when he received BBC1 North East, Northern Ireland and West; Border TV; Central TV and Central East Midlands; HTV West; RTE1 and 2; TVS and Ulster, from his home in Birkenhead. On the 28th, he again looked for u.h.f. DX and found BBC1 Northern Ireland, RTE1 and 1 and Ulster.

The Mancinis received Band III pictures from France (Canal +) on November 14, 15, 22 and 23 and December 6, 9 and 10 and from Ireland (RTE1) on November 22.

At 0950 on the 17th, David Glenday logged the Danish test card "TV2 Hedensted" on Ch. 30.

I noticed a real hefty ghost on u.h.f. pics during the evening of the 22nd and co-channel interference on the 29th and December 24. It began building up in the band on the 29th between 0200 and 0400 and by 0825 negative pictures from France were appearing in at the lower end of Band III.

News from India

Tropospheric openings enhancing the range of signals in Band III were observed by Lt. Col. Rana Roy in Meerut from September 28 to October 1 and days 4 to 7 and 10 to 16 inclusive. Most of these were early morning events which enabled Rana to see adverts, Fig. 1, from Lahore TV at 2215 on September 30 and breakfast TV and test cards from stations in India and Pakistan. Among those he identified in Band III were Agra, Amritsar, Bhatinda, Bhawalpur TV (Pak), Faisalabad (Pak), Jalandhar TV, Kasauli TV, Lahore TV (Pak), Musoorie TV, Rawalpindi TV (Pak), Rana observed heavy co-channel interference on Ch. 10 from Bhawalpur on Musoorie at 2140 on September 28 and again at 0840 on October 5, Figs. 2 and 3 and a very clear picture, at 2230 on September 28, from Bhatinda TV on Ch. 12, Fig. 4.

On 22 days during the month prior to November 3, Rana has received multiple, fluttering and smeary pictures, no doubt via "F2", in Band I, from Malaysian and Russian television networks. Identification of stations during this mode of propagation is extremely difficult however, his detailed log includes a variety of adverts — Fig. 5, seen with multiple images at 2145 on October 18, badminton, car-racing, clocks — mainly Russian, dancing, feature films with sound dubbed in Malaysian language. logos — the "3", Fig. 6, probably Malaysian at 2115 on the 20th and "Sports" at 1515 on the 27th and news —, Fig. 7, BPEMR from the USSR at 2100 on November 3. "Two news presenters (one lady — one gent) with "B" caption on left top when the lady was present and on the right top when the gent was present. At times a star was seen on top left side when another news presenter was present," said Rana.

SEEN & HEARD

Pictures Archives

Among the multitude of pictures received by David Glenday during the tropospheric opening around 1615 last June 10 were teletekst from Holland (NOS-TT) Fig. 8 and Videotext Fig. 9 from West Germany (ARD/ZDF). I often refer to the DXpeditions frequently made by George Garden from Edinburgh to his favourite site on Cairn O' Mounth. George kindly sent photographs of a recent visit showing the view from the position of his antenna and JVC receiver, Fig. 10 and a sample of the picture quality he received from Border TV's transmitter at Eyemouth which he identified by local adverts, Figs. 11 and 12.

The next three deadlines are:
February 13, March 13
& April 17

SSTV

During November, Fred Pearce (Driffield, *sorry Fred, I got this wrong in a recent issue)* received QSL cards confirming his reception of slow scan television pictures from stations in Denmark, Hungary and Switzerland and added, 584ES English School Radio Club (Nicosia) to his new station score.

LONG MEDIUM & SHORT

Brian Oddy G3FEX
Three Corners, Merryfield Way, Storrington,
West Sussex RH20 4NS

By way of an experiment, a new medium wave DX chart has been included this month, which it is hoped will enable more information to be made available in less space. Your comments on the new chart would be appreciated.

Long Wave DX

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (= GMT).

Listening in Newcastle-upon-Tyne, **Neil Wheatley** heard an announcement by Radio Jordan via their new s.w. service on 9.560MHz (Eng 0500-2300) that they intend to set up a broadcast service in the l.w. band on 207kHz with a combined transmitter power of 1200kW. Since that frequency is already in use by DLF Munich, W. Germany (500kW) and Azilal, Morocco (800kW), there could well be problems with interference!

The long hours of darkness just now are helping DXers to log some additional stations via sky wave paths. Some interesting changes that take place after sunset were noted by **Fred Pallant** in Storrington. Using a Trio R2000 receiver with a random wire antenna strung around the loft, he logged three additional stations after dark: Oranienburg 177 (750kW), Motala 189 (300kW) and Roumoules 216 (1400kW). Surprisingly, the signal from Kaliningrad 171 (1000kW) deteriorated from SIO 344 to 123 after dark, and that of DLF Munich 207 (500kW), rated as SIO 244 during daylight, became inaudible.

A number of change were also observed after dark by **Philip Rambaut** in Macclesfield. The strength of the signals from Kaliningrad 177, Munich 207, Konstantinow 225 (2000kW), Tipaza 254 (1500kW), Burg 263 (200kW) and Topolna 272 (1500kW) increased by about one S unit on their daytime values. That of Medi-1 Nardor 171 (1200kW) and Moscow 263 (2000kW), which both rated as S1 during daylight, became inaudible. Philip uses an International Marine Radio R700M communications receiver with a random wire antenna.

A move to Javea, Spain is providing Jurgen Thiel with good opportunity to search for weak DX signals as the level of electrical noise there is very low indeed. His location is 300m a.s.l. and 1km from the sea. Apart from a 750m mountain called Montgo which lies 1km to the west, clear paths exist in all other directions. His log includes the BBC Radio 4 broadcasts via Droitwich 189 (400kW), also shared by Burghead (50kW) and Westerglen (50kW), which reach him at a remarkable SINPO 55555 at any time between 1000 and 1700.

MW Transatlantic DX

Some broadcasts from Canada and the USA have been reaching our shores rather earlier than hitherto, but there has been a distinct lack of signals from the Caribbean area and S. America. The broadcasts from WINS in New York 1010 were received by **Tim Shirley** in Bristol at 2100 one evening, but that was quite exceptional as their signals are more likely to be heard after 2300. Tim also found the reception conditions interesting just before dawn. At 0530 he logged CHUB in Nanaimo, BC 1570 for the first time. This station has not been mentioned before in this series, so Tim's reception is subject to confirmation by QSL. Tim has received an attractive QSL card from KAAY in Little Rock, Arkansas which confirms his reception of their broadcasts on 1090 last September — see Fig. 1.

The earliest signal to reach **Jim Willett** in Grimsby stemmed from CBA in Moncton, New Brunswick 1070, which rated as 222 at 0015. By 0030, CJYQ in St John's, Newfoundland 930 was peaking 333 and WCAU in Philadelphia 1210 was logged as 222 at that time. At 0200 Jim heard WTTP in Natick, Massachusetts 1060 for the first time. A reception report detailing their signal as SIO 222 has been sent to them and Jim is now awaiting their QSL. Jim also sent reception reports to CJRP in Quebec 1060, rated as 222 at 0130 and to CBG in Gander 1400, rated as 233 at 0230.

Other MW DX

In Chertsey, Ciaran Fitzsimons heard Denizli, Turkey 558, rated as 33344 at 1733 and a broadcast in Arabic from Damas-Adra 567, rated as 42352 at 1735. Listening at 0230, Jim Willett picked up a broadcast in Arabic from UAE Dubai 1480, rated as SIO 223.

Jurgen Thiel has erected a 220m long Beverage antenna, directed towards the UK and terminated to earth at its northern end. Using it in conjunction with a battery portable, he can hear some of the BBC Radio 1 and 2 broadcasts at any time of the day or night! For example, BBC Radio 1 on 1050 (shared by Burghead (20kW), Droitwich (150kW), Postwick (10kW), Stagshaw (50kW), Startpoint (100kW) and low power relays) rates at 55555 at 1530. As an experiment, Jurgen is intending to lengthen the antenna by another 150-200m in the near future.

Following my comments about long distance m.w. reception during daylight, **Roy Hill** (West Kilbride) says he can usually hear Marnach, Luxembourg 1440 all day and two stations in W. Germany — Saarbrucken 1422 and Langenberg 1593 for much of the day. Infrequent, but deep slow fades have been observed on these signals. He has noticed that during the winter, the band is quite lively with signals from NW Europe for several hours after sunrise and presumes they reach him via sky wave paths. At present, Roy uses a 100m random wire antenna with an r.f. pre-amplifier ahead of his Lowe HF125 receiver, but says his best results were obtained with an outdoor 3m by 4m one turn resonant loop.

The choice of receiver is also important if good results are to be obtained on this band. Writing from London, **Phil Townsend** says that the m.w. performance of his dismounted Blaupunkt car radio is superior to his Lowe SRX 30 communications receiver; however, the short tuning scale is a serious disadvantage as sometimes the scale pointer hardly moves when tuning from one station to the next.

For those DXers who enjoy searching for signals from the low power BBC relay stations installed around the UK, Ian Bond (Wirral) reminds them that the BBC Radio 1 relay in Wallasey runs just 500 watts on 1107.

MW Local Radio DX

The construction of a G2VZ type m.w. loop has been keeping Darren Taplin busy in Tunbridge Wells. He connected it to his Eddystone 680X communications receiver. Although the strength of the incoming signals was less than when using his 25m random wire antenna, he was pleased to find that the directional properties of the loop were quite good. He was delighted to find that he could "null out" ILR Essex Radio 1431 (0.35kW) and hear ILR Radio 210, Reading 1431 (0.14kW) for the first time.

A number of experimental m.w. loops have been built by **John Ratcliffe** in Southport, Queensland, Australia. Using Litz wire for the main loop winding has made a considerable improvement in both signal strength and overall performance.

Using a home-made loop with a Vega 206 portable, **Sheila Hughes** (Morden) logged ILR Radio Tay, Perth 1584 (0.21kW) for the first time, 22112 at 1150. Sheila also added ILR Moray Firth Radio, Inverness 1107 (1.5kW) as 23222 at 1535.

No doubt the 220m Beverage antenna used by Jurgen Thiel helped him to log ILR Invicta Sound, Maidstone 1242 (0.32kW) as 35333 at 0025 and ILR Southern Sound, Brighton 1323 (0.5kW) as 34333 at 1820. Hearing such low power transmissions

Freq kHz	Station	Country	Power (kW)	DXer
153	Bechar	Algeria	2000	D
153	DLF Donebach	W. Germany	500	A*,B,C,D
153	Brasov	Romania	1200	C
162	Allouis	France	2000	A*,B,C,D,E
171	Medi 1-Nador	Morocco	1200	A*,C,D
171	Kaliningrad	USSR	1000	B,C
177	Oranienburg	E. Germany	750	B*,C,E
183	Saarlouis	W. Germany	2000	A*,B,C,E
189	Caltanissetta	Italy	?	D
189	Motala	Sweden	300	B*,C,E
198	Ouargla	Algeria	2000	A*,D
198	BBC Droitwich	UK	400	A*, C,D,E
207	DLF Munich	W. Germany	500	B,C*,D
207	Kiev	Ukraine	500	A*
209	Azilal	Morocco	800	A*,C,D*
216	Roumoules	Monaco	1400	A*,B*,C,D,E
216	Oslo	Norway	200	E
225	Konstantinow	Poland	2000	A*,B,C,D*,E
234	Junglinster	Luxembourg	2000	B,C,D,E
234	Kishinev	USSR	1000	C
245	Kalundborg	Denmark	300	B,C,E
254	Tipaza	Algeria	1500	A*,B,C,D
254	Lahti	Finland	200	C
263	Burg	E. Germany	200	C,E
263	Moscow	USSR	2000	A*,B,C
272	Topolna	Czechoslovakia	1500	A*,B*,C*,D*,E
281	Minsk	USSR	500	C

Note: Entries marked * logged during darkness. All other entries were logged during daylight.

DXers:
A: Ciaran Fitzsimons, Chertsey
B: Fred Pallant, Storrington.
C: Philip Rambaut, Macclesfield.
D: Jurgen Thiel, Javea, Spain.
E: Neil Wheatley, Newcastle-on-Tyne.

SEEN & HEARD

Freq kHz	Station	Country	Power (kW)	DXer
520	Hof-Saale	W. Germany	200	C*
531	Leipzig	E. Germany	100	C*
549	DLF Beyreuth	W. Germany	200	M*
558	Denizli	Turkey	?	C*
567	RTE-1 Tullamore	S. Ireland	500	C*,G,L,M,N*
567	Damas-Adra	Syria	300	C*
576	Stuttgart	W. Germany	300	C*
576	Radio Metro	?	?	E*
585	RNE-1 Madrid	Spain	200	C*,L*,N*
603	BBC-R4 Newcastle	UK	2	G
604	Capital Radio	?	?	E*
612	RTE-2 Athlone	S. Ireland	100	A*,G,M*,N*
621	VOA Selebi-Phikwe	Botswana	?	E*
630	Saratov	USSR	?	C*
639	BBC Limmasol	Cyprus	500	E*
639	Liblice	Czechoslovakia	1500	C*
648	BBC Orfordness	UK	500	M
666	Bodenseesender	W. Germany	300/180	C*
675	Marsellle	France	600	M
684	Beograd	Yugoslavia	2000	I*,N*
684	RNE-1 Sevilla	Spain	250	L*
693	Berlin	E. Germany	250	C*
693	BBC Droitwich	UK	150	M
720	Sfax	Tunisia	200	C*
729	RTE-1 Cork	S. Ireland	10	G
729	Oviedo	Spain	50	I*
738	RNE-1 Barcelona	Spain	250	C*, N*
747	Hilversum-2 Flevo	Holland	400	M*
756	Brunswick	W. Germany	800/200	M*
765	Sottens	Switzerland	500	I*
783	Burg	E. Germany	1000	N*
792	Sevilla	Spain	20	I*
801	BRF via Munich	W. Germany	420	L
810	BBC Westerglen	UK	100	N*
846	Rome	Italy	540	I*,N*
855	Murcia	Spain	125	I*,N*
873	AFN Frankfurt	W. Germany	150	J*,M,N*
882	BBC Washford	UK	70	L,M*,N*
891	Algiers	Algeria	600/300	N*
900	Milan	Italy	600	I*,M*
909	BBC-R2 Moorside Edge	UK	200	M
918	R.Intercont. Madrid	Spain	20	I*
918	R. Ljubljana	Yugoslavia	600/100	C*,L*
936	Radio Bremen	W. Germany	100	K*
945	Toulouse	France	300	C*
963	Pori	Finland	600	K,M*,N*
972	NDR/WDR Hamburg	W. Germany	300	B*,M,N*
981	Algiers	Algeria	600/300	B*,G*

Freq kHz	Station	Country	Power (kW)	DXer
990	RIAS Berlin	W. Germany	300	C*
1008	Malaga	Spain	?	B*
1017	Wolfsheim	W. Germany	600	M,N*
1053	BBC-R1 Droitwich	UK	150	M
1062	Kalunborg	Denmark	250	I*,N*
1071	Brest	France	20	I*
1089	BBC-R1 Brookmans Pk	UK	150	M
1098	Velke Kostolany	Czechoslovakia	400	I*
1107	AFN Munich	W. Germany	40	C*
1107	BBC-R1 Wallasey	UK	500	A
1125	Zagreb	Yugoslavia	200	C*
1134	Zagreb	Yugoslavia	300	N*
1143	AFN via Stuttgart	W. Germany	10	C*,I*, K*
1143	Kaliningrad	USSR	150	N*
1179	Solvesborg	Sweden	600	A*,C*,H*,N*
1197	VOA via Munich	W. Germany	300	G*
1206	Wroclaw	Poland	200	M*
1215	BBC Moorside Edge	UK	100	M*
1233	Prague	Czechoslovakia	400	I*
1269	Neuminster	W. Germany	600	C*,L*,M*,N*
1278	Strasbourg	France	300	C*
1278	RTE-2 Dublin/Cork	S. Ireland	10	B*,G*,H*
1287	Litomysl/Liblice	Czechoslovakia	300/200	H*,N*
1314	Kvitsoy	Norway	1200	M*,N*
1323	Leipzig	E. Germany	150	N*
1332	Rome	Italy	300	N*
1341	BBC Lisnagarvey	N.Ireland	100	G,M,N*
1350	Nancy/Nice	France	100	I*,N*
1359	RBI Berlin	E. Germany	250/100	B*
1368	Manx Radio, Foxdale	I.O.M	20	D*,M
1386	Kaunas	USSR	1000	N*
1395	Lushnje	Albania	1000	B*,N*
1422	Alger-3	Algeria	50/25	M*
1422	Saarbrucken	W. Germany	1200/600	M*,N*,F
1431	Dresden	E. Germany	250	M*
1440	Marnach	Luxembourg	1200	F,M,N*
1449	Squinanzo	Italy	50	M*
1467	TWR Monte Carlo	Monaco	1000/400	H*,M*
1476	Wien-Bisamberg	Austria	600	M*
1476	RCE Bilbao	Spain	20	M*
1481	Dubai	UAE	?	O*
1503	Stargard	Poland	300	B*,H*
1512	BRT Wolvertem	Belgium	600	A*,H*,M*,N*
1521	Kosice	Czechoslovakia	600	H*
1530	Vatican Radio, Rome	Italy	150/450	I*,N*
1539	DLF Mainflingen	W. Germany	700	N*
1575	Genoa	Italy	50	N*
1593	Langenberg	W. Germany	400/800	C*,F,M,N*

Note: Entries marked * logged during darkness. All other entries were logged during daylight.

at that distance must rank as a remarkable achievement.

Short Wave DX

An increasing number of sunspots are being observed on the active surface of the sun. Due to the intense solar activity, high levels of solar noise have been evident on the higher frequency bands from time to time recently. During some days reception has been more seriously affected by sudden ionospheric disturbances. Apart from these effects the reception conditions are in general very good.

Five broadcasters are now making daily use of the **25MHz (11m)** band: RNI Oslo, Norway 25.730 (Eng (Sundays only 1000-1030), Norw to Africa 1000-1045 and 1200-1250); BBC via Daventry, UK 25.750 (Eng to Africa, Asia 1100-1515); Radio RSA, Johannesburg, S. Africa 25.790 (Eng to Europe, Canada, USA 1400-1556); RFI Paris, France 25.825 (Fr to Africa 0900-1545) and Radio Denmark, Copenhagen 25.850 (Dan to Africa 1400-1455).

Although the jamming by the USSR of the broadcasts from Radio Liberty via Gloria, Portugal 25.665 (Russ to N. Asia, E. Europe 0900-1600) ceased at the end of November, their transmission was subsequently discontinued. The test transmissions made by UAE Dhabi on 25.900 (Ar 0615-1600) have not been heard recently. Test transmissions & broadcasts by Radio Nederlands were heard on 25.970 (Du 1030-1125) during early December, but they have also ceased.

The BBC World Service broadcasts via Daventry UK 25.750 are being well received in Africa **Dick Moon** rated their signal in George, S. Africa as 44444 at 1100 and the latest report from **P. R. Guruprasad** in Molepolole, Botswana quoted 45434 at 1410. Dick Moon logged the transmission from RFI Paris, France 25.820 as 34343 at 1055.

Writing from "down under", John Ratcliffe says he tuned to 25.750 just in time to hear that it was "13 hours Greenwich Mean Time" and that he was listening to "The World Service of the BBC". Their broadcasts are also being heard every day in Montreal, Canada by **Alan Roberts**. Using a 31m dipole with a single conversion home-built receiver he can hear some of the other transmissions too, but the broadcast from RNI in Oslo 25.730 have only been heard once. The only signal that moves his "S" meter needle stems from Radio RSA in Johannesburg on 25.790.

That signal has probably been bending a few "S" meter needles in the UK. Using a Matsui MR 4099 portable with just its built-in whip antenna, **John Nash** rated their signal in Brighton as 55444 at 1425. They have been attracting the attention of **Ted Walden-Vincent** in Great Yarmouth. He uses a Grundig 1400SL portable with its built-in whip antenna and reports reception as good during most afternoons. John **Coulter** found their talk about an amateur radio satellite called "Dove", which beams down peace messages on 145.975MHz, of special interest. John uses a Yaesu FRG-7 receiver in Winchester.

Broadcasts from RFI, RNI and the BBC were mentioned in a large number of reports. The signals ratings varied quite considerably, no doubt because these transmissions reach us via backscatter and other modes. One common factor was mentioned, rapid flutter and echo effects on the BBC signal.

The propagation conditions prevailing in the **21MHz (13m)** are generally excellent. Most of the broadcasts which are beamed to Europe are reaching their target well. They include Radio Japan via Moyabi, Gabon 21.695 (Eng, Jap 0700-0830) 35553 at 0703 by **David Edwardson** in Wallsend; UAE Radio Dubai 21.605 (Ar, Eng 0615-1400) 54344 at 1030 by **Mark Selby** in Aldershot; Radio RSA Johannesburg, S. Africa 21.590 (Eng 1400-1600) logged at 1400 by **Edward Broadsmith** in Worcester; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 44434 at 1505 by John Nash; WYFR via Okeechobee, Florida 21.615 (Eng, Ger, It 1600-1900) logged at 1606 by **Ron Pearce** using a 2 transistor (2N3819/BC109c) straight receiver in Bungay.

Transmissions to other areas have also been reaching the UK. The BBC via Limassol, Cyprus 21.470 (Eng to E. Africa 0500-1615) was logged as 44444 at 0703 by **Kenneth Reece** using a JRC NRD 525 receiver with a delta loop antenna in Prenton; RBI Berlin, GDR 21.540 (Ger, Hi to S. Asia 0730-0830) SIO 323 at 0820 by

DXers:

A:	Ian Bond, Wirral.
B:	John Evans, Shawforth.
C:	Ciaran Fitzsimons, Chertsey.
D:	Gordon Garraway, Bristol.
E:	P. R. Guruprasad, Botswana.
F:	Roy Hill, West Kilbride.
G:	Leslie Hollis, Grantham.
H:	Sheila Hughes, Morden.
I:	George Millmore, Wootton I.O.W.
J:	Mark Selby, Aldershot.
K:	Tim Shirley, Bristol.
L:	Darran Taplin, Tunbridge Wells.
M:	Jurgen Thiel, Javea, Spain.
N:	Phil Townsend, London.
O:	Jim Willett, Grimsby.

David Middlemiss in Eyemouth; SRI via Schwarzenburg, Switzerland 21.695 (It, Eng, Ger, Fr to S. Asia 0745-1030) 35444 at 0835 by **David Wratten** using a Trio R2000 receiver with a 30m wire antenna in Cambridge; Radio Portugal via Sao Gabriel 21.700 (Port to Africa 1000-1200) SIO 433 at 1000 by **Cyril Kellam** in Sheffield.

Those heard during the early afternoon include Vatican Radio, Rome 21.485 (Fr, Port, Eng to Africa 1100-1220) 55555 at 1215 by **Bill Griffith** using a Sony ICF 2002 portable with an AN-1 active antenna in London; Radio Moscow, USSR 21.800 (Eng, Fr, Ar to N. Africa 0900-1700) SIO 444 at 1245 by Philip Rambaut; Radio Austria Int, Vienna 21.490 (Ger, Sp, Fr to W. Africa 1300-1700) 55555 at 1305 by **Neil Dove** in Lockerbie; Radio DW via Wertachtal, W. Germany 21.600 (Eng, Swa, Fr to Africa 1500-1750) SIO 555 at 1500 by **Kenneth Buck** in Edinburgh, using the home built receiver seen in Fig. 2.

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Later, the BBC via Ascension Island 21.470 (Eng to Africa 1615-1745) was logged at 1635 by Ron Pearce; BRT Wavre, Belgium 21.810 (Eng to Africa 1630-1655) 45444 at 1640 by P. R. Guruprasad; Radio DW via Cyclops, Malta 21.680 (Ur, Hi, Eng to S. Asia 1430-1650) SIO 333 at 1645 by Philip Rambaut WCSN Scotts Corner, Maine 21.640 (Eng, Fr, Ger to Africa 1600-1755) SIO 534 at 1650 by Alan Smith in Northampton; RAI Rome, Italy 21.690 (So, It to Africa 1640-1745) 32222 at 1700 by Christian Pritchard using a Kenwood R2000 receiver with a.t.u. and random wire antenna in Cambridge; Radio Nederlands via Bonaire, Ned. Antilles 21.685 (Eng, Fr, Du to Africa 1830-2125) 44433 at 1851 by Darran Taplin.

The conditions on the 17MHz (16m) band are in general excellent, but from time to time solar flares seriously disturb reception by causing total radio blackouts.

Listening at 0600, Christian Pritchard picked up Radio New Zealand 17.705 (Eng to Pacific Areas 2345-0730) and rated their signal as 32222. Kenneth Reece has continued to monitor their transmissions daily and his latest log details variations in their signal which range from "just audible" during some mornings to 34443 at 0527 at best.

Many broadcasters beam a variety of languages towards Europe at some time during the day. They include Radio Pakistan, Islamabad 17.660 (Ur, Eng 0715-1120), rated as SIO 333 at 0815 by David Middlemiss; UAE Radio Dubai 17.865 (Ar, Eng 0615-1500) SIO 433 at 1030 by Kenneth Buck; Voice of Israel, Jerusalem 17.575 (Eng, Fr 1100-1200) 34444 at 1100 by David Wratten; Radio Bangladesh, Dacca 17.710 (Eng 1230-1300) 34543 at 1230 by Leslie Hollis using a Yaesu FRG-7 receiver with a Windom antenna in Grantham; Radio RSA Johannesburg, S. Africa 17.795 (Eng 1800-1900) 54444 at 1800 by Robert Cowell using a Hammarlund HQ 180XE receiver in Blackpool; RCI via Sackville, Canada 17.875 (Hung, Cz, Eng, Fr, Russ 1800-2100) 33343 at 1951 by Leo Barr using a Matsui MR-4099 portable in Sunderland; Radio HCJB Quito, Ecuador 17.790 (Cz, Fr, Eng, Ger 1800-2230) 43433 at 2153 by Richard Radford-Reynolds using a Sangean ATS-803A receiver with a 3m wire in Southampton.

Broadcasts to other areas were logged during the morning were from Radio Japan via Yamata 17.810 (Jap, Eng to SE. Asia 2200-1000) rated as 33443 at 0555 by Kenneth Reece; Radio Bucharest, Romania 17.805 (Eng to Australia 0645-0715) 55345 at 0700 by Mark Selby; AIR via New Delhi, India 17.705 (Eng, Hi to E. India 0730-0740) 23443 at 0730 by David Edwardson; KYOI Saipan, N. Mariana Islands 17.780 (Eng to E. Asia 0200-0800) SIO 433 at 0745 by Alan Smith; BBC via Mahe, Seychells 17.885 (Eng to E. Africa 0900-1400) SIO 222 at 1200 by Philip Rambaut.

During the afternoon, Radio Cairo, Egypt 17.595 (Eng, Beng to Asia 1215-1430) was logged as 45344 at 1258 by P. R. Guruprasad; Voice of Turkey, Ankara 17.785 (Eng, Ur, Far to S. Asia, N. Middle East 1330-1500) 33333 at 1330 by Alan Curry using an Icom R-70 receiver in Stockton-on-Tees; Vatican Radio, Rome 17.730 (Am, Fr, Eng to E. Africa 1515-1600) 34532 at 1545 by Neil Dove; RTM Tangier, Morocco 17.595 (Fr, Eng to N. Africa, Middle East 1400-1700) 53444 at 1640 by John Nash; RTV Tunis, Tunisia 17.610 (Ar to N. Africa, Middle East 0600-1700) SIO 444 at 1655 by John Evans using a Racal RA17L receiver with a 10m vertical antenna in Shawforth.

Later, RCI via Sackville, E. Canada 17.820 (Eng, Fr to Africa 1800-2000) was rated as 35132 at 1822 by Ciaran Fitzsimons using a Saisho SW2000 receiver; WHRI South Bend, USA 17.830 (Eng to S. America 1800-0000) 34433 at 1859 by Darran Taplin; Radio DW via Antigua, W. Indies 17.810 (Ger to C. America, USA 2000-2120) logged at 2028 by Colin Diffell in Corsham.

Good conditions for long distance reception have also been evident in the 15MHz (19m) band. The cessation of the jamming activities by the USSR has resulted in a general improvement in reception.

The broadcasts from Radio New Zealand, Wellington 15.150 (Eng 2345-0730) beamed to Australia have reached the UK. Kenneth Reece has been monitoring their frequency most mornings before dawn. Their signal varied from 13332 at 0424 to 33343 at 0546, but during some mornings it could not be heard at all.

The latest report from George Hewlett, who monitors the broadcasts from Radio Australia on a daily basis in Torquay, indicates that their transmission via Shepparton, SE. Australia 15.240 (Eng to S. Pacific areas 2100-0730) has not been heard for several weeks.

Most broadcasters beam their transmissions towards Europe at some time. They include Radio Japan via Yamata 15.325 (Russ, Sw, Ger, Fr, Eng, Jap 0500-0900) SIO 433 at 0715 by Alan Smith; UAE Radio Dubai 15.435 (Ar, Eng 0615-1500) 54444 at 1330 by Robert Cowell; RTM Tangier, Morocco 15.335 (Ar 1000-0100) 34242 at 1350 by John Nash; Radio Kuwait, St. of Kuwait 15.505 (Ar 0700-0000) SIO 444 at 1500 by Kenneth Buck; Voice of Israel, Jerusalem 15.615 (Heb 0615-2000) 55545 at 1615 by Neil Wheatley; Radio Korea, Seoul, S. Korea 15.575 (Ar, It, Eng, Sp, Port, Ger 1645-2300) 32353 at 1855 by Ciaran Fitzsimons; WINB Red Lion, USA 15.185 (Eng 2003-2245) heard at 2011 by Colin Diffell; Radio Damascus, Syria 15.095 (Ger, Fr, Eng 1835-2105) heard at 2025 by Dick Moon; WRNO New Orleans, USA 15.420 (Eng 1700-2100) 44333 at 2027 by Richard-Reynolds; Radio RSA Johannesburg, S. Africa 15.365 (Eng 1800-2100) SIO 333 at 2038 by John Evans; RAE Buenos Aires, Argentina 15.345 (Ar, Fr, It, Sp, Ger, Eng 1700-2300) 55434 at 2250 by Neil Dove.

Broadcasts intended for other areas were also noted. They stemmed from the BBC via Tsang Tsui, Hong Kong 15.280 (Eng to E. Asia 0300-0815) 35433 at 0427 by Kenneth Reece; Voice of Greece, Athens 15.630 (Gr, Eng to E. Asia 1000-1050) 34333 at 1040 by David Wratten; Radio Nederlands via Flevo, Holland 15.560 (Eng to S. Asia 1130-1225) 52253 at 1215; WYFR via Taipei, Taiwan 15.055 (Eng to S. Asia 1302-1502) 33532 at 1310 by Leslie Hollis; Radio Finland via Porl 15.185 (Eng, Sw, Fin to E. Africa, Middle East 1505-1657) 55555 at 1505 by Sheila Hughes.

During the evening REE via Noblejas, Spain 15.375 (Eng, Fr to Africa 1900-2100) was noted as 54454 at 1935 by P.R. Guruprasad; BBC via Ascension Island 15.400 (Eng to Africa 1500-2300) 34433 at 1956 by Leo Barr; AIR via Bombay, India 15.360 (Eng to E. Africa 1800-2000) 44444 at 1900 by Christian Pritchard; BBC via Skelton, UK 15.070 (Eng to C. America

Freq kHz	Station	ILR BBC	Power (kW)	DXer
585	R. Solway	B	2.00	G,M
603	Invicta Sound	I	0.10	D,F,G,H,J,N
603	R. Gloucester	B	?	A,D,H,N
630	R. Bedfordshire	B	0.30	F,G,H,J,L*,N
630	R. Cornwall	B	2.00	F
657	R. Clwyd	B	2.00	F,G,M,N
666	DevonAir R.	I	0.34	F,G,N
666	R. York	B	0.50	G,N
729	BBC Essex	B	0.10	F,H,I,J,L*,N
756	R. Cumbria	B	1.00	B,G,M
756	R. Shropshire	B	1.00	G,N
765	BBC Essex	B	0.50	G,H,J,L,N
774	R. Kent	B	0.70	D,E,F,G,H,L*,N
774	R. Leeds	B	1.00	B,M
774	Severn Sound	I	0.14	D,G,N
792	Chiltern R.	I	0.27	E,F,G,H,J,L*,N
801	R. Devon	B	2.00	D,F,G,I,J
828	2CR	I	0.27	F
828	Chiltern R.	I	0.20	E,G,H,J,L,N
837	R. Furness	B	1.00	M
837	R. Leicester	B	0.70	E,F,G,H,J,N
855	R. Devon	B	1.00	F
855	R. Norfolk	B	1.00	E,G,H,J,N
855	R. Lancashire	B	1.00	B
873	R. Norfolk	B	0.25	E,F,G,H*,I,J,N
936	Brunel R (GWR)	I	0.18	C,F,G,H,I,N
945	GEM-AM (R. Trent)	I	?	F,H,J*,N
954	DevonAir R.	I	0.32	F,N
954	R. Wyvern	I	0.16	J*,N
958	Capital Radio	I	?	C
990	R. Aberdeen	B	1.00	M
990	R. Devon	B	1.00	F
990	Beacon R.	I	0.09	N
990	Hallam R.	I	0.25	N
999	Red Rose R.	I	0.80	B
999	R. Solent	B	1.00	E,F,G,H,J,N
999	GEM-AR (R. Trent)	I	0.25	G,N
1026	R. Cambridgeshire	B	0.50	E,G,H,J,N
1026	R. Jersey	B	1.00	F,J
1035	R. Kent	B	1.00	E,G,L*,N
1035	Northsound R.	I	0.78	B,M
1047	R. Gloucester	B	?	A
1107	Moray Firth R	I	1.50	E
1107	R. Northampton	B	0.50	E,F,G,H,J,N
1116	R. Derby	B	0.50	G,N
1116	R. Guernsey	B	0.50	E,F,H,J,N
1152	R. Broadland	I	0.83	N
1152	LBC	I	23.50	E*,F,G,H,I*, J,K*,L*,N
1152	Metro R.	I	1.80	M
1161	R. Bedfordshire	B	0.08	H,N
1161	Brunel R. (GWR)	I	0.16	I
1161	R. Sussex	B	1.00	F,H,J
1161	Viking Gold	I	0.35	G,N
1170	R. Orwell	I	0.28	G,J,N
1170	R. Tees	I	0.32	M
1170	Ocean Sound	I	0.12	F,H,J
1242	Invicta Sound	I	0.32	F,G,H,J,K*,N
1251	Saxon R.	I	0.76	E,F,G,J,N
1260	Brunel R (GWR)	I	1.60	F,H,I
1260	Leicester Sound	I	0.29	E,G
1278	Pennine R.	I	0.43	F
1305	R. Hallam	I	0.15	N
1305	Red Dragon R.	I	0.20	F,G
1323	R. Bristol	B	1.00	G
1323	Southern Sound	I	0.50	E,F,G,H,J,K*,N
1332	Hereward R.	I	0.60	E,G,J,N
1359	Essex R.	I	0.28	G,H,J,L*,N
1359	Mercia Sound	I	0.27	N
1359	R. Solent	B	0.25	F,H
1368	R. Lincolnshire	B	2.00	N
1368	R. Sussex	B	0.50	E,F,H,J
1431	Essex R.	I	0.35	H,J,N
1431	Radio 210	I	0.14	E,F,G,H,J,N
1449	R. Cambridgeshire	B	0.15	G,J,N
1458	GLR	B	50.00	F,G,H,J,K,L*,N
1458	R. Newcastle	B	2.00	M
1458	Radio WM	B	5.00	N
1476	County Sound Gold	I	0.50	E,F,G,H,J,N
1485	R. Humberside	B	1.00	G,N
1485	R. Oxford	B	0.50	H,N
1485	R. Sussex	B	1.00	E*,F,H,J
1503	R. Stoke-on-Trent	B	0.50	F,G,N
1521	Mercury	I	0.64	E,F,G,H,J,N
1521	R. Nottingham	B	0.50	G,N
1530	R. Essex	B	0.10	G,H,J,N
1530	Pennine R	I	0.74	J*
1530	R. Wyvern	I	0.52	F,N
1548	Capital (Gold)	I	97.50	C,E*,F,G,H,J, K,L*,N
1548	R. Cleveland	B	1.00	M
1557	Northants 96	I	0.76	G
1557	Ocean Sound	I	0.50	F,H,J*
1584	R. Nottingham	B	1.00	E,F,G,N
1584	R. Tay	I	0.21	E
1602	R. Kent	B	0.25	D,E,F,G,N

Note: Entries marked * were logged during darkness. All other entries were logged during daylight.

DXers:
A: Edward Broadsmith, Worcester.
B: Alan Curry, Stockton-on-Tees.
C: Francis Hearne, Ilford.
D: Leslie Hollis, Grantham.
E: Sheila Hughes, Morden.
F: George Millmore, Wooton, I.O.W.
G: Christian Pritchard, Cambridge.
H: Mark Selby, Aldershot.
I: Tim Shirley, Bristol.
J: Darren Taplin, Tunbridge Wells.
K: Jurgen Thiel, Javea, Spain.
L: Phil Townsend, London.
M: Neil Wheatley, Newcastle-upon-Tyne.
N: David Wratten, Cambridge.

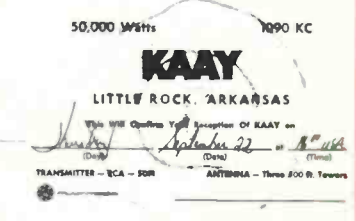

Fig. 1

SEEN & HEARD

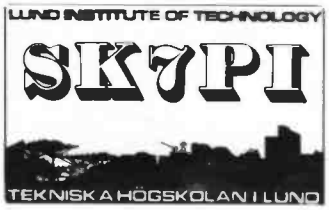

Fig. 2

2000-2245) 55555 at 2000 by Michael Anthony using a Drake SW4A receiver with a 5m wire antenna in Delray Beach, Florida; Africa No. 1, Gabon 15.475 (Fr, Eng to W. Africa 1700-2100) SIO 444 at 2045 by David Middlemiss; VOA via Greenville, USA 15.580 (Eng to W. Africa 1600-2200) 33553 at 2121 by John Parry in Northwich; RFI via Montsinery, Fr. Guiana 15.200 (Port, Sp to S. America 2200-0200) SIO 222 at 2205 by Philip Rambaut.

Broadcasters are now using the **13MHz** (22m) band, some of the programmes intended for European listeners stem from Radio Austria, Vienna 13.730 (Ger, Fr, Eng, Sp 0700-1700) 55545 at 0800 by Mark Selby; Radio Iceland, Reykjavik 13.790 (Ic 1215-1245) SIO 444 by Philip Rambaut; WCSN Scotts Corner, Maine 13.760 (Eng 400-1555) 43333 at 1400 by Alan Curry; WHRI South Bend, Indianna 13.760 (Eng 1500-2100) logged at 2058 by Colin Diffell; WRNO New Orleans, USA 13.760 (Eng 2100-0000) SIO 333 at 2200 by Cyril Kellam.

Broadcasts for other areas include RBI Berlin, GDR 13.610 (Port, Ger, Eng to E. Africa 0445-0645) 44444 at 0602 by Kenneth Reece; Radio Pakistan, Karachi 13.675 (Ur, Eng to Middle East 1315-1630) SIO 354 at 1615 by Kenneth Buck; Radio Prague, Czchoslovakia 13.715 (Eng, Cz, Ar, Fr to S. Asia 1430-2125) 44344 at 1550 by John Nash; WYFR via Okeechobee, Florida 13.695 (Fr, Eng to E. USA 1200-2245) SIO 233 at 2110 by David Middlemiss; Radio Pyongyang, N. Korea 13.650 (Eng, Sp to USA, S. America 2300-0050) 23323 at 2311 by Leo Barr.

Although a number of interesting signals from distant locations were logged in the **11MHz** (25m) band, the broadcasts from Radio Australia have seldom reached the UK. George Hewlett noted that their transmission to the S. Pacific and Europe via Shepparton 11.910 (Eng 0400-0630) has been audible at times around 0600, but it is very weak and marred by co-channel interference.

Other broadcasts intended for Europe stem from Radio Moscow, USSR 11.745 (Eng, Ger, Russ 0730-1630) 42334 at 1225 by Ian Bond; RTV Tunis, Tunisia 11.550 (Ar 0600-1700) SIO 343 at 1350 by John Evans; Voice of Mediterranean Valetta, Malta 11.925 (Eng, Ar 1400-1600) 32233 at 1400 by Christian Pritchard; Voice of Greece, Athens 11.645 (Eng, Gr 1500-1550) 54444 at 1530 by Robert Cowell; AIR via Aligarh, India 11.620 (Eng 1845-2230) 55445 at 1850 by Ciaran Fitzsimons; Radio Bucharest, Romania 11.940 (Ger, Fr, Eng, Port 1800-2155) heard at 1909 by Colin Diffell; Voice of Vietnam, Hanoi 12.020 (Eng, Russ, Viet, Fr 1600-2130) SIO 333 at 1920 by Alan Smith; RNB Brasilia, Brazil 11.765 (Fr 2000-2050) 34443 at 2000 by Richard Radford-Reynolds; Radio Portugal, Lisbon 11.740 (Port, Ger, Eng, Fr, It 1700-2200) 34434 at 2012 by Leo Barr; Radio Damascus, Syria 12.085 (Ger, Fr, Eng 1835-2105) SIO 455 at 2016 by Kenneth Buck; WCSN Scotts Corner, Maine 11.680, logged at 2045 by Julian Wood using a Kenwood R1000 receiver in Buckie; REE via Arganda, Spain 11.790 (Fr, Eng 1800-2200) 43443 at 2130 by Sheila Hughes, Radio Liberty via Playa de Pals, Spain 11.815 (Russ 2100-2300) SIO 433 at 2200 by Cyril Kellam; Radio Japan via Moyabi, Gabon 11.800 (Jap, Eng 2200-0000) 54444 at 2325 by Mark Selby.

Broadcasts to other areas logged include the BBC via Kranji, Singapore 11.750 (Eng to Australia, E. Asia 0900-1030) noted as 34333 at 1025 by Michael Anthony; TWR Agena, Guam 11.805 (Eng to Australia 0930-1100) 23422 at 1042 by Kenneth Reece; KYOI Saipan, N. Mariana Islands 11.900 (Eng to E. Asia 0800-1600) 33532 at 1220 by Leslie Hollis; Radio Beijing, China 11.600 (Eng to S. Asia, Africa 1400-1755) 34443 at 1515 by Neil Dove; Radio Sweden via Horby 11.845 (Eng, Fr, Sw to Africa 1800-1930) 44433 at 1806 by Darran Taplin; AIR via Aligarh, India 11.860 (Fr, Eng to Africa 1845-2045) 54454 at 1945 by P.R. Guruprasad; KLNS Anchor Point, Alaska 11.700 (Russ, Jap to E. Asia 1900-2100) logged at 2030 by Dick Moon; AWR Guam, C. Pacific 11.700 (Chin to C. Asia 2200-0200) 24332 at 2100 by David Wratten; RCI via Sackville, E. Canada 11.880 (Fr, Eng to Africa 2100-2200) 44434 at 2150 by John Nash; BBC via Tsang Tsui, Hong Kong 11.945 (Eng 2245-0045) SIO 222 at 2248 by Philip Rambaut; Radio Globo Rio de Janeiro, Brazil 11.805 (Port to SE. Brazil 0800-0200) 44344 at 0015 by Bill Griffith.

The conditions on the **9MHz** (31m) band have enabled the broadcasts from Radio New Zealand, Wellington 9.850 (Eng to Australia 0900-1115) to reach

Freq MHz	Station	Country	UTC	DXer
2.300	CKBS Hyesan	N. Korea	1500	R
2.307	RRI Jakarta, Java	Indonesia	1600	R
2.325	ABC Tennant Creek	Australia	2100	R
2.380	R. Limeira	Brazil	0130	R
2.560	Xinjiang	China	2303	E
3.200	TWR	Swaziland	1900	G
3.215	R. Orange	S. Africa	0400	N,T
3.230	ELWA Monrovia	Liberia	2215	N
3.255	BBC via Maseru	Lesotho	1840	G
3.260	ORTN Niamey	Niger	0543	P
3.270	SWABC 1, Namibia	SW Africa	2200	N
3.365	GBC Radio 2	Ghana	2115	K,N,T
3.380	Austrian Army R	Austria	1645	T
3.905	AIR Delhi	India	1815	D,H,T
3.909	R. Beijing	China	007	E
3.915	BBC Kranji	Singapore	2000	D,H,J,K,T
3.920	KCBS Shinuju	N. Korea	0124	P
3.940	PBS Hubei Wuhan	China	2210	T
3.950	PBS Qinghai Xinlng	China	0001	A,E
3.955	BBC Daventry	England	1700	C,H,P,T
3.960	R.L. Munich	W. Germany	0029	A,P
3.965	RFI Paris	France	1930	N,P
3.970	RFE Munich	W. Germany	2115	D,L
3.975	BBC Skelton	England	2000	C,K,L
3.980	VOA Munich	W. Germany	2000	D,K,P
3.985	R. Beijing, China	via SRI Berne	2200	B,C,H,I,Q,S,T.
3.985	SRI Berne	Switzerland	2000	K,P,T
3.995	DW Cologne (Julich)	W. Germany	2000	K,P,Q,S
4.050	R. Frunze	USSR	0008	P
4.060	R. Moscow Kharkov	USSR	2220	A,B,C,P
4.065	R. Moscow Ryazan	USSR	2000	I,K
4.190	R. Uchiza	Peru	0200	R
4.220	PBS Xinjiang	China	0112	E,P
4.550	PBS Xinjiang	China	0106	E
4.610	R. Moscow, Khabarovsk	USSR	0138	P
4.635	R. Dushanbe Tadzhik	USSR	0141	P
4.725	BBS Rangoon	Burma	1455	E
4.735	Xinjiang	China	0016	E,M,P
4.740	R. Afghanistan	via USSR	1900	E,O,P
4.750	R. Bertoura	Cameroon	2010	K
4.755	Caracol Neiva	Colombia	0007	T
4.755	Sanl Radio	Honduras	0855	E
4.760	ELWA Monrovia	Liberia	0608	E,H,O,P
4.760	R. Afghanistan	via USSR	1900	A,C,F,J,S
4.765	R. Moscow	via Cuba	0701	P
4.770	CPBS Beijing	China	0002	E
4.770	FRCN Kaduna	Nigeria	2140	A,K,T
4.770	R. Mundial, Bolivar	Venezuela	2253	A,E,T
4.775	R. Gabon, Libreville	Gabon	1940	K
4.775	AIR Gauhati	India	0150	P
4.780	R. Pakistan, Islamabad	Pakistan	1445	E
4.785	RTM Bamako	Mali	2020	K,P
4.785	R. Baku	USSR	0207	E,P
4.790	Azad Kashmir R	Pakistan	1602	E
4.795	R. Moscow	USSR	2155	A,P
4.795	R. Ulan Ude	USSR	1940	K
4.800	PBS Xinjiang	China	2257	A,E,T
4.800	AIR Hyderabad	India	0108	E,P
4.800	LNBS Lesotho	Maseru	1945	N
4.810	R. Yerevan	USSR	2050	E,I,K,P
4.815	R. Beijing	China	1347	E
4.815	R. diff TV Burkina	Ouagadougou	2050	A,K,P,T
4.820	R. Botswana	Botswana	2015	N
4.820	Khanty-Mansiysk	USSR	0446	P
4.830	Africa No. 1	Gabon	2000	A,H,I,K,M,N,T
4.830	R. Tachira	Venezuela	0101	E,N,P,T
4.835	R. Tezulutlan, Coban	Guatemala	0205	P

Freq MHz	Station	Country	UTC	DXer
4.835	RTM Bamako	Mali	2100	E,F,I,K,M,P,T
4.835	RTM Kuching	Sarawak	0015	E
4.840	PSB Heilongjiang	China	2205	K
4.845	ORTM Nouakchott	Mauritania	1940	A,E,F,J, K,N,P,S,T
4.850	R. Columbia Pt	Costa Rica	0645	P
4.850	AIR Kohima	India	0023	P
4.850	R. Capital, Caracus	Venezuela	0435	E,N
4.860	Kalinin	USSR	2130	A,B,H,J,K
4.865	PBS Lanzhou	China	2200	B,E,K,P,T
4.865	V of Cinaruco	Colombia	0215	E
4.870	R. Cotonou	Benin	2135	H,K,P,T
4.870	Ulangoom, Ubsu-nuur	Mongolia	0027	E
4.875	Uraisk	USSR	0443	P
4.880	SABC Radio 5	S. Africa	1900	K,N,P
4.885	R. Clube do Para	Brazil	0757	E,P
4.885	R. Beijing	China	1338	E
4.885	Voice of Kenya	Kenya	2140	K
4.890	RFI Paris	via Gabon	0433	P
4.890	ORTS Dakar	Senegal	2105	K,O,P,T
4.895	R. Ashkabad	USSR	2130	K
4.895	R. Moscow, Kalinin	USSR	2305	A,O,P
4.905	R. Nat. N'djamena	Chad	2100	K,P
4910	RRI Bukittinggi	Indonesia	2330	E
4.910	R. Zambia, Lusaka	Zambia	2100	K
4.915	R. Ghana, Accra	Ghana	2130	E,H,K,M,P,T
4.915	Voice of Kenya	Kenya	1800	N
4.920	ABC Brisbane	Australia	1903	K
4.920	AIR Madras	India	0035	T
4.920	R. Moscow B, Yakutsk	USSR	2005	K
4.935	Voice of Kenya	Kenya	2015	H
4.940	R. Abidjan	Ivory Coast	0631	P
4.940	R. Kiev	USSR	2130	A,E,K,N,P
4.940	R. Moscow, Yakutsk	USSR	1715	A
4.940	R. Yaracuy, S. Felipe	Venezuela	0213	P
4.955	R. Clube Rondonopolis	Brazil	0800	B
4.955	R. Cultura, Campos	Brazil	0817	P
4.970	PBS Xinjiang	China	2339	E
4.975	R. Uganda, Kampala	Uganda	1950	K,N,T
4.975	R. Dushanbe	USSR	0031	E,P
4.980	Azad Kashmir R	Pakistan	0050	P
4.980	Ecos del Torbes	Venezuela	0757	E,P,T
4.990	AIR New Delhi	India	2359	E,M,P
4.990	FRGN Lagos	Nigeria	2255	E,I,N
4.990	R. Yerevan	USSR	2200	H
5.005	R. Nacional, Bata	Eq. Guinea	2050	K,P,T
5.005	R. Nepal, Kathmandu	Nepal	1530	E
5.010	R. Garoua	Cameroon	2005	A,K,P
5.010	SBC Singapore	Singapore	1600	T
5.015	R. Moscow Arkhangelsk	USSR	2110	K,P
5.020	ORTN Niamey	Niger	2110	K,P
5.030	R. Impacto	Costa Rica	0600	N,P,T
5.035	Schulungssender	Austria	1427	P
5.035	R. Bangui	C. Africa	2110	K
5.035	R. Phnompenh	Kampuchea	1447	P
5.035	R. Alma Ata	USSR	0637	P
5.040	Vos del Upano, Macas	Ecuador	0430	N
5.040	R. Tbilisi	USSR	2050	K,P
5.045	R. Rioja	Peru	0706	P
5.045	R. Togo, Lome	Togo	2100	K,P
5.050	R. Tanzania	Tanzania	0549	P
5.057	R. Tirana Gjirokaster	Albania	2115	A,K,N,P,S
5.060	PBS Xinjiang	China	2330	E,P
5.260	R. Alma Ata	USSR	0045	P
5.290	R. Moscow Krasnoyarsk	USSR	0048	P
5.440	PBS Xinjiang	China	1550	E
5.800	PBS Xinjiang	China	1550	E

DXers:
- A: Leo Barr, Sunderland.
- B: Robert Cowell, Blackpool.
- C: Alan Curry, Stockton-on-Tees.
- D: Neil Dove, Lockerbie.
- E: David Edwardson, Wallsend.
- F: Bill Griffith, London.
- G: P. R. Guruprasad, Botswana.
- H: Sheila Hughes, Morden.
- I: David Middlemiss, Eyemouth.
- J: John Nash, Brighton.
- K: Fred Pallant, Storrington.
- L: John Parry, Northwich.
- M: Roy Patrick, Derby.
- N: Christian Pritchard, Cambridge.
- O: Richard Radford-Reynolds, Southampton.
- P: Kenneth Reece, Prenton.
- Q: Mark Selby, Aldershot.
- R: Tim Shirley, Bristol.
- S: Neil Wheatley, Newcastle-upon-Tyne.
- T: David Wratten, Cambridge.

ADVERTISERS INDEX

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SEEN & HEARD

the UK. From Birmingham, Ferris Harris says he was thrilled to hear their broadcast at 0900 for the first time. Alan Smith was also delighted to hear the NZ Bellbird and their opening announcement at 0900 for the very first time. He then managed to pick up it up on three successive mornings! Some idea of their signal can be ascertained from the 24432 rating noted by David Edwardson at 0910.

Broadcasts to Europe from Radio Australia via Shepparton, SE. Australia 9.655 (Eng 0700-1000) are reaching their target well. Although George Hewlett has noticed some co-channel interference at times, most mornings their signal is SIO 444. Their Shepparton station also beams programmes to other areas which have also been reaching the UK. Leo Barr logged 9.770 (Eng to SE. Asia 1000-1300) as 22232 at 1045. In Florida, Michael Anthony noted 9.580 (Eng to C. Pacific, USA 0800-2130) as 44544 at 1015. At 1952, Richard Radford-Reynolds rated 9.620 (Eng to E. Asia, W. Pacific Area 2000-2130) as 32332.

During the day, many broadcasts are beamed towards Europe. They include the Voice of Mediterranean Valletta, Malta 9.765 (Eng, Ar 0600-0800) SIO 444 at 0745 by Cyril Kellam; Radio Budapest, Romania 9.835 (Sp, Ger, Hung 1015-1200) 32333 at 1100 by Michael Anthony; Radio Pyongyang, N. Korea 9.345 (Eng, Fr, Russ, Kor 1300-1750) 34443 at 1300 by Leslie Hollis; RNI Oslo, Norway 9.655 (Norw, Eng, Sp 1700-1745) 33333 at 1702 by Ciaran Fitzsimons; Radio Jordan via Al Karanah 9.560 (Eng 0500-2300) heard at 1900 by Roy Patrick using a Lowe HF125 receiver in Derby; Vatican Radio Rome, Italy 9.646 (Pol, Ger, It, Eng, Fr, Sp 1900-2110) SIO 454 at 2000 by Kenneth Buck; Radio Cairo, Egypt 9.475 (Ar 1800-2350) 43434 at 2040 by Leo Barr; Voice of Vietnam, Hanoi 9.840 (Eng, Russ, Viet, Fr, Sp 1600-2130) 54333 at 2041 by Richard Radford-Reynolds; BSKSA Riyadh, Saudi Arabia 9.720 (Fr, Eng, Ar 1400-2300) 32222 at 2050 by Alan Curry; AIR via Delhi, India 9.910 (Eng 2000-2230) 43533 at 2055 by Neil Dove; Radio Baghdad, Iraq 9.770 (Fr, Ger, Eng 1900-2225) SIO 544 at 2135 by Alan Smith; VOFC Taipei, Taiwan 9.955 (Eng, Sp 2200-0000) SIO 323 at 2215 by David Middlemiss; Voice of Israel, Jerusalem 9.010 (Russ, Fr, Eng, Yid 2100-2325) 32323 at 2315 by Neil Wheatley.

Abbreviations

Alb	Albanian
Am	Amharic
Arm	Armenian
Ar	Arabic
Beng	Bengali
Bur	Burmese
Ca	Cantonese
Chin	Chinese
Cz	Czechoslovakian
Dan	Danish
Du	Dutch
Eng	English
Far	Farsi
Fin	Finnish
Fr	French
Ger	German
Gr	Greek
Ha	Hausa
Heb	Hebrew
Hi	Hindi
Hung	Hungarian
Ic	Icelandic
It	Italian
Jap	Japanese
Kor	Korean
Norw	Norwegian
Pol	Polish
Port	Portuguese
Rom	Romanian
Russ	Russian
So	Somali
Sp	Spanish
Sw	Swedish
Swa	Swahili
Ur	Urdu
Viet	Vietnamese
Yid	Yiddish

Also logged were the BBC via Ascension Island 9.600 (Eng to Africa 0400-0815) 44554 at 0647 by John Parry; Radio HCJB Quito, Ecuador 9.745 (Eng to Australia 0700-1030) 52234 at 0735 by Mark Selby; RTV Bamako, Mali 9.635 (Fr to Mali 0700-1800) SIO 343 at 0845 by John Evans; VOA via Greenville, E. USA 9.590 (Eng to C. America 1000-1200) SIO 444 at 1100 by Edward Broadsmith; FEBC Manila, Philippines 9.800 (Chin to C. Asia 0900-1830) 32343 at 1422 by Leo Barr; SLBC Colombo, Sri Lanka 9.720 (Eng, Hi to S. Asia 1230-1730) 33232 at 1500 by David Wratten; FEBA Radio Mahe, Seychelles 9.590 (Eng 1500-1625) 23432 at 1600 by John Nash; Radio America Lima, Peru (Sp to Peru 24hrs) logged at 1600 by Tim Shirley; SRI via Schwarzenburg, Switzerland 9.885 (Ar, Eng, Ger, Fr to Africa 1715-2000) 33433 at 1833 by Darran Taplin; Radio Algiers via Ouled Fayet, Algeria 9.510 (Fr, Sp, Eng to N. Africa 0700-0005) 44322 at 1910 by Sheila Hughes; BBC via Skelton, UK 9.410 (Eng to S. Europe, N. Africa 0100-2315) 55344 at 2020 by P.R. Guruprasad; KYOI Saipan, N. Mariana Islands 9.465 (Eng to E. Asia 2000-2200) logged at 2104 by Dick Moon; Radio Yugoslavia, Belgrade 9.620 (Eng, Fr to W. Africa 2130-2200) 33333 at 2130 by Christian Pritchard; Voice of Turkey, Ankara 9.445 (Eng, Tur to USA 2300-0450) 55555 at 2300 by Ian Bond.

In the congested **7MHz (41m)** band stations logged include WYFR via Okeechobee, Florida 7.355 (Russ, Ger, Eng 0400-0745) 44444 at 0640 by Sheila Hughes; WCSN Scotts Corner, Maine 7.365 (Eng, Fr, Ger 0600-0755) SIO 533 at 0710 by Alan Smith; WHRI South Bend, USA 7.355 (Eng 0800-1100) rated as "good" by Roy Patrick at 0930; Radio Australia via Carnarvon 7.205 (Eng 1430-2030) 33343 at 1800 by Christian Pritchard; AIR via Delhi, India 7.412 (Eng 1845-2230) 35334 at 2000 by Neil Wheatley; IBRA Radio, Malta 7110 (Pol, Ger, Eng 2000-2115) 44344 at 2053 by Leo Barry; Radio Beijing, China 7.820 (Russ, Rom, Yu, Hung 1500-2155) 34553 at 2105 by John Parry; Radio Moscow, USSR 7.150 (Eng 1700-2300) 54445 at 2120 by Ian Bond; Radio Sophia Bulgaria 7.115 (Eng 2130-2200) 54344 at 2143 by John Nash.

Some broadcasts to other areas logged were: the Voice of Nigeria, Lagos 7.255 (Eng, Fr, Ha to Africa 0500-2200) logged at 0600 by Tim Shirley; BBC via Tsang Tsui, Hong Kong 7.180 (Jap, Eng, Chin to Asia 1100-1615) 34443 at 1245 by Leslie Hollis; KBS Seoul, S. Korea 7.550 (It, Fr, Kor, Ar to E. Africa 1545-1945) SIO 333 at 1740 by Philip Rambaut; Radio RSA Johannesburg, S. Africa 7.295 (Port, Eng to E. Africa 1700-2100) 55555 at 1900 by P. R. Guruprasad; Voice of Israel, Jerusalem 7.460 (Eng, Port, Sp to USA 0000-0255) 45444 at 0018 by David Wratten.

Some long distance signals were also logged in the **6MHz (49m)** band: WHRI South Bend, Indiana 6.100 (Eng to Europe, E. USA 0600-0800) 54434 at 0620 by Kenneth Reece; Burma BS, Rangoon 5.985 (Bur, Eng to Burma 0930-1600) SIO 333 at 1530 by Alan Smith; VOA via Tinang, Philippines 5.955 (Chin, Ca to C. Asia 1100-1600) 31532 at 1530 by Richard Radford-Reynolds; Radio Pyongyang, N. Korea 7.576 (Russ, Fr, Kor, Sp, Ger to Europe 1500-2150) 44444 at 1625 by Bill Griffith; Radio Australia via Carnarvon, W. Australia 6.035 (Eng to Europe, S. Aia 1530-2030) 33343 at 1800 by Christian Pritchard; Radio Globo Rio, Brazil 6.030 (Port to SE. Brazil 0800-0200) logged at 0130 by Tim Shirley; Radio Japan via Sackville, Canada 5.960 (Jap, Eng to USA 0200-0400) 34543 at 0345 by Neil Dove.

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
840	WHAS	Louisville, KY	2300	A
860	WOAY	Oak Hill, W. VA	2100	A
1010	WINS	New York, NY	2100	A
1030	WBZ	Boston, MA	0500	A
1050	WFAN	New York, NY	0200	B
1210	WCAU	Philadelphia, PA	0030	B
1220	WGAR	Cleveland, OH	0130	A
1500	WTOP	Washington, DC	0230	B
1510	WSSH	Boston, MA	0215	B
		Canada		
820	CHAM	Hamilton, ON	0230	A
930	CJYQ	St. John's NF	0030	B
1010	CFRB	Toronto, ON	0200	B
1050	CHUM	Toronto, ON	0200	B
1060	CJRP	Quebec, PQ	0130	B
1060	WTTP	Natick, MA	0200	B
1070	CBA	Moncton, NB	0015	B
1070	CHOK	Sarnia, ON	0730	A
1390	CHOO	Ajax, ON	0600	A
1400	CBG	Gander, NF	0230	B
1570	CHUB	Nanaimo, BC	0530	A

DXers:
A: Tim Shirley, Bristol.
B: Jim Willett, Grimsby.

LW MARITIME RADIO BEACONS

Brian Oddy G3FEX
Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

The introduction of this new series in the November '88 *SWM* has met with a good response and a number of interesting logs for inclusion in the chart have been received from both old timers and newcomers to this aspect of our hobby. Several listeners have mentioned that searching for new beacons is proving to be far more interesting and absorbing that they had envisaged and that their speed in reading the callsigns, which are sent in Morse code, is already improving.

The details given in the chart this time may help DXers to overcome the difficulties in identifying some of the beacons. It seems that a copy of *Reed's Nautical Almanac* may not be available in some of the public libraries, but enquiries made by (Newcastle-upon-Tyne) indicate that the Almanac is published annually towards the end of August and can be purchased direct from the publishers. The 1988 edition costs £13.95, but the publishers will sell back copies (if available) at £2.00 each plus £2.00 postage. The beacon details quoted in the 1987 edition should be adequate for most DXers. If you wish to obtain one, contact: **Thomas Reed, 178-185 High Street West, Sunderland, Tyne and Wear. (Tel 091-567 5211).**

The next deadline for this section will be March 13

SEEN & HEARD

Freq MHz	Call-sign	Station Name	Location	DXer
287.3	CM	Cromer LH	Norfolk	I*,J*,D
287.3	DG	Douglas Pier LH	I.O.M.	C,I,J,K*
287.3	FN	Walney Island	off Lancs	C,I,J
287.3	GA	Outer Gabbard LV	off Suffolk	I,J*,L
287.3	GR	Goeree	Holland	J*
287.3	LV	Dudgeon LV	off Norfolk	I
287.3	NR	Noordhinder LV	Holland	E*,I,J
287.3	PS	Point Lynas	Anglesey	C,I*,J
287.3	SG	Sjaellands LH	Denmark	B,E*
287.3	SK	Smith's Knoll LV	off Norfolk	I*
287.3	SL	Sletterhage	Denmark	J*
289.6	LP	Loop Head	S. Ireland	J*
289.6	TN	Thyboron LH	Denmark	E*,J*
291.9	CP	St. Catherines Pt	I.O.W.	B,I
291.9	ER	Pointe de Ver LH	N. France	J
291.9	FG	Pointe de Barfleur	N. France	B,I*,J
291.9	KD	Kinnairds Head LH	Aberdeen	I,J,K*
291.9	MH	Mahon, Minorca	Balearic Is	E*
291.1	MR	Montedor LH	Portugal	E*
291.9	NR	N. Ronaldsway LH	Orkney Is	B,J*
291.9	PB	Portland Bill LH	Dorset	B
291.9	TI	Cap d'Antifer	France	B,I
294.2	AH	Altacarry Head LH	Antrim	C,I,J
294.2	DA	Pladda LH	Is of Arran	C,J
294.2	LG	Eilean-Glas LH	Is of Harris	B
294.2	MW	Mew Island LH	off Co. Down	C,I,J
294.2	NO	Cabo de la Nao LH	Spain	E*
294.2	PA	Cabo de Palos LH	Spain	E*
294.2	RN	Rinns of Islay	Is of Islay	C,I,J
296.5	BH	Blaavandshuk LH	Denmark	J*
296.5	BN	Ballycotton	S. Ireland	J
296.5	FL	Flatholm	Bristol Ch	B
296.5	FT	Cap Ferret LH	W. France	K
296.5	HM	Hanstholm	Denmark	J
296.5	LA	Lista LH	S. Norway	B,E*,J*
296.5	LS	Lundy Is. S. LH	off N. Devon	J
296.5	NK	Inchkeith	F of Forth	A
296.5	NP	Nieuwpoort W. Pier	Belgium	E*,I,J*
296.5	OH	Old Head Kinsale	S. Ireland	J
296.5	SB	South Bishop LH	Pembroke	B,C,J
296.5	TR	Tuskar Rock	S. Ireland	C,I,J
296.5	VN	Capo Vaticano LH	Italy	E*
298.8	BL	Butt of Lewis	Is of Lewis	B,I*,J
298.8	LZ	Lizard LH	S. Cornwall	B,I,J
298.8	OB	Hoburg	Spain	J
298.8	PE	Penlee Pt	SW. Cornwall	B,J
298.8	QS	Casquets LH	Channel Is	I*,J
298.8	RD	Roches Douvres LH	Channel Is	B,J
298.8	SP	Start Point LH	S. Devon	B,I,J
301.1	BA	Punta Estaca Bares	N. Spain	E*
301.1	BJ	Bjornsund	Norway	J*
301.1	CN	Cregneish	I.O.M.	B,C,I,J
301.1	GV	Genova Lantern	N.W. Italy	B
301.1	IA	Llanes LH	N. Spain	E*
301.1	IB	Bardsey Is LH	N. Wales	J
301.1	NF	North Foreland LH	E. Kent	I,J
301.1	PS	Cabo Penas	N. Spain	E*,J
301.1	PY	Point of Ayre LH	I.O.M	C,F,I,J
301.1	SR	Skerries LH	Anglesey	C,F,H,J
301.1	SU	South Rock LV	Co. Down	C,I,J,K
301.1	WK	Wicklow Head Light	Co. Wicklow	C,E*,I,J
303.4	BM	Brighton Marina	E. Sussex	G
303.4	CH	Chichester Bar	W. Sussex	E*
303.4	FB	Flamborough Hd LH	E. Yorkshire	C*,D,F, I,J,L,M*
303.4	GX	Ile de Groix LH	N.W. France	B
303.4	LM	Isle of May	off Fife	A,B,C*, I,J,K*,D
303.4	LT	Longstone LH	Berwick	I,J
303.4	PO	Poole	Dorset	J
303.4	SJ	Souter Light	Sunderland	F,I,J,L,M
303.4	SL	Spurn LV	off Yorks	B,M*
303.4	SN	Ile do Sein	N.W. France	J
305.7	CB	Corbiere	Jersey C.I.	I,J
305.7	CS	Calais Main LH	N. France	E*,I,J
305.7	FS	Fall's LV	off Kent	I,J
305.7	GU	Tongue LV	off Essex	B
305.7	OE	Ostende	Belgium	I,J
305.7	WH	West Hinder	off Belgium	I,J
308.0	BD	Barra Head LH	Is of Barra	B,C,I,J
308.0	CA	Creach d'Ouessant	N. W. France	C*,I
308.0	GL	Eagle Island LH	W. Ireland	C,J
308.0	HK	Texel	Germany	J
308.0	MZ	Mizen Head LH	S. Ireland	C,I
308.0	PI	Cabo Espichel LH	Portugal	E*
308.0	RC	Cabo Roca LH	Portugal	E*
308.0	RR	Round Island LH	Scilly	B,C,I,J
308.0	SN	Cabo de Sines	Portugal	E*
308.0	ST	Stevns Klint Lt	Denmark	C*,J
308.0	TY	Tory Island LH	off Donega	C,J
310.3	AL	Pointe d'Ailly LH	France	I,J*
310.3	DU	Dungeness LH	S. Kent	D,I,J
310.3	FI	Cabo Finisterre LH	N.W. Spain	E*
310.3	FP	Fifeness Pt	Fife	A
310.3	LR	Laeso Rende LH	Denmark	E*
310.3	PH	Cap d'Alprech	France	I,J
310.3	VI	Cabo Villano	Spain	J*
312.5	BK	Baltiysk Rear LH	USSR	E*
312.6	GU	Geltungane	Norway	J*
312.6	KH	Kish Bank	E. Ireland	C,E*,J
312.6	NB	Nab Tower LH	off Sussex	I
312.6	PT	Souter Pt	Durham	M
312.6	RB	Cherbourg	France	B,I*
312.6	RW	Scarweather	Glamorgan	B
312.6	UK	Sunk LV	off Essex	J
312.6	YE	Ile d'Yea LH	France	E*,K
313.5	BN	Cap Bon	Tunisia	E*
313.5	CX	Cap Caxine LH	Algeria	E*
319.0	LEC	Stravanger	Norway	A,J
381.0	AB	Akraberg LH	Faroes	B
406.0	VZ	Visby LH	Sweden	E*
412.0	AS	Aarhus LH	Denmark	E*
414.0	FK	Frederikshavn Bkw	Denmark	E*

Note: Entries marked * logged during darkness. All other entries were logged during daylight.

DXers:

A: Kenneth Buck, Edinburgh.
B: Gordon Garraway, Bristol.
C: Clive Grey, Wirral.
D: Leslie Hollis, Grantham.
E: Alan Jarvis, Cardiff.
F: Cyril Kellam, Sheffield.
G: John Nash, Brighton.
H: John Parry, Northwich.
I: Norman Pilgrim, Leicester.
J: Philip Rambaut, Macclesfield.
K: Tim Shirley, Bristol.
L: Andrew Westmoreland, Wakefield.
M: Neil Wheatley, Newcastle-upon-Tyne.

Please note that this column will only be published quarterly. The next one will appear in the May '89 issue

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