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Practical Wireless, January 1999
WHAT'S NEW

We have spent the last few months here at our HQ, in Southampton, rebuilding our stores.

We can now offer you the chance of browsing through the shelves to find a bargain.

There are too many items to list here, so pop along this January and have a rummage through our stores.

FT-100

The long awaited FT100 should be available by the time you read this. Just look at the specification.

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Yes, ICOM have done it again. Another winner for sure, this latest offering from Icom is built around the already successful IC706 but now with 70cm on board and a higher output on 2m.

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The Directors and Staff of PW Publishing Ltd. wish all our Readers and Advertisers a Very Merry Christmas and a Prosperous New Year.

Please note that the Editorial and Advertising Offices will be closed from Christmas Eve until Monday 4th of January 1999.
O
casionally, I have to take the decision to 'hold over' publication of articles in PW and I must assure readers that such decisions are often very difficult. It's especially difficult when it's my own work that's involved and, in this case, it's the second part of the 'Radio Basics' continuing 'Tinny Dipper' project.

The reason why the project has been 'held over' is that for most of the production schedule of this issue I have been unwell following a minor operation which temporarily destabilised my diabetic condition. Fortunately though - I'm back at work and thanks to the Editorial team we're 'back on course' and I plan to finish the project soon.

In the meantime, because of the correspondence and interest shown in the 'Radio Basics' series, I've taken the opportunity to publish a 'Radio Basics Up-date' page to help answer all the queries that have come my way. I hope you find it helpful!

Finally, I'd like to thank everyone from PW Publishing who helped look after me when I was so much 'under the weather'. So, 'thank you' Alan, Margaret and husband Chris, Steve & Sandie and their friend Ed' and Shelagh. What a marvellous 'care team' they made!

Tipperary Tribute

I had only just arrived back in the office when a tribute arrived from Tipperary in Ireland which really helped me cheer up! The letter - from Liam O'Brien EI7FE - was sent on behalf of the Tipperary Amateur Radio Group to tell me that at their Annual General Meeting earlier in the month, they'd voted to extend honorary membership to me. No tonic could have worked better I can tell you!

Liam EI7FE (centre of photograph wearing the checked shirt) told me in the letter that they knew I'd had some health problems this year and they wished me well. Additionally, the invitation was extended because of appreciation of your visits to us, the kind words about us and the very kind words about Irish Amateur Radio published in Practical Wireless.

Of course, I was deeply moved by the kind words about Irish Amateur Radio and membership to me. No tonic could have worked better I can tell you!

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HEADLINE NEWS

RSGB's Roving Rally

After 38 years of rallies at Woburn Park, the RSGB will be moving its National Mobile Rally to Hatfield House, Hertfordshire on the 1 August 1999.

Yes, the home of Lord Salisbury will be the home of the RSGB next year and the new table of events reflects this mood for change. Along with all the old favourites, there will be a large car boot sale and flea market, an antenna park with expert advice at hand, a direction finding hunt, craft stalls and children's entertainment!

For further details, you can get in contact with Marcia Brimson on (01707) 659015.

MAPLIN'S MINDSTORMS!

Maplin Electronics has negotiated a deal to stock the market leading robotic invention system - LEGO MINDSTORMS! Designed to develop problem solving skills in the area of robotics.

Targeted at the 12+ age group, Maplin says that "MINDSTORMS" comes in a 700 piece set including two motors, light and touch sensors and much more - mechanisms, gears and wheels, etc. Maplin also tells us that a CD ROM is included in the package which can download the appropriate software in order to programme your invention!

Strangely enough though, this hi-tech toy doesn't come with a construction booklet! Quite a challenge from what Maplin say. Also in the pipeline, Maplin tell us, is a plan to release two additional expansion sets: 'Robosports' and 'Extreme Creatures'. So, keep your eyes peeled for these!

For more information on either the IC-706MkIIIG or the IC-R2 and any of Icom's products, you can get in contact with Icom at Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741. You could visit their Web site on: http://www.icomuk.co.uk

LICENCE TO BECOME UNLICENSED!

The Radiocommunications Agency (RA) have announced that they will be shortly authorising a new hand portable mobile radio service for business, on a licence exempt basis!

According to the RA, Private Mobile Radio (PMR) 446 radio equipment is a short range voice communication system which will replace Short Range Business Radio (SRBR) speech service which is not licence exempt. The service will provide a basic but effective radio system for both business and non-business users and will be ideal for communication over short distances, i.e. within office buildings, factories and building sites.

However, the RA state quite clearly that it will not be suitable for safety of life use or for users who need to have access to frequencies at particular locations and times and only speech transmissions can be made. The RA say that they will stop issuing SRBR licences but existing SRBR licences will be extended until 31 December 2001 to enable SRBR users to transfer to the new PMR 446 service. After this time, no use of SRBR equipment or SRBR speech frequencies will be permitted.

MARKING TIME WITH THE NEW ICOM IC-706MkIIIG

ICOM have just announced the release of a new edition to their range of compact multi-band, multi-mode transceivers - the IC-706MkIIIG! This h.f./v.h.f./u.h.f mobile transceiver, according to Icom, incorporates an expanded frequency range which now includes 470MHz and provides access to the 70cm (430MHz) band in addition to h.f., 6m (50MHz) and 2m (144MHz) bands.

ICOM state that a new addition of power MOS-FETS in all the power amplifier (p.a.) sections results in a considerable increase in the level of output power: the 144MHz band has been increased to 50W with 20W on 430MHz and 100W for the h.f. and 500W bands. With a compact body and carrying handle, Icom say that the IC-706MkIIIG is very well designed. Its individual band change key and sub-dial facilitates mobile and memory operation.

ICOM have also sent us word of their latest receiver to hit the Amateur Radio market. According to Icom, the IC-R2 has a wide frequency coverage of 0.495-1309.995MHz which is divided into nine frequency bands and is capable of reception in f.m., w.f.m. n.w.f.m. and a.m. modes. It also has 400 memory channels separated into eight banks for easy memory channel management.

Dale Blackman, Marketing Manager for Icom said that: "The radio is extremely user-friendly and very competitively priced at £139 including VAT, yet it maintains the quality and features that have become Icom's trademark. It really is exceptional value for money".

For more information on either the IC-706MkIIIG or the IC-R2 and any of Icom's products, you can get in contact with Icom at Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741. You could visit their Web site on: http://www.icomuk.co.uk

BARRY ARC & THE BBC LIGHTEN UP THE NEW YEAR!

From the 17 December 1998, the Barry ARC (BARS) will be involved in a very special event which will not only celebrate the beginnings of radio, but will hopefully...
help build a brighter future for Amateur Radio in general.

In celebration of the first ever ship-to-shore wireless communication achieved between South Foreland Lighthouse and a lightship by Guglielmo Marconi, several members of the Barry ARC have been asked if they would reconstruct this very special moment in history.

PV phoned Glyn Jones GW0ANA, Chairman of BARS, to find out more about what will be taking place that week and discovered that he had some very good news. The BBC, having heard about the event, contacted Glyn and asked if they could record a re-enactment of Marconi's early work at South Foreland Lighthouse in Kent for an "Open University" programme. It will be looking at radio communication - from Marconi to the Digital age and will be screened on BBC2 in February of 1999. The members of BARS taking part will be in dressed in the costume of the period - as you can see from the photo!

The programme will mean good things for Amateur Radio as well done to the BARS for all their hard work in putting Amateur Radio back at the forefront of communications!

---

**PIE HALL'S NATIONAL MILLS DAY!**

Denby Dale (Pie Hall) Amateur Radio Society have dropped us a line to say thank you to all who supported and took part in National Mills Day 1998. According to Tony Barr, the Secretary of the Club, you can still claim the Mills day award for 1998 if you send a copy of your log, along with £3 made payable to Denby Dale ARS, to Tony Barr G4LLZ QTHR. (All profits from the fund will go to SPAB).

If you didn’t know about the National Mills Day this year, do not fear! Denby Dale ARC will be running another one in 1999. This time, for two days: Saturday 8 and Sunday 9 of May 1999. Tony states that you don't have to do both days, but it will give all Amateurs a chance to put on a station on either day as some Mills will not be opening on the Sunday.

The set-up for 1999 will be the same as 1998: each club or individual will be responsible for approaching the Wind/Water Mill owners, applying for your own GB... callsign via the RSGB. Good publicity is just what is needed for Amateur Radio as well. According to Tony Barr, the Chairman of BARS, to find out more about what will be taking place that week and discovered that he had some very good news. The BBC, having heard about the event, contacted Glyn and asked if they could record a re-enactment of Marconi's early work at South Foreland Lighthouse in Kent for an "Open University" programme. It will be looking at radio communication - from Marconi to the Digital age and will be screened on BBC2 in February of 1999. The members of BARS taking part will be in dressed in the costume of the period - as you can see from the photo!

The programme will mean good things for Amateur Radio as well done to the BARS for all their hard work in putting Amateur Radio back at the forefront of communications!

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**Svetlana Survives Economic Crisis**

Readers of Practical Wireless along with major businesses which are involved in Amateur Radio, may be pleased to hear that despite the major economic crisis that is occurring in Russia at the moment, Svetlana Electron Devices are still going strong.

In the middle of October, Svetlana sent PW a press release saying that "The current economic crisis in Russia... should have a minimal effect on tube production at Svetlana SPb..." This in itself was very good news, but at the beginning of November we received a further press release concerning the release of their new Svetlana Audio Catalogue.

According to Svetlana, their extensive variety of audio tubes (valves) are of exceptional quality and the Winter 1998 Audio Tube Catalogue is a complete reference for the entire Svetlana Audio Tube (valve) Line.
**MILLENIUM SPECIAL EVENT FEVER!**

**PRIDE OF PORTISHEAD**

David Barlow G3PPE, the Radio Officers Association Special Event Manager has brought us news of a Special Event Station in honour of Portishead Radio which is due to close down on March 31 1999.

An award will be available for any Radio Amateur who contacts or logs as a short wave listener is.w.1.), four of the area stations on the map shown in Fig. 1. David Barlow states that qualifying stations will be on air during April 1999. The Portishead station will be on air during the first fortnight of that month. (Full details of stations on air will be available nearer the date).

Although mainly a c.w. event, there will be a strict rule that stations will send no faster than the station received and time will be put on one side for ORP and ORS working.

David also told PW that the 500kHz distress c.w. watch will cease on December 31 1998 and there will be a Special Event to acknowledge the work of all ex-marine and shore based Radio Officers. This will be mainly an s.s.b. event, although stations will be asked to spend some time on the Morse key. The RNLI and the Mission to Seamen are the charities which will benefit from the event.

For further information, you can contact David Barlow G3PPE at "Pine" Churchtown, Cury, Helston, Cornwall TR12 7BW. Or you can E-mail him at: dbarlow@enterprise.net There is also a Web site which you can visit: http://homepages.enterprise.net/dbarlow

Or failing that, you can reach him on Packet: g3plefb7tas.#44.GRB.EU

---

**Kenwood's TH-D7E Packet Package!**

Kenwood have sent us news of the new TH-D7E Data Communicator - a new dual band/dual receive hand-held which Kenwood say, is intended to fill the gap which was left by the TH-79E.

Kenwood go on to state that the TH-D7E has a "market leading feature" which should make it stand-out from the TH-79E and that is a Packet TNC which is built-in as standard. This TNC, according to Kenwood, has a number of facilities. It "... operates on both 1200 and 9600 baud and can therefore be used for DX cluster monitoring as well as for sending simple Packet messages via the keyboard". It also allows APRS location beaconing by using an external; GPS receiver - Kenwood say that it will also store received APRS data on up to 40 stations!

Finally Kenwood tell us that it can control many functions of the VC-H1 Visual Communicator which they also launched recently, therefore, for instant portable SSTV, it allows direct transceive mode selection and titling from its keypad.

Kenwood state that the final price is not yet fixed but should be around £325.

---

**WARINGTON'S ANTENNA ANTIICS**

Warrington ARC were busy this summer when some misleading information from their planning authority meant that after having erected their Force 12 array on a fixed mast, they were ordered to then mount it on a retractable mast so that it could be "parked" at roof level.

The photograph shows their daring member: Bill Rabbitt G0PZP who was brave enough to go up the crane and do the work. The crane had been organised through Maurice Jeffery G7HRN and in charge of overseeing the upgrading of the antenna system was George Fare G3OOG. It's good to hear about your Club's antics, so keep PW updated on what's happening in your area!
NEW NOVICE KITS

Lake Electronics have sent PW a last minute FAX to tell us about two Novice kits which they are promoting at the moment. A simple Radio Receiver comprising of just one f.e.t. and one transistor in a basic t.r.f. circuit which covers 6-12MHz and can receive some short wave broadcast stations on a personal crystal ear piece is the first of these new kits, say Lake Electronics. Assembly is on a small printed circuit board and full instructions are supplied.

The second kit is an Audio Amplifier which, Lake Electronics state, closely follows the NRAE Course Manual. All parts - including the loudspeaker - are supplied and they say that it works well in conjunction with the Novice receiver. They cost £8 each plus £1 P&P (for either one or both items). No pictures are available yet but you can contact Alan Lake G4DUVW at Lake Electronics on Tel: 0115-938 2509 or write to them at 7 Middleton Close, Nuthall, Nottingham NG16 1BX.

THE KIND HEART OF AMATEUR RADIO

Cockenzie & Port Seton ARC have written to the PW News desk to tell us that they have managed to raise £873 over the past year for their Adopted Charity - the British Heart Foundation. In the photograph they sent us, you can see (from left to right). Iain Lowis (Director for Scotland for the British Heart Foundation), Ron Brown GM4IKU, Wallace Moodie MM0AMV, Margaret Chalmers GM0ALX and Bob Glasgow GM4UYZ.

Well done to the Cockenzie & Port Seton ARC and good luck for your future fund-raising activities!

WATERS & STANTON'S WATSON & WEATHER EQUIPMENT

If you were interested in the Watson WMM-1 Multi-Mode Data modem, then you just may be even more interested to hear that Waters & Stanton have released the Watson WMM-2 model which they say is "very advanced".

The IBM compatible Data modem now comes with filters which, say W&S, make it especially stable. Coloured LED's show signal state and the new modem is also compatible with all of the HamcommUVFAX/BAYCOM programs. You can purchase the WMM-2 from W&S for £89.95. The Essex based company have also sent word of the BP-2 Packet Modem. This v.h.f./u.h.f. Packet with 1200 baud is also IBM compatible and mention that it plugs into your RS-232 PC D-25 port, is self-powered so the only connection you need make is to your transceiver. They supply the software on 3.5in disk and W&S say that there can't be a simpler or safer way to get started. It costs £59.95 and is also available from W&S now.

"And now for the weather". A phrase which we in Britain have come to know and dread, but which is very apt for the next few items which W&S have sent us information about. Oregon Scientific have six new clocks on the market which not only tell the time but also the weather - and probably more accurately then the TV weather programmes!

The 12 Hour Radio Controlled Weather Centre (BAR888U), according to W&S, is a radio controlled clock which is locked to Rugby MSF. It has a barometer, tells you the inside and outside temperature, has up to three remote sensors (only one supplied) and is linked by a 418MHz radio system with a range of about 30m. It costs £69.95.

The 1224 Hour Clock & Barometer, Thermometer Hygrometer (BAR888U) has a built-in alarm plus a calendar and barometer. It also has a memory so you can recall the past 24 hours values. With temperature and humidity displays this also costs £69.95.

Waters & Stanton say that when going abroad the 12/24 Hour Travel Clock With 'Phone Organiser (AM133) might be worth investing in. It shows local time plus the time in 27 major cities! It has a pocket calculator for currency conversions plus a telephone organiser which can, apparently, store 190 names and numbers and has Internet storage. It costs £15.95.

The 12 Hour Radio Controlled Clock (RM913E) is said to automatically lock onto the Rugby MSF radio signal and tells you the time, date, day and month and also functions as an alarm clock, according to W&S and is priced at £19.95.

The 12/24 Hour Weather Alarm Clock (BA312E) has all the functions of the 12 Hour Radio Controlled Clock, but also displays weather patterns with five weather forecast symbols. With a built-in thermometer which displays the temperature, W&S say that it is an "ideal low-cost clock for the desktop or bed side" at £29.95.

Finally, the Radio Controlled Projection Clock (RM318P), according to W&S has a powerful beam which can be projected onto the ceiling so that you can see the time any time of the day or night without even moving! It also functions as an alarm clock and displays the day, date and month. Quie a novelty from what W&S say and it costs £29.95. For more information, you can phone their Dealer Hotline on 01702 203553.

BARRY'S BRONZE APPEAL!

Barry Amateur Radio Society (BARS) have been busy trying to find a way to replace their bronze plaque which was, unfortunately, stolen last year from Lavernock Point in South Wales. The plaque originally marked the spot where Guglielmo Marconi made the first ever radio transmission across water and it has taken BARS all this time to be able to find the funds to replace it.

They would like to thank all the Radio Amateurs around the UK who donated to the appeal. So if you helped BARS in replacing the plaque, well done. BARS would especially like to thank Martin Lynch of Martin Lynch & Sons for their generosity in making up the shortfall in their appeal fund. They say that without his kindness, the appeal would have taken much, much longer.

In the photograph, you can see Jim Chetcuti GW2PYX and Brian Vodden GW3WBU who BARS tell us did a great job of fixing the plaque to the wall.
Harwell Mystery Solved

Dear Sir
I always wondered where the name "Harwell" came from and Ben Nock G4BXD gave me the answer (after 44 years) in the October 1998 issue of PW.
I was also trained in the Harwell, not in the 1940s, but in 1954 and not at any RAF station, but at Royal Netherlands AF Radio Radar School near Arnhem here in Holland.

The "boxes" were placed in the attic of the building. Two rows of ten on either side with the Net Control Station at the very end which, I believe, was a pre-World War Two NSF transmitter (NSF - Nederlandse Seintoestellen Fabriek), which was operated by the instructor.

Our boxes had the same dimensions as described by G4BXD. It had no door and no d.f. loop on top (not needed in administration/log c.w. nets), but we did have a loudspeaker in the roof. The loudspeakers were there, not to let us hear the engine noise, etc., but the barking voice of our instructor when we did not use the correct NATO c.w. procedure!

The boxes were very badly lit, like the one in the article and equipped with T1154/R1155, two generators, dummy antenna and 'brasspounder' (Not the RAF type 'F'-key.

It was exciting to hear the generators start and the R1155 come to life after some seconds. It was also exciting to work for the first time, as a 19 year old airman, with a professional transmitter!

Harwell was the only name we knew and we used it to name our lessons in the attic. We had used it to name our lessons in the attic. We had

so, thanks to Ben G4BXD who gave me great pleasure with the Harwell story.

Louis van Erck PA0LCE, Netherlands
Morse & A Maltese Opinion

Dear Sir
A lot has been written, both in favour and against the abolition of the Morse requisites to obtain a class A Amateur Radio License. First of all, what is Morse code?
Morse is an art, another language with which one can communicate all over the world, music to the ear and a very efficient and cheap means of communication.
Most of the big Radio Societies like the RSGB and the ARRL are stating that the radio fraternity is becoming an ageing one and this is because Morse is keeping young persons from taking up the hobby. In my opinion, this is sheer nonsense!
One of the reasons why the young people are no longer interested in taking up Amateur Radio is the use of the Internet - which, first of all, is much cheaper to set up, can communicate all over the world and no licence or examination is needed.
Another reason is the price of radio equipment, which is that young idiot who is ready to spend more than £1000 on a black box instead of putting that amount of money as the first instalment to buy a car? I am afraid to say that the big Radio Societies have given much importance to the Internet and the computer.
I have also heard rumours - true or not, I don't know - that the ARRL Handbook is no longer to be issued in book form, but on disk! If this is true, such is the importance given to the computer.

In my opinion, by abolishing the Morse test, we will be killing Amateur Radio. A lot of Radio Amateurs, especially those interested in QRP (who I dare say are the people who are keeping the hobby alive), will lose interest and Amateur Radio will die a natural death.

Carmel Fenech 9H1AQ, Malta GC

Illegal Operation on 28MHz

Dear Sir
It is with concern that I write this letter to you and feel that you may help to bring this to the attention of your readers via the PW pages.
For a number of years now the 28MHz band has been suffering from 'Pirates' who have moved up from the CB band and operate anywhere from 28.250MHz downwards on f.m./a.m./s.s.b.

It seems to me, that when the sunspot cycle is at a minimum and the Amateur activity is low, they seem to think that they are safe from detection. Sadly, this problem has now spread to the 12m (24MHz) band, I have recently lost contacts on 12m due to the fact that Spanish-speaking pirates operating with converted CBs in South America are openly using the band and are ignoring requests to move.
I recently spoke to an American Amateur who had the same problem on 12m and he informed me that Taxi drivers in Sao Paulo were also using the band.

The point I would like to make here is - who is going to do something about it? What band is next? The 21MHz band?

Don Kirby GW0PLP
Cardigan

Editor's comment: Although the illegal operation on 28MHz is a real problem (particularly on the 28.200MHz International Beacon Frequency) the Radiocommunications Agency (RA) would not be able to help us as we are an 'unprotected service' and pay a correspondingly very low licence fee. The answer lies in our own hands - via the International Amateur Radio Union but the chaos associated with the various South American bureaucracies doesn't bring me much hope of a solution - let's hope they all go to v.h.f. or the Internet!

Don Kirby GW0PLP
Cardigan

Letters Received Via the 'Internet'
To start off his 1999 series of practical ideas the Rev. George Dobbs G3RJV says why not "Add life with a moving meter needle" by making an audio S-meter for simple receivers?... After the usual appropriate quotation of course!

Carrying on the Practical Way

There was a time when Radio Amateurs knew what happened inside their equipment - they probably built it. Then came the time when they no longer built the equipment but still knew what happened inside the box. But nowadays - many amateurs do not know what all the controls on the front panel do. Such has been the progress of our hobby!

Certainly the front panels of modern equipment can be complex. They have multi-function readouts and indicate many of the internal functions. Perhaps this is sophistication, although I suspect the ultimate sophistication is a transceiver with only one knob and one switch.

Home built equipment certainly tends to be less complex. Although there are Amateur Radio constructors building very complex equipment, my mail seems to suggest that the most popular 'home brew' projects are those which cost very little and can be completed in a couple of evenings, or a weekend and will work first time.

One common project is the simpler amateur bands receiver, perhaps direct conversion or a simple superhet. Neither of these is likely to include an S-meter as part of the circuit. Usually S-meter readings are derived from the automatic gain control (a.g.c.) voltage.

Direct conversion receivers have no (conventional) intermediate frequency (i.f.) stages, the usual location of a.g.c. control, and many simpler superhets do not include a.g.c. Despite this, in both cases it is possible to add a simple audio derived system of automatic gain control.

Re-Assuring Meter

When operating a receiver, I think there's something re-assuring about having a little meter needle dancing up and down in sympathy with the signal strength. The fact that it may not be doing much in the way of objective measurement seems to be of little importance!

Even the S-meters on the most sophisticated items of Amateur Radio equipment can be of little ultimate value. The more experienced operator knows what an S7 signal sounds like on the receiver and also tends to doubt anyone who says "you are S7 on the meter".

Many S-meters only offer subjective readings but they do look nice on the front panel. So, I begin this little project with honesty as the meter described here has no objective accuracy at all, but it does indicate the relative audio output of the signal being tuned.

The chief advantage of the project is cosmetic - it makes the front panel look better and gives the pleasing effect of seeing the signal as well as hearing it. The whole effect is enhanced if you can find one of those surplus CB rig type S-Meters with the built-in bulb. Doubly so, if you can remove the bulb and paint it with a green or orange felt-tipped pen to add a coloured glow!

The Circuit

The circuit for the audio derived S-meter is shown in Fig. 1. Since the circuit has to connect to the existing receiver audio stages, it's important that it does not offer a significant load to these circuits at the point of contact. Thus the input...
stage for the S-Meter offers a high impedance.

A relatively high value pre-set potentiometer feeds the signal to a field effect transistor (f.e.t.) stage. This arrangement is unlikely to have much effect wherever it's connected, apart from sampling the audio signal because the stage really acts as an impedance transformer.

My prototype used the MPF102 f.e.t. only because I have a lot of them. The more popular 2N3819 f.e.t. will serve the purpose just as well. But remember that the 2N3819 does not have the same pin placements. For some reason (perhaps to do with age!) I have often connected the 2N3819 the wrong way in a circuit, hence my stock of MPF102s.

The capacitor, C5, couples the audio signal to a relatively high gain audio amplifier stage. This uses a bipolar device. Once again this could be almost any generic npn transistor. I have stocks of the 2N3904 so that decided my choice.

The 2N2222 would be another good choice. If, in practice, the overall gain of the S-meter seems a little low, try increasing R6 to around 100kΩ.

The capacitor, C8, feeds the audio signal to a detector circuit, which converts the audio signal into a relative d.c. signal. The diodes D1 and D2 act as a voltage doubler detector to drive the meter from the load, R10. The diode types are also non-critical (mine are the popular 1N914, or they may have been the 1N4148 - who knows!).

The capacitor C9, a 4µF type, 'smooths' out the movement of the voltage. (This may need a little experimentation). If you want the needle to give steady readings, increase the value of C9, if you like it to dance around a little, decrease C9. I found that 4µF (in practice a 4µ7F) was a good compromise value.

The meter is one of those small edge-wise CB type S-meters so often found at reasonable prices. They usually have a full-scale deflection of some 200µA. However, any meter with a similar full-scale deflection would do the job.

Building the S-meter

The little circuit could be built in almost any way. This time I chose to use Perf-Board: the board with a 0.1 inch matrix of holes but without the copper strips found on Vero-Board. I like it as a one-off building medium.

Using Perf-Board it’s possible to replicate a p.c.b. layout without all the fuss of etching a board. The component leads push through the holes and the surplus lead lengths can be used to form the tracks to connect the components in the circuit. Where this is not possible, bits of snipped off leads from other components can be used to form the tracks.

The layout follows the circuit drawing placements. The choice of component types was solely governed by what I had in stock. The higher value capacitors are a mixture of radial electrolytic and tantalum types. The smaller values are cheap ceramic types.

Where To Connect?

The question remains - where to connect the S-meter? I tried the circuit on several receivers, from simple direct conversion receivers to commercial superhets. The most appropriate place seems to be at the top end of the audio gain control. (I suggest you avoid the slider of the control as this would obviously change the reading as the audio gain control was used).

In most cases using the 'top end' of the control will give enough audio signal to produce a useful range of readings. However, it's possible to connect the input of the meter further down the audio amplification circuitry.

There's no reason why it cannot be connected directly on to the output at the loudspeaker or headphone socket. The only answer is to try it and brighten up the front panel of that simple receiver...and I look forward to giving you an S7 report next time we meet on the bands!...
December 13: The Leeds & District Amateur Radio Society is to be held at the Pudsey Civic Centre (Dawson Corner). There will be all the usual traders. Doors open at 1100 (1030 for disabled visitors). There will be a talk-in, a licensed bar, etc. John Mortimer M1CAI on (01943) 874650 or Malcolm Robertson G7VCK on Leeds 0113-225 3379.

December 13: The Verulam Amateur Radio Club will hold its annual rally at the Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Hertfordshire. Ian Forsyth G0PAU on (01923) 265672.

January 17: The Oldham ARC Mobile Rally is to be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 1100 (1030 for disabled visitors). The event features the usual traders and a Bring & Buy stall. Morse tests are available on demand. Talk-in on S22 via GB4ORC commencing at 0730. There will be refreshments and free parking. (01706) 845143 or 0161-652 4164.

February 7: The 14th South Essex Amateur Radio Society Rally is to be held at Drayton Manor Park. Fazeley, Tamworth. There is one large hall, just out of town on the Horbury Road. Easy access from M1 junct 39 & 40 - well signposted and with a talk-in on 2m and 70cm. Doors open 1100 (1030 for disabled visitors and Bring & Buy). Roy G0TYB on (01924) 893321 or packet G0TYB@GB7WRG. E-mail rally@waveg.demon.co.uk or visit the web page at http://www.waveg.demon.co.uk/rally/

February 21: The Barry Amateur Radio Society Rally has changed its venue. The new and improved venue is the Holmview Leisure Centre, Skomer Road, Barry. Facilities include lounge bar, catering and parking. Admission is £1.50 and doors open at 1000 for disabled visitors and 1030 for general public. Brian GW0PUP on (0222) 832253 combined telephone and fax number.

March 7: The Wythall Radio Club are holding their 14th Annual Radio & Computer Rally at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from junction 3 of the M42. Doors open from 1000 to 1600 and admission is £1.50. There will be the usual traders in three halls and a large marquee, Bring & Buy, bar and refreshment facilities are also on site. Talk-in on S22. The rally will also be a unique park and ride for easy and comfortable parking.

If you're travelling a long distance to a rally, it could be worth photoning the contact number to check all is well, before setting off. The Editorial Staff of PW cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers directly. - Editor

Contact Chris GOEYO on 0121-246 7257 evenings and weekends for more details, FAX on 0121-246 7268 or E-mail goeyo@compuserve.com

March 21: The Tiverton South West Amateur Radio Club will be sponsoring and arranging their rally in the Tiverton Panner Market, Doors open at 1000. There will be a wide selection of traders, catering for all aspects of the hobby. There will be the usual excellent food and catering facilities and in the Panner Market. More information from Alan Sedgbeer GOMAS on (01884) 252259.

May 9: The Drayton Manor Radio Club are holding their 13th Annual Amateur Rally in the Tiverton Panner Market. More information from Peter G6DRN on 0121-443 1189 evenings and weekends.

May 20: The Newbury & District Amateur Radio Society will be holding their 13th Annual Amateur Radio Car Boot Sale at Cold Ash playing field, near Newbury. Sellers/Traders should arrive by 0800. Sale open from 0800 till 1500. Ian Trussor, Secretary, on (01635) 826019. E-mail G3RVW@compuserve.com

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<tr>
<td>Cigar power load</td>
<td>£20.00</td>
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<tr>
<td>Active magnet antenna</td>
<td>£99.95</td>
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**MFJ-118**

MFJ-78411

MFJ-%DI.5kW versa turn

MFJ-%9

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**HANDHELD ACCESSORIES**

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<td>Nissi EP-320</td>
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<td>Nissi EP-300T</td>
<td>£19.95</td>
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<tr>
<td>Over the ear earpiece with lapel mic &amp; FTT. Fits Kenwood, Yaesu or Icon.</td>
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**VECTRONICS**

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**HANDHELD ACCESSORIES**

**POLICE STYLE HOLSTER HHC-2**

**PRINTED BY PRACTICAL WIRELESS, JANUARY 1999**
In a way I’m pleased that I’ve been able to find somewhere in PW to publish this page because, in doing so, it’s possible to answer many common questions which have been asked by readers in the last few months. This page also provides an opportunity to defend those readers who’ve considered themselves as “being rather thick” (their words not mine) for not understanding what turns out to be quite straightforward when we’ve discussed it together.

Additionally, I hope to complete the ‘Radio Basics’ Information Sheet 3 soon, so it will join sheets 1 & 2 which are available free if you send a large s.a.e. (50p stamp).

Winding Coils

Unfortunately, one of the biggest problems for beginners in the radio hobby is the winding of tuning coils and this statement is certainly backed up by the comments I’ve received from readers following the series! So, to help I’ve prepared some photographs to prepare some photographs to the series! So, to help I’ve received from readers following up by the comments I’ve statement is certainly backed winding of tuning coils and this.

Fig. 1: Winding single layer and multi-layer coils (see text).

The basic former is shown on the right of the photograph and a single layer coil is in the centre. Note how I’ve used beeswax to anchor both ends of the windings. Incidentally, various sources of wax are shown in Fig. 2. The old silvered mica (usually known as ‘silver mica’) capacitors are very useful for this purpose. You can see how I’ve scraped off little pieces of wax to use on the coils. These are placed as ‘blobs’ and provide an efficient ‘adhesive’ and insulator. The candle wax from the coil shown in Fig. 2, can be ‘dipped’ onto the coil winding to be sealed by taking advantage of the wick. You can probably just see where I’ve used the side of the candle in carrying out this process. It’s a little smelly but there’s no danger and you can very easily clean the soldering iron by wiping it on the cleaning sponge (you have got one haven’t you!). Please note however, that the candle wax (paraffin wax) is more brittle compared to the beeswax and should not be used for temporary permanent fixing purposes.

Multi-Layer Coil

The coil on the far left of Fig. 1 is the start of a multi-layer coil and is shown because readers often have problems with this form of coil. At the top (indicated by a larger amount of wax) the winding is continued through the wax and melted onto the former. The wax stays fairly flexible and provides an efficient ‘adhesive’ and insulator.

Technical stability....an old and useful technique!

Radio Frequency Chokes

Another item which seems to have caused confusion is the construction of home-made radio frequency chokes. Ifirst described winding these items on page 16 of the May 1998 issue of PW for full description of the techniques) is that you can’t damage the former with hot wax. In fact, the paper absorbs some of the wax, adding to the general stability....an old and useful technique!

Radio Frequency Chokes

Fig. 3: Winding ‘home-brewed’ radio frequency chokes on resistor bodies (see text).

If you wish, you can buy ferrite cores to wind your own chokes and Fig. 4 shows one which has been wound on a ferrite core. It so happens that I’ve got a range of these cores from Robin Sykes of Sycom (see advert) but they are available at many rallies and from many of our advertisers. Once you’ve completed the chokes, the windings should be sealed with wax to stop them unwinding or slipping off. Hopefully, I’ve now straightened out one or two problems for budding constructors. And to re-assure those of you who’ve told me that they “feel rather stupid” for asking for clarification...I’ve got to point out that in a classroom situation they’d be able to ask the question there and then as they arise! (A small price to pay for ‘distance learning perhaps?).

Please keep writing in with your comments and I hope you all continue to enjoy ‘Radio Basics’ as much as I do preparing it for you.

As mentioned in ‘Keylines’, in place of the usual ‘Radio Basics’ column Rob Mannion G3XFD is taking the opportunity to provide up-dates and information on questions and reader’s problems involving published projects in the series so far.
MOSLEY U.S.A. H.F. ANTENNAS

Mosley Antennas have pre-drilled, colour coded elements making assembly quick and easy. Hardware is Stainless Steel, Tubing, aircraft grade, drawn, aluminium. The telescopic tubing is therefore closer tolerance, so no unsightly hose clamps like other makes. Mosley have two traps in each trap assembly. A Mosley 3 element, has 8 trap assemblies, other makes have twelve!

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VHF Transceivers
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- Capco SPC300 HF ATU 1kW £175
Wig less St No.46

The waterproof Wonder

Ben Nock G4BXD, our Valve & Vintage military specialist, takes a very close look at the water-tight Wireless Set No. 46. Due to the conditions it was designed for, the Wireless Set No. 46, as you will discover, is truly a 'Waterproof Wonder' indeed!

During the years of the Second World War there were many innovations in the field of radio communication. Necessity being the mother of invention, great strides and leaps in design, construction and downright cleverness took place.

One of the interesting sets to emerge from this period was the Wireless Set No. 46. This small, man-carried set used several clever design considerations and brought easy, reliable communications to the foot soldier and could even withstand a dunking in the sea.

Developed around the early part of 1941, one design consideration was that the 46 set could be used for a sea landing, with the Commandos for example, so the set should be watertight, easy to operate and able to withstand the knocking about it was likely to receive. Indeed, around the joint between the set and its case is a rubber gasket to keep out the water and all the controls have rubber gaskets around the shafts and the handbook tells the operator how to wrap the batteries to keep out the water.

The transmitter output of the No. 46 set is much greater than the other well known 'manpack' set of that period - the Wireless Set No 38. Between 1 and 1.5W is available from the No. 46 set, compared to the 0.25W (250mW) for the No. 38 set.

The receiver and transmitter of the No. 46 set are crystal controlled thus eliminating the need for the operator to 'net' onto another station. The frequency stability and relatively high power make the No. 46 set a very attractive choice for troops that have to be fast moving or first in to a particular action.

The wireless set is carried in a canvas bag on the operator's left chest with a separate canvas bag on the back holding the batteries. A single cable runs between the set and battery bag, there being a junction box on the side of the battery bag to which the headphones and microphone are connected. (See Fig. 1). Two pairs of headphones and a microphone can be connected, one for the operator carrying the set, another set for any passing officer. The headphones are the normal DRL2 type whilst the microphone uses the throat type. (See Fig. 2). The usual rubber 'snatch plugs', found on the No. 22, 19 and 62 sets for example, are used for easy connection.

The canvas cover for the set also holds the antenna rods when not in use and even has a dust cover for the microphone plug. All the controls are on the top of the set and are thus easily visible to the operator. The size of the set, as can be seen from the photographs, is about 300x175x100mm, the set itself weighs approximately 5Kg whilst a complete station, with one set of batteries, weighs in at approximately 11Kg.

Amplitude Modulation

The 46 set could be operated between 3.6 and 9MHz and offered amplitude modulation R/T (a.m.) or modulated c.w. (m.c.w). The push-to-talk switch acting as the Morse key in this mode. There is no b.f.o. provided on the receiver so normal c.w. cannot be resolved. The coverage of the No. 46 set is divided into four bands, there being a small colour coded coil pack for each band, which plugs inside the set whilst in the workshop.

It was not envisaged that the operator would change either the crystals or the band coils in the field. Two 10XJ crystals are needed per channel, three channels being available. With the i.f. of the receiver at 1550kHz, the receive crystal needs to be 1550kHz higher than the transmit crystal (which is always on the frequency of required operation) between 3.6 and 4.3MHz, whilst being 1550kHz lower for the remaining coverage. (See Fig. 3).

"...it's a real pity such design and production ideas aren't more prevalent today"

Fig. 1: The Wireless Set No. 46 as carried by the foot soldier.

Fig. 2: The headphones and microphones as used with the Wireless Set No. 46.

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Practical Wireless, January 1999
The complete set uses six valves in total, four on receive and three on transmit with one being common to both paths. The receiver is a standard single conversion superhet with an i.f. of 1550kHz as previously stated.

The first stage in the receive path is a common passive tuned antenna circuit, the first valve being the crystal oscillator and frequency changer. This feeds the first i.f. amplifier stage. A second i.f. amplifier stage also acts as the receive audio amplifier.

The fourth valve in the chain operates as the a.f. detector and a.g.c. detector on receive and as the modulation amp or m.c.w. oscillator on transmit.

Notice the clever multi-role use of these valves, saving on space and power consumption. On transmit the output of the modulation amplifier drives the modulator stage proper, which acts upon the single transmit stage, this being a crystal oscillator cum p.a. stage. Despite this method the p.a. still manages to deliver nearly 1.5W into the common antenna circuit.

Antenna Rod
The standard antenna would have been the 2.3m rod type, made up from B sections carried with the set. If manoeuvres permitted, a 4.8m whip, made up from F sections and using a ground spike and bracket along with a small adapter, using the terminal marked F to feed the antenna, that plugged into the set, could be used.

Diagrams in the handbook also suggest the use of a trailing wire laid on the ground of around 7.6m in length. The wire was to be laid in the direction communication was wanted. Wires thrown into trees or other high supports could also be used, again utilising the antenna adapter, this time using terminal 'L', which is in reality, a couple of series capacitors in a small box.

Another innovation of the No. 46 set was that a built-in dummy load was provided which could be used to give an indication of the state of the batteries. The dummy load represented the same match as the 2.3m whip. The quoted range of the sets, working 46 to 46 set, was up to 16km for the 2.3m antenna whip but, of course, this would be very dependent upon frequency, time of day and terrain.

Battle Battery
The No. 46 set used the same type of battery as that termed the 'battle battery' for the wireless set No 18, or the 163/3 battery. Supplies needed are around 150/160V h.t., 12V grid bias and 3V for heaters. The power consumption on receive, in the a.m. mode, is about 10mA. In the m.c.w. mode it is also about 10mA. On transmit, in a.m. mode, the h.t. drawn is about 28mA, whilst in m.c.w. mode it is 37mA.

Heater current on transmit, either mode, is 550mA. Whilst on a.m. reception it is 350mA. On m.c.w. reception it is up to 850mA. This is due to all the heaters being on in this mode for quick change over. However, if you wanted to use one of these sets today it is very unlikely the correct battery could be obtained.

The nice thing is through, with such a large back pack (see Fig. 5), it would be quite easy to make up and accommodate a set of batteries for the heaters - two D cells for instance - a set of AA cells for the grid bias (as little current is drawn) and a small inverter unit, running off D cells as well for instance, supplying the 150/160V h.t. needs. I have described such a power supply if past articles.

Little Wonder
The Wireless Set No 46 is certainly one of the little wonders of the war. It is compact, reliable, easy to use and (of great importance) not too heavy. Though I guess if you're carrying the set, a rifle, ammunition, tin hat, full battle dress, webbing, supplies, etc., then it might all seem just too much!

Though the set does lack the facility of tuning around the bands, the crystal control option does mean the set is stable. It might not be very versatile on the amateur bands, but if a net frequency was being used - for example the 3.625MHz of the Military Wireless Amateur Radio Society (correct at time of writing) - then you could have a couple of crystals cut, or better still, grind them yourself and the set could be used in a limited fashion.

The set is a very nice example of the 'best of British', it's a real pity such design and production ideas aren't more prevalent today. My mark - ten out of ten for the No. 46 set.

PW
Making Light Work...

Solving Power Problems

Reviewing solar panel units in the winter? You may think that Rob Mannion G3XFD has totally lost all his reason! But no, Rob considers that as we know they'll work in summer - he'd try them for possible all year round use.

Fig. 1: One of the pair of solar panels posed alongside a copy of PWV for size comparison purposes. Each unit is rated at a nominal 8W for size comparison purposes. Each unit is for size comparison alongside a copy of PIN solar panels posed Fig. 1. One of the pair of panel units in the winter. If you've lost your senses, but I was anxious to try solar power panels to provide a 'trickle charge' system for when I was operating in my car during the autumn and winter. During the summer, running the car engine up now and then again (even with the air-conditioning on) became quite unpleasant and it was obviously not an 'environmentally friendly' thing to do.

Even in winter, when it can get quite cool at times, I still find it pleasant to sit in the car operating on h.f. as G3XFD/P. And, as many of you will know...it can get surprisingly warm in a car behind the windscreen so it seemed a very good idea to try a set of panels to see if they would be a good investment for possible all year round operation.

Hey Solar Products

Bob Keyes GW4IED of Key Solar Products has been involved for some years now in both solar power and wind-driven energy sources. Bob has supported our 144MHz QRP Contest by awarding prizes for the runner-up and I was intrigued by the solar panels he'd donated - so I thought I'd try them for myself.

The panels Bob supplied were a nominal 8W at 12V type measuring 465 x 365 x 23mm in their casing. As they obviously incorporate glass, they're not that light (but still very portable) and weigh in at approximately 3kg.

For the review I was supplied with two separate units of the size mentioned, as Bob thought they'd be more portable and less cumbersome than a larger type. Each was fitted with a generous four metre length of lightweight 'mains' type twin cable with a fuse unit. The rear of the solar panel unit also contains diode protection to avoid 'feed back' from the battery that the unit is connected to for charging.

Useful Charge

Operating with the solar panels on the roof of my estate car I found that on the first day - chosen because it was overcast with intermittent rain showers - I found that the two solar panels working in parallel provided a very useful charge into the car battery. Even during a heavy rain shower the charge going into the battery (monitored using an AVO 8 meter) rarely dropped below 25mA.

During overcast conditions with no rain I found that the panels provided an average of 160mA, dropping to around 25mA in a heavy shower. It was fascinating to watch the meter vary its indication as cloud cover changed as the clouds themselves moved.

In bright wintry sunshine the maximum current going into the my vehicle battery reached a peak of 500mA. I didn't think this was too bad at all...considering that the panels were laid almost flat on the car roof and weren't pointed directly to the weak wintry sun which was low on the horizon.

Running my Alinco DX-70 at 10W and less, I was quite happy that I could operate for long periods without risking a flat battery. I always worry about this because my car is a diesel (virtually impossible to push start) and the battery has many demands on it because of the special adaptations so that I can drive the vehicle. So, I always take care to ensure I don't get stuck in lonely h.f. operating locations!

Practical Alternative

After my experiences using the solar panels over a month or so, I really think that they provide a practical, alternative charging supply. They would be absolutely ideal for a narrow boat holiday as you could place them on the cabin roof, or for camping to maintain a dedicated battery for a hand-held or portable rig. I'm so pleased with the results of the tests that I'm buying a set of panels for general and portable use. When not in the car I'll use them to 'trickle charge' 12V batteries I keep in the shack.

Solar panel efficiency (and value-for-money) has improved from the days I used them for maintaining the batteries at remote v.h.f. Band II radio and Band IV & V u.h.f. television 'active deflectors' in the Highlands of Scotland. In those days, solar panels cost the price of a diesel (virtually impossible to push start!) and the battery provided power for many years - providing we didn't run out of sun!

So, it's without hesitation that I can thoroughly recommend these solar panels as an 'eco-friendly' battery charging system. With the appropriate care they should provide power for many years - providing we don't run out of sun!

My thanks go to Bob Keyes GW4IED of Key Solar Products, 4 Glanmore Crescent, Newport, South Wales NP9 8AX. Tel/FAX: (01633) 280958. Price of the solar unit reviewed are £33 each plus £10 P&P (per order, Thus two panels cost £10 P&P). See Special Offer on page 51.

Bob also has a catalogue showing his full range of 'alternative' energy products and this is available in exchange for four First class stamps.

Practical Wireless, January 1999
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Practical Wireless, January 1999
Ray Bennett GM0OTP shares the story behind a Special Event Station which took place back in November 1996 from the wireless cabin aboard Royal Research Ship Discovery, now based in Dundee, a city which is also famous for Jam, Journalism and (formerly) Jute manufacturing!

The RRS Discovery on trials off the Bell Rock in 1901, from an original painting by Captain Charlie Keith Major, courtesy of Dundee Heritage Trust.

This fascinating story really begins when Commander Robert Falcon Scott, Royal Navy, led the National Antarctic Expedition for scientific and geographical work down South on Discovery in 1901. He'd already decided not to take wireless equipment which was still largely experimental after seeing telegraphy demonstrated in Switzerland where he was trying out sledges.

As a naval officer, Cdr. Scott knew of another officer - Captain Jackson, who had an interest in communications at sea by means of wireless telegraphy in association with Marconi and William Preece, (Chief Engineer to the Post Office in 1896). Another heavily timbered ship built to withstand the ice - the Terra Nova - didn't have wireless either. Built in Dundee, it took him on his fatal last journey to Antarctica in 1910.

(Incidentally, despite research I cannot find mention of telegraphy in books on Terra Nova, or any evidence of antennas rigged on the vessel in photographs, or telegraphists 'signed on' in the crew manifest).

Major Refit

The Discovery was sold to the Crown Agents in 1923 and had a major refit by Vosper before beginning life as Royal Research Ship Discovery, intended for scientific research in the Southern Ocean.

Modifications were made to improve the ship's sailing performance by moving the mainmast approximately 2.5 metres forward. Additional modifications included upperworks built to carry a Gipsy Moth seaplane and the present larger deckhouse. in place of three smaller ones, to accommodate a wireless cabin with separate battery room.

The Discovery then had her port of registry changed from London to Port Stanley since she was then owned by the Governor of the Falkland Islands. A very long way from her London to Port Stanley since she was then owned by the Governor of the Falkland Islands. A very long way from her

Wellgate Library.

The Hakluyt Society which caters for such specialists.

Details of Williams' c.w. exploits, problems with propagation and getting signals are published in Antarctic Days With Mawson by Harold Fletcher, which is in the Wellgate Library.

My research has also been rewarded by some information from Mrs Betty Hence, Company Historical Dept, GEC-Marconi Electronics Ltd, who advises me that the first Marconi wireless equipment fitted in Discovery was in the 'T-type' series.

Contemporary Gear

I am also pleased to report the members of the Royal Naval Amateur Radio Society (RNARS) have kindly offered help to find early contemporary gear to 'refurbish' the Discovery wireless cabin. Can you visualise a figure in Petty Officer's uniform seated at the bench, hand on key with a continuous Morse tape playing? With this facility, visitors to the ship will have a peek into the past on board at early maritime wireless communication.

Our Special Event Station was actually operated on the weekend of 16/17 November 1996 in aid of the BBC's 'Children In Need' appeal from which we raised £295. The Discovery was built in Dundee in 1901 and we operated in the original radio room which was last used in 1932.

No, not the natural 'fireworks of the Antarctic's 'Aurora Australis' - but man-made fireworks celebrating the 10th anniversary of the preservation of the RRS Discovery at her Dundee birthplace.

(From a postcard photograph courtesy of Dundee Heritage Trust).

Jones G4XZJ for historical information.

I have been re-reading correspondence with Martyn some years ago when reconstruction of the wireless cabin on board Discovery was first mooted. He has been studying polar exploration for 40 years, has a library of 400 books on the subject and is a member of the Hakluyt Society which caters for such specialists.

Details of Williams' c.w. exploits, problems with propagation and getting signals are published in Antarctic Days With Mawson by Harold Fletcher, which is in the Wellgate Library.

My research has also been rewarded by some information from Mrs Betty Hence, Company Historical Dept., GEC-Marconi Electronics Ltd., who advises me that the first Marconi wireless equipment fitted in Discovery was in the 'T-type' series.

Contemporary Gear

I am also pleased to report the members of the Royal Naval Amateur Radio Society (RNARS) have kindly offered help to find early contemporary gear to 'refurbish' the Discovery wireless cabin. Can you visualise a figure in Petty Officer's uniform seated at the bench, hand on key with a continuous Morse tape playing? With this facility, visitors to the ship will have a peek into the past on board at early maritime wireless communication.

Our Special Event Station was actually operated on the weekend of 16/17 November 1996 in aid of the BBC's 'Children In Need' appeal from which we raised £295. The Discovery was built in Dundee in 1901 and we operated in the original radio room which was last used in 1932.

So, perhaps when you do "Cross The Silvery Tay" - to Dundee Heritage Trust)
The warm smell of polished wooden cabinets and the dim glow of valve filaments announces that Charles Miller is looking after PW's vintage 'wireless shop' this month. This time he's chatting about 'ruling the waves' and 'waiving the rules'!

First of all, I would like to thank all the readers who wrote to tell me their personal experiences with the Barker 88, the subject of my last piece. Incidentally, it was also one of the few radio sets that continued to be produced through the Second World War after most of the manufacturers had been co-opted into making military equipment.

One particular letter referred to a development of the '88 called the '838'. Someone else has sent me brief details of what appears to be a projected push-button version which does not appear to have materialised.

As regards the bomb damage to Barker's store during the war, at the recent Radiophile exposition at Cowbit (Lincolnshire) I met a surprisingly young-looking gentleman. He told me that he'd been a student in London at the time and had actually seen the German V1 'Doodle-bug' pilot-less flying bomb fall onto the premises.

Turning back to 1939, considering the ever-worsening situation in Europe during the August of that year, the annual RadioOlympia went ahead in what appeared to be a spirit of almost total optimism on the part of the radio and television trade. In fact, the only admission of concern about what might happen if war broke out, was the decision by radio makers to postpone the fitting of new dials marked in accordance with the wavelength changes planned to take place the following March! It was a good idea at the time, as they say, but it didn't work out as expected.

**Optimistic Noises**

Whatever optimistic noises might be being made in public by the establishment as Britain experienced a glorious summer, in private there was little doubt of what was about to happen as the Nazi hordes poised themselves to cross the River Vistula into Poland.

The invasion took place in the early hours of Friday, September 1st, and, as Britain was pledged to give military support to Poland, war with Germany became inevitable. That same day, BBC engineers started to put into operation a long-planned emergency measure designed to prevent enemy aircraft from using its transmitters as handy radio beacons by which they could home in on the main UK centres of population.

All the medium wave regional stations and some of the nationals were re-tuned to one of two groups on 391.1m and 449.1m, the former being used in the northern part of Britain, the latter in the south.

Even the old long-wave transmitter at Daventry, mothballed since 1934, was dragged out of retirement and re-tuned to work on 391.1m. The result of this reorganisation was to render it impossible for any aircraft using radio direction finding equipment positively to identify the location of any one station until it was virtually within sight, by which time it was anticipated that the station in question would have been closed down on orders sent out by RAF Fighter Command.

Listeners in the area concerned would notice a considerable drop in signal strength but, provided they had decent antenna and earth systems, they ought to be able to carry on listening via one of the other stations in their particular group.

The idea was ingenious but unfortunately, to make it effective, all the transmitters had to carry the same programme material so the BBC had to abandon its cherished National and Regional set-up in favour of a single nationwide programme.

Obviously, the long wave National transmitter at Droitwich couldn't be fitted into the scheme so it was closed down altogether for the time being. Meanwhile, the former National transmitters at Brookman's Park, Moorside Edge and Westerglen on 261.1m were reassigned to a new night-time European Service.

A few weeks later the Droitwich transmitter was returned to the same wavelength and joined the other three. Because it too used a unique wavelength, the television transmitter at Alexandra Palace had to be shut down, which happened unceremoniously on that fateful Friday morning at the end of the trade transmissions made for the benefit of exhibitors at RadioOlympia.

In fact, the show itself closed down the same day instead of remaining open until the Saturday. Presumably someone had tipped the wink to the organisers that to remain open would be to risk grave embarrassment for the radio set exhibitors when the wavelength changes took effect.

**Air Became Blue**

When the following morning dawned the air...
became blue all over Britain with the curses of listeners who couldn’t find the usual Regional or National programmes, only a single new one calling itself the BBC Home Service. Particularly incensed were those people who had invested in expensive new sets featuring automatic tuning which had no longer worked as expected.

Added to the chorus of complaints were those of radio set designers who discovered that all their carefully considered new tuning dials had become obsolete overnight. As regards television, those would-be viewers who had recently paid out very large sums for receivers were not exactly pleased to discover that, effectively, they had wasted their money.

For that matter, gloom and despondency descended like a pall on the set makers who had invested much time and money in producing television receivers that now might as well be put back into their packing cases and dumped into storage rooms. All this must also have caused some heart-searching on the part of our old friends at the BVA: what were they going to do with all those special types that had been specially developed for television?

There was an additional problem...what was going to happen if and when domestic radio receiver production had to take second place to military communications equipment? However, it’s the lip service that blows nobody any good and on further consideration of the situation certain compensations became apparent.

Television & Radar

Most of the television valves could be used equally well for radar purposes and ordinary radio sets. Consequently, military sets. In fact, the valve manufacturers were about to enter the nearest thing to paradise they could expect to find on earth! When domestic receiver production did taper off about a year later, the existing vast range of different valves was reduced to a core of essential types. These were to be made in their millions and paid for by the best customer that any firm could wish for - the British tax-payer.

As an unexpected bonus, the Nazi occupation of most of Europe did something that the BVA never could manage on its own...it brought an end to the importation of cheap Continental valves. In addition, the restriction of trans-Atlantic shipping curtailed imports from the USA.

The sound of cash registers ringing merrily in the valve makers’ warehouses was music to the ears of the fortunate shareholders. Meanwhile, that section of the Establishment devoted to thinking up arcane rules and regulations about broadcasting had turned its attention to the various radio relay exchange companies, of which Rediffusion Ltd. was the best known example, that had been set up to distribute interference-free radio programmes to households via cable networks.

To preserve the BBC’s monopoly the cable networks had always been forbidden to generate their own programmes material. But now this rule was to be relaxed to permit them to send out emergency messages at the behest of the local Chief Constable or Air Raid Precautions Controller.

Nothing is simple to the official mind however! So the facility was hedged about with a myriad of restrictions that must have made it all but impossible for anyone to judge what constituted an emergency within the meaning of the law.

For instance, to the ordinary individual it might well seem to be a good idea, if part of a town was a raging inferno due to incendiary bombs, to warn people to keep clear of it: but no, not a word was to be said!

The same applied if a certain area had been deluged with poison gas - keep quiet about it. If streets had been blocked and bridges brought down by bombs, too bad - road users must be left to find that out for themselves.

Under No Circumstances!

Even if hordes of panic-stricken citizens were to be observed running like lamblings towards areas of extreme danger, under no circumstances were they to be warned by public address loudspeakers. Oh, and to make sure that citizen morale was kept low, it was not permitted to report that enemy aircraft were being driven off by our own fighters.

It must have been great fun for the Civil Servants concerned to sit in deep bomb-proof shelters and dream up the measures. There was, however a concession. Relay companies with two-channel services were to be permitted to put out foreign music broadcasts on one of them even during devastating air raids, provided, of course, that the other channel carried the BBC Home Service.

There was a catch though, as no foreign spoken items might be sent out. So presumably, someone had to sit by the main amplifiers in the relay company’s headquarters and flick the switches to off when announcements between musical items were being made.

How the local Chief Constables and Air Raid Precaution (ARP) Controllers ever managed to get a word in edgewise through all this red tape is difficult to see. Unless, that is, they did a quick babble between foreign musical items!

In fact, as far as can be deduced from the complex list of ‘thou shalt nots’, all that they were permitted to utter were the words “action alert” or “raiders passed” (which must have been a great help).

As I’ve remarked before, it seems almost incredible nowadays that no one ever seemed to have stood up and told the people responsible for all those regulations that most of them were a load of rubbish. In fact, it’s hard to avoid the conclusion that we won the war in spite of them and not because of them. We did win, didn’t we? PW

Further Reading: The BBC At War

Readers interested in learning more about the (fascinating) and often heroic work carried out by the BBC and its Engineering staff (some of whom made the ultimate sacrifice while on duty) during the Second World War are strongly recommended to read BBC Engineering History 1922-1972 (Published by the BBC). Although it’s a rare book and long out of print, your local library can obtain a copy for you. You will not be disappointed!

Richard Lewis

Practical Wireless, January 1999
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 Practica  Wireless, January 1999


Laura Scott G4HUV describes a 'vintage style' t.r.f. receiver.
Try it...and rediscover the delights of getting the best from a simple receiver!

The tuned radio frequency (t.r.f.) receiver I'm describing was originally constructed to meet the spirit of the December 1996 transatlantic tests on 1.815MHz. The 'tests' used a reconstructed vintage style transmitter to recreate the first transatlantic QSO by an Amateur Radio station (1BCG) from Greenwich Connecticut some 75 years ago.

I found that 1920s parts were not readily available. So this receiver - whilst using triode valves as in 1921 - also uses parts dating from around the 1950s. Additions to the circuitry have been made which recognize the increased occupancy and power levels in today's radio spectrum. Because of this, the end project might be correctly called 'practically vintage'.

Delightful Receiver

The result is a delightful little receiver which, from concept to completion took two weeks of spare time and was constructed entirely of junk box parts. With switched or plug-in coils, it could probably be extended to cover the 3.5 and 7MHz bands.

Two 12AT7 double triode valves are used which saves space. Additionally, the valve holders are still available (from scrap or junk boxes) and at rallies.

The first triode section, V1a, is used as an r.f. amplifier which isolates the regenerative detector (second section) from the effects of antenna loading. It also inhibits radiation from the oscillating detector.

I used a grounded grid configuration in the r.f. amplifier for stability and the gain can be preset by adjusting the cathode tap on the link winding. A second link winding connects the antenna input via a 1kΩ attenuator potentiometer (which can be wirewound).

Due to the low impedance at the r.f. amplifier cathode plus the antenna loading, the input tuned circuit is well damped and...
does not need to be ganged with the detector tuning. Sensitivity is constant over 1.8 to 2MHz.

The detector tuned circuit, L3/C7/C8, is overwound with 15 turns tapped at five turns which allows for coarse adjustment of the positive feedback (use 5, 10 or 15 turns). The 5.6pF capacitor may also be changed to vary the feedback. Windings of suitable inductance were found on some scrap Toko i.f. coils (remove any fixed tuning capacitors).

Extra windings were added to the coils as indicated. KANK 3333 coils should be suitable with around 180pF of tuning. Trimming capacitance - with link windings should be added or adjusted to suit. (By using wafer switches to modify the fixed capacitance the 3.5MHz band could also be covered).

Terminations for the additional windings can be provided by cutting "lands" in a piece of p.c.b. material. This can then be stuck to the side of the coil can.

The recovered audio signal at the detector anode is passed through a two stage resistance-capacitance filter to remove r.f. and then to the volume control and a.f. amplifier. (the 1920s circuitry would have used a 3:1 step-up transformer to couple the detector and audio amplifier, but one was not available, however, the 9.5dB loss is not important with this circuit).

Crowded Bands

For today's crowded bands, an active resistance-capacitance audio filter can be added before the volume control. This filter should have an input resistance greater than about 300kΩ to avoid significant loss of audio signal.

The audio output transformer, T1, which I used, is an RS Components 250V to 6.3V 1A filament transformer. It performs admirably into an 8Ω load.

My Version

My version was built on the copper side of a piece of p.c.b. material with the valve holders standing upright 15mm above the copper on 6BA screws and nuts. Isolated pads were then cut in the copper below the valve holders for the pin connections.

I mounted tall components upright from the copper base or from pads on the board itself. Small components were suspended between their relevant connection points.

As construction progressed I found it necessary to fit a series resonant trap (C1/L1) across the 50Ω antenna input connection. This was to prevent overloading and rectification of the audio from a local broadcast transmitter on 1650kHz.

Reaction Control

For those readers who are unfamiliar with this type of circuit, the reaction control (the 50kΩ variable resistor, R5), is rotated so that the detector is just over the 'threshold' of oscillation. This is indicated by a significant and sharp increase in background hiss.

At the 'threshold' point, the sensitivity is maximum and c.w. and s.s.b. signals are converted to audio frequencies. In the prototype, this point occurred when the wiper of the reaction control was at a potential of 40V.

With some modern (high power!) signals, the detector is easily overloaded so I fitted the 1kΩ r.f. attenuator, R1, and found it to be very effective (if not essential). It works as a form of r.f. gain control.

Sensitivity Good

The receiver sensitivity is very good and on a quiet band (in a quiet location) the background hiss increases by 10 to 15dB when the antenna (which should present a 50Ω impedance) is connected. I found the audio output level is adequate for 8 to 16Ω headphones or a small loudspeaker.

For my receiver, an elderly p.s.u., which provided 250V and 150V d.c. (from a VR150 regulator) plus 6.3V a.c. was used. The current drain at 250V is 25mA maximum.

The detector circuit takes only about 2mA which could be supplied from a 70V string of zener diodes across the 50kΩ reaction control. This is fed from the 250V line through a 33kΩ 2W resistor.

That's all there is to it! So, why not have a go yourself...you won't be disappointed!

PW
A Shining Example of International Co-operation

The International Beacon Project

Following the publication of PW's 'Lo Band' Data Card with h.f. beacon information, Martin Harrison G3USF the RSGB beacon co-ordinator for h.f. International Amateur Radio Union (IARU) provides the facts and fascinating story behind the International co-operation needed to operate such a system.

ften the perennial query in every operator's or listener's mind as he or she sits down at the h.f. rig or receiver is "What are the bands like"? A quick tune gives some impression but silence may simply mean that nobody is calling rather than that the band is closed. Many a good contact has been lost in that way, especially on 24 and 28MHz where inactivity breeds inactivity.

Fortunately we now have propagation indicators that never sleep and never weary with an apparently dead band - the NCDXF/IBP beacon network. That mouthful of initials needs some unpacking and that's my job in this article!

North California DX Foundation

The NCDXF is the North California DX Foundation which conceived, initiated and developed the project. The acronym IBP stands for International Beacon Project, as the network is now known.

In essence, the IBP goes back to 1979, when the first of eight frequency-sharing beacons was set up on 14.100MHz. This limited scheme has now been supplanted by an 18-station network on 14.100, 18.110, 21.150, 24.930 and 28.200MHz - a quantum leap forward.

Traditional 10W beacons (mainly on 28MHz) have given excellent service over many years. And I say "Hats off" to the operators who maintain them so devotedly, usually with little recognition and they still have a useful role.

However, these new 100W beacons give us a much better idea of what we ordinary operators with basic transceivers and modest antennas are likely to hear or work. And they do this on five bands, 24 hours a day.

The World

The IBP beacons are dispersed as evenly around the world as geography and licensing authorities allow. They lie at a fair range of beam headings and distances. So, they quickly tell us something about paths to the Western hemisphere, the Far East, the Antipodes, Southern and East Africa and closer to home.

Each beacon transmits on each frequency in turn for 10 seconds and then goes silent until its 3-minute cycle resumes. The sequence moves westwards from New York across North America, Asia and the Pacific, to Africa, Europe and, finally, South America.

At the moment, 16 of the planned 18 beacons are already installed (though the California and Hawaii beacons are not yet licensed for 18 and 24MHz). Additionally, KH6WO and OA4AB are operating from temporary locations, pending transfer to their long-term sites.

The Canadian beacon, VE8AT, was to have been moved to one of the Northern Arctic islands during this past summer. However, the building that was to have housed it burned down so, for the present, it's at

Fig. 1: Beacon locator map as published on the PW "Lo Band" Data Card.
Edmonton in VE6.

Negotiations are under way for the remaining two sites in Central Siberia and China. Updates are posted promptly at the NCDXF Website - http://www.ncdxf.org/beacon.htm. Major changes are also announced in the UK via the RSGB's GB2RS News broadcasts.

Kenwood Transceiver

All the beacons are identical: Each uses a Kenwood TS-50 transceiver, Trimble Navigation Acutime GPS Receiver, controller (purpose-built by N6EK) and Cushcraft R-5 multiband vertical antenna.

Transmissions are also standardised: callsign at 22wpm followed by four one-second dashes. The callsign and first dash are at 100W, the other three dashes at 10, 1W and 100 milliwatts respectively.

In marginal conditions, only the 100W transmission will be audible, but I find that if the band is reasonably open, the 10 and 1W level transmissions can usually be heard too - very heartening for QRPers! The 100 milliwatt dash is altogether more demanding and is more readily imagined than truly heard.

Yes, I agree that 22 wpm Morse is faster than most of us are comfortable with. (So much has to be packed into a 10-second transmission.) However, if you know what you are looking for, the different beacons are easier to identify than you might think!

Only LU4AA has a double letter; only YV5B starts with a Y. Incidentally, due to a fault, CS3B currently sends all four dashes at 100W and so on. But if you really find the Morse too much of a struggle, the BeaconClock program tells you which beacon you should be hearing for any given time and frequency and it is free at http://www.mutadv.com/kawin/pages/be neclock.htm

Crucial Synchronisation

The crucial synchronisation of the entire system is achieved by means of the GPS receiver and the control unit designed and built by Bob Fabry N6EK. Bob is one of two people.

All the IBP beacons use the same equipment, including a Cushcraft vertical antenna and a Kenwood TS-50 transceiver. The illustration, depicting the W6WX beacon on the West Coast of the USA, provides a good idea of the enormous amount of work hidden behind each beacon callsign.

Continued on page 40...
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without whom the International Beacon Project would never have come to fruition.

Bob's technical expertise and countless hours of constructional work were allied to the dedication of John Troster W6ISO in locating sites, ensuring financial support and backup and seeing through the endless negotiations needed to get the project off the ground. Anyone using the IBP beacons owes a great debt to these two, NCDXF and the societies and institutions who will maintain the beacons through the years ahead.

How Best To Use It?

So, we now have a very advanced beacon system... how best to use it? In answering the question I've got to say...it obviously depends largely on our individual needs and interests.

One way to use the system is to set the receiver for your favourite band and listen through the 3-minute cycle to assess what state it is in. Alternatively, if you want to work, let's say South Africa, wait for ZS6DN to come up on 14MHz, move with it to 18MHz and so on and see which frequency gives the best signal. If you do either regularly, you develop a feel for what is 'normal' for that band or path at any particular time and consequently, whether conditions are 'up' or 'down'.

Against that understanding of what is 'normal', the abrupt disappearance of the beacons may indicate a sudden Ionospheric Disturbance, heralding disturbed conditions 24-48 hours later. Alternatively, if 4X6TU (Tel Aviv, Israel) surges back after evening fadeout this can be due to F2 enhancement, which sometimes occurs in the early stages of an ionospheric storm, briefly providing unusual DX contacts up to 50MHz.

If OH2B (the Finnish beacon) 'goes auroral' with a rusty note you can look to 50 and 144MHz for auroral contacts. And if it comes through strongly during disturbed conditions there may be auroral-Es at both h.f. and v.h.f.

I'm hoping that when VEBAT finally reaches its Arctic home it may provide valuable pointers to transpolar openings on 50MHz as well as h.f. In short, once we get to know them, the beacons are useful for those of us who work above 30MHz as well as below.

What Next?

What next? Even an 18-beacon network leaves lots of gaps. There's scarcely space for more beacons on 14MHz but there's certainly room on 'ten' metres where 28.190 to 28.199MHz is designated for regional frequency-sharing networks. That gives three frequencies for each IARU region - enough for as many beacons as we are likely to need.

Europe could take the lead in establishing the first of the continental 28MHz (even better would be 28/50MHz) frequency-sharing networks, building on lessons of the IBP system. Surely there are sufficient people interested in the challenge of creating such a state-of-the-art network to bring it into being? No existing beacon would be obliged to close but some might well 'trade up' to a new system.

The beacons are also an ideal platform for propagation buffs. They make it so easy simply by direct monitoring or using a time-controlled cassette recorder. More ambitious projects would require computer-controlled logging.

Worldwide Challenge

The IARU will shortly be issuing a worldwide Challenge for the best automated monitoring system for the IBP beacons. Details will appear in PW in due course. But there's certainly nothing to stop you pondering your own approach even now!

However, if you do not fancy rolling your own, DL4FBI's program (described in the ARRL's October 1997 OST magazine, can be downloaded from the ARRL's 'ftp' site oak.oakland.edu in the pub/hamradio/arll/qst-binarries directory, where the file is DL4FBI.ZIP.

The only real problem is that the beacons are vulnerable to interference. Alternatively, if you operate in IARU beacon sub-bands, and on 14MHz have done so for many years, the 14.100MHz transmissions are frequently buried under digimode transmissions or contest c.w.

Unfortunately, there are also ominous signs of the other frequencies being affected as maximum usable frequencies (MUFs) rise with the new solar cycle. Band plans are, of course, only advisory, but if you operate on h.f. please respect the beacon frequencies. (Sadly, some long-established G calls are regular 'ragchewers' on 28.200MHz c.w.)

If you do hear someone operating on a beacon frequency, even if you are not yourself a beacon user, do please ask them as courteously as possible to move. The IBP network is a superb tool for operating or propagation study. So, let us exploit it to the full and do everything we can to maintain its full usefulness for the entire Amateur Radio community worldwide.
Welcome to Antennas-in-Action, a bi-monthly section of PW dedicated to all to do with antennas, feeding them and building and looking after them. In this section you will find articles, ideas, mini reviews, readers' tricks and tips all together. This is also your section of the magazine where you can share your ideas about good, and bad, antennas with other readers.

In Antenna Workshop this time David Butler continues with his microwave tales of 10GHz and above. In 'Tex Topics' you'll find a clothes dryer support, a dual-band v.h.f./u.h.f. portable antenna, a couple of simple but ingenuous ideas, a satisfied antenna user, and some more on the accuracy of the MFJ-2598 Antenna Analyzer. Oh and of course—some books for your bookshelf.

**A Few Books**

Let me start off with a few books for Christmas as, by the time you read this column there's probably just time before Christmas to get yourself that 'extra Xmas present'. At the lower end of the price range, but offering very good value for money, is Antennas For VHF and UHF from the pen of Ian Poole G3YWX. This 100-page Babani book with over 50 illustrations, covers in nine chapters most of the basic informations that is needed, from basic concepts, to feeders to the antennas and measurements.

Each antenna type, be it Yagi, cubical quad or wideband antenna has its own chapter. Even vertical antennas and the simple dipole have their own chapters. All in all very good value for money and suitable for the beginner or as an 'aid-memoire' for the more advanced user; Ian has also mentioned to me that he has a new book due out soon and I shall be looking at it on your behalf. The book, published by the RSGB, is about propagation, so keep looking in.

Mowing up, in both size and coverage, Your Ham Antenna Companion by Paul Danzer N1HI from the ARRL covers antennas from h.f. to u.h.f. There are seven chapters in this new edition of the book, covering h.f., v.h.f., u.h.f. and 'hidden' antennas, before dealing with how to feed the antenna and how to get it up in the air to start with.

Although the book's American origin shows in the chapters on safety and resources, it is illustrated with enough drawings and photographs to make it a very good read for everyone. In the resources section are a variety of book titles suggested, including several from the RSGB, and for those of you with Internet access, there are some antenna start-point addresses for you to have a look at with your new computer.

The final book I've got for you this time is from Joseph J. Carr. The Practical Antenna Handbook now has an accompanying CDROM with software (runs on Windows 3.11 and Windows95). Consisting of 29 chapters and an index, this book really has 'everything'. The CDROM has various software programs and data files on it. The antennas program, which needs the CDROM to be resident in your drive to work acts as a front-end to several other programs to calculate antenna dimensions. The types dealt with are: Wire antennas, Vertical antennas, Beam and small loop antennas. Another program to be found is miniNEC, which is a 'freeware' program to evaluate antennas as short discrete sectional parts.

Other programs on the CDROM apart from VOACAP, calculate Latitude/longitude, impedance matching and wavelength frequencies. Turning now to the VOACAP program, which is a propagation prediction program said to be used by Voice of America when making their own schedule predictions.

This book is a splendid reference book, even if you do not at present have an IBM (or clone) PC computer with a CDROM. However, if you have a PC then this book/CDROM is to be highly recommended to anyone with a fascination for antennas in general.

**Your Letters**

Now to turn to your letters, many of which ask for advice about some aspect of antennas, either to recommend one type or another or how to mount or feed them. I've said many times, that a good library is an asset for any hobbyist, and two letters I've replied to recently have had answers that referred back to articles that have appeared in previous issues of PW.

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Practical Wireless, January 1999
Fig. 1: A spare clothes dryer can make a simple, quick to erect antenna support (see text).

From Ian Hughes came a request for information about converting an old CB 'Silver Rod' antenna (physically 5/8, but electrically 3A/4 - I think) to use as on the 50MHz band. This one turned out easier to remember than to find - but eventually I tracked it down to the August 1994 'Antenna Workshop' where J. Bolton G4XPP described just the modifications needed ("A Cheap 50MHz vertical Antenna" page 36).

It was to another 'Antenna Workshop' that I turned for an answer to the query sent in by Ken Smith G3IYU, who asked for some information about sacking various antennas on a single stub mast: the answer was once again in an August issue of PW, but this time in 1996.

\[\text{Fig. 2: Approximate dimensions for the aluminium plate used.}\]

where on pages 44/45, David Butler G4ASR explained just how to stack various antennas on one pole.

**Clothes Dryer**

I've had a letter from Glenn Loake G1G8I with a rather novel use of a 'spare' clothes dryer. In his letter, Glenn states: "As winter is approaching, perhaps our thoughts turn to next year's special event and portable operations. This idea is basically for use in locations where no ground spike or guy wires can be used, such as car parks, school playgrounds and the like. This project is to allow portable working anywhere.

First the mast support. This is an Inverted clothes dryer setup to become a self supported short mast, as shown in Fig. 1. A cross bolt is fitted in the upright stem about 450mm down from the top (bottom) to support the extension mast when dropped into the tube. The extension mast is a 1.5m length of non-conducting material (fibre-glass or wooden pole etc.)

You will notice that the extension mast is serrated at the bottom so as to 'lock' when the dipole is rotated into desired direction. A short cross-arm may be clamped to this extension mast to aid rotation. But if a simple dipole antenna system is used, then the requirement for pointing accuracy is reduced.

**Now The Dipole**

I'll now turn to the dipole, which is made from two mobile whip antennas formed into a dipole as shown. The plate for the whips is as shown in Fig. 2, which is attached as I mentioned to the insulating material extension mast for best results. Of course the results were not as good as a full 1/4 dipole as expected. In spite of this limitation, I have still managed to work into Europe as far as Italy and most of the former Russian states.

I haven't managed to get into the USA yet, perhaps due mainly to the time of day. The results are better than just using one of the whip antennas on the car. I can hear someone asking why not just use a vertical antenna? My answer to that is that a bidirectional antenna, such as this dipole, allows unwanted signals to be 'nullled out'.

This year I have only made the 14MHz (20m band) version and I was pleased with the results, with the exception of one minor problem. The drawback is that the dipole made from simple mobile whips is very narrow-band in use. The only adjustment of matching is with the short stainless steel whip ends. I've found that a bandwidth of 25-30kHz is usable and although this can be improved by using an a.t.u., the performance does drop slightly.

Transportation is easy, as the clothes dryer frame folds up into a shortish single 'pole'. One of the whips forming the dipole is taken off and the plate removed from the extension mast. This leaves three narrow 'packages' that can be fitted into most cars. A plus point of course, is that the removed whip can be used on the car while travelling to the location.

The whips I used in the design were purchased from QSL Communications, a supplier I found that has a good speed of return for small order items. I shall try whip antennas for other bands in the coming year, and although it's not as efficient as a full-sized dipole, the compensation is ease of erection (one person) for a simple short duration station. If you friend using the system in windy conditions then a couple of large stones or sandbags on the legs should keep the system stable in all but the strongest winds."

On reasonably calm days the dryer support could be used to support a small h.f. mini-beam or, perhaps a two or three element beam for 50MHz. This is something you could try for yourselves. I've noticed that there are similar designs for portable mast supports on offer at shows that I've been to recently".

Thanks Glen. I like the idea, it seems to be a little cheaper than the portable mast supports I've seen, and at a push, you could 'borrow' one from the back garden to try it.

**Fig. 3: An N-type plug set into a plastic block forms the centre of a portable dual-band dipole.**

---

**LETTERS OR E-MAILS FROM IAN HUGHES, KEN G3IYU, GLENN G0GBI, TONY G4WIF, BILL G3NOX AND SHANE G0NCF FEATURE THIS MONTH**

**Antennas in action**

PW - Antennas in Action, January 1999
**tex topics**

**Fig. 4:** Two 4mm plug/socket arrangements are used for mounting the elements of the antenna.

out first! I've used something similar myself at home to support a small 144MHz beam while carrying out tests on it so, I know this idea works.

Mind you, I had to put the rotary dryer the right way up before 'she-who-must-be-obeyed' came home. Questions such as 'I wonder why my dryer is so dirty?' gave me a few minutes of having to think very quickly though not to mention the drain on the pocket to foster 'peace' afterwards. So beware readers, should you try this one at home!

**Dual-Band Dipoles**

I've been looking at a very neat portable dipole that may be used with acceptably low s.w.r. on both the 144 and 430MHz bands. Suitable for both horizontal or vertical polarisation the Hari antenna consists of a central block with a substantial N-type socket with 4mm sockets and two whip antenna elements fitted to 4mm 'banana' plugs.

What is actually hidden within the central block I don't know, but when assembled it worked quite well on both bands. I fitted it with a two metre length of RG58 coaxial cable to a 430MHz hand-held transceiver. Even though this wasn't an ideal feeder to use, the signal increase on a distant repeater was significant, and it became fully quieting in almost any position of the antenna.

To fix the antenna to a support, there's a sturdy bolt with a plated wing nut set into the material of the centre. This bolt is isolated from either of the two elements, so it may be attached to metal poles for support. The central part of the antenna is shown on the photographs of Fig. 3 and 4. I found that the antenna, as supplied, had a commendably low s.w.r. in both the 144 and 430MHz bands.

Available from Waters & Stanton for £19.95 the unit is ideal for those who must - he - obeyed' came home. Some time ago I had an E-mail from Shane G0NCF asking for some information about the Qtek Penetrator antenna. I had to reply that I knew nothing about it, all I could offer were articles that I thought might be of help. But since then I've had another E-mail from Shane, who said 'I have taken the plunge, and bought one, but I am very pleased with it. The long wire version is 45ft (14.5m) long with an 'AMU' (auto matching unit), and the s.w.r. is 1:1 on all bands except 80m (3.5MHz) where it is 1.3:1'. I was told that it uses 'variable reactance' to achieve this, I would still be interested to know exactly how this is achieved, but it works.

"Considering my small loft (4.5x3.5m) it works well, I get good reports on 20m (14MHz) and up, but 40m (7MHz) and below are not so favourable as you would expect, but I have had QSOs on 40 and 80m. An earth is recommended for the antenna but after reading up on the subject, including your article in the Practical Wireless, it does not seem worth while as the antenna is in the loft, and the size of ground plane I would need is not practical, so I am going to try a short counterpoise as mentioned in the HF Antennas For All Locations book. The antenna will then be an asymmetrical dipole (sort of) replacing the need for an earth! I tried connecting the antenna in a loop but the signals dropped slightly on the lower bands so I think it is best to use it with a counterpoise".

I'm glad you've had some success Shane, I'm sure your words will be of help to readers wondering if such an antenna will work for them. They can take heart from your success! Now, if one of our readers could explain how the 'variable reactance' part of the antenna works - I for one would be very interested.

**Antenna Analyser**

Some time ago I had a call at home from a reader who bought an MFJ-259B Antenna Analyser after reading your article in the HF Antennas For All Locations book. He was interested in how this is achieved, but it works.

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reading my review in the October 1996 issue of PW. The reader (I'm sorry I'm unable to remember his name or callsign) mentioned that he had noted that his unit seemed to be rather inaccurate at times. Unfortunately he didn't write to me as I thought he was going to, but the basis of his test was, to take a length of 50Ω coaxial cable then, to mismatch it and measure the reflected impedance at various frequencies.

As I promised to try the same on my own unit, here are my results for that reader. I took a 5.5m length of new RG58 and terminated it with a 25Ω load (25.5Ω at d.c.), and recorded the R and X values displayed by my MFJ-2598 over the 2-36MHz range (every 2MHz). Look at the column values shown in Table 1 (labelled 'Real R' and 'Real X'). These are the values read off the display.

I then sat down and did some work with a Smith Chart to determine what values of resistance and reactance I would get at the various frequencies. To speed up this part of the task, I used software, Fig. 5, to explain how the table works, look at the line for say, 10MHz. The reactance of 43Ω and 5.5m length of RG58 represents some 0.27%, at this frequency.

From the Smith chart (or software), at the antenna analyzer end of the coaxial cable, there's an impedance representing 95.4Ω resistive and -17.71Ω reactive. The 'r' sign in the reactance value, means (by convention) that the reactance is actually capacitive. As I mentioned in my review, the MFJ-2598 cannot determine the nature of the reactance - only its magnitude.

From my initial test I have to say that I was somewhat surprised at the results. The values of R and X that were displayed seemed, at times, to be very 'wrong'. In an effort to try and understand why I put the values into a 'spreadsheet' on the computer and I tried a few variations.

After my deliberations I think I know what the problem appears to be. When the value of the resulting impedance is used (a combination of resistance and reactance), then the figure became more regular. The graphs shown in Fig. 6, should make the readings a little clearer. As you can see there is a better correlation of results to calculated values when using the impedance values, rather than resistance and reactance values separate.

When the impedance is close to 50Ω (say 40-60Ω) the accuracy is quite good, but when the impedance differs more from the nominal 50Ω of the bridge, accuracy suffers. An interesting point is that when I averaged out the inaccuracies (sum of all points divided by the number of measurements), the accuracy became a far more credible 0.4%.

So, while the MFJ-2598 isn't a laboratory instrument for displaying complex Impedance values, it is a more useful piece of test equipment when the Impedance approaches the optimal 50Ω resistive, which is after all the main object of the exercise. And again I must apologise to the reader, whose query started this line of experiment, for being unable to remember his name or callsign.

Fig. 7: Tony G4WIF says, this plastic furniture joining block can be a versatile part in antenna building (see text).

Tips To Try

Now let me look at a couple of tips you can try out yourself. From Tony Fishpool G4WIF, comes a tip about cheap insulating supports for wire antennas. Tony has obviously been building some furniture recently, and had some of those brown block connectors left over. I've shown the type in the drawing of Fig. 7. If you haven't seen them before, they're corner joining blocks used when making chipboard furniture. The joining blocks have three holes through them making them useful, Tony says, in a variety of places. They can be used as wire antenna centre supports, by bringing the feed cable up through the single hole and attaching the screen and the inner to element wires secured by passing them through the other two holes.

By cutting a slot into the block as shown in Fig. 6 it can become a support hook for a wire antenna so that as Tony says "I use the block as a hook to keep the centre of my doublet from drooping in the centre". Even then, Tony mentions that it also makes a good end Insulator for an antenna due to its high strength.

Because of the type of plastic used, it's also quite 'slippery' and makes it ideal for running the antenna support 'stringing' through even the antenna wire itself should you have to 'droop' the ends of a doublet due to space limitations, it saves on expensive 'egg-insulator'. Thanks for those tips Tony, I'll never look at a joining block the same way again!

Modified W3EDP

"It's a modification to the W3EDP antenna" says Bill G3NQX with his idea for a multi-band counterpoise. The W3EDP antenna, that was featured in the May 1998 issue of PW in an article by John Heys G3DBQ, needs differing lengths of counterpoise if it's to be used on all the h.f. bands. However, Bill writes in to say that, by using his counterpoise, made from 300Ω slotted feeder (Fig. 8), you can use the W3EDP on all the bands from 3.5 to 28MHz without having to change the counterpoise.

Bill went to say that he couldn't claim that it's his idea, He wrote 'This idea works well, given to me by a fellow amateur who got the idea from another amateur on the air'. Apparently the latter amateur was using a kite to support his W3EDP antenna with this form of counterpoise as the only 'earth' connection. Such a simple modification being to make a simple antenna even easier to use - and of course in the best traditions of amateur radio - from a friend of a friend!

Ah well that's the end of the space I have available this month so, I'll say 73 until the March issue. But don't forget we need your tricks, tips and antenna related ideas - so get writing!
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T he 10GHz band has seen a large increase in activity over the past few years. This can be traced to the commercialisation of direct-to-home satellite television equipment. The reduction in price of active microwave devices such as diodes and transistors has been considerable. Hardware such as antennae, low noise block downconverters (ln.b.d) and low noise amplifiers (ln.a.) have similarly dropped dramatically in price.

Because component costs are now so low, enthusiasts such as Charlie Suckling G3WDC, Sam lewell G4ALN. Andy Talbot G4HT and Michael Kuhne DB6NT have been developing state of the art microwave equipment that can be assembled on a shoestring for relatively little. As a result, prices have dropped dramatically in price.

The flavour of higher frequencies means that it's time for David Butler G4ASR to give you some ideas of the surplus market for fairly a few tens of pounds.

There are also a number of commercial 10GHz systems available off-the-shelf for those who haven't the time or the inclination to build a station from scratch. The uses these are being put to are as varied as can be found on the lower v.h.f. and u.h.f. bands. Most 10GHz operation is now based on narrowband s.s.h. and c.w. transverters, just like the lower bands.

Wideband f.m. systems based on surplus intruder alarm s.o.l. units are also popular and can be used for television, satellite receiving equipment can also be modified to receive amateur television and satellite transmissions.

When the Phase 3D satellite eventually gets launched it will use a number of microwave up and downlinks, including the 10GHz and 24GHz bands. All of these activities require the use of some form of microwave antenna so here are some ideas you could adopt.

**Off-Set Dish**

Surplus t.r.o. (television receive only) dishes usually between 350-400mm in diameter can be used as a high gain antenna (reflector) on the 10GHz band. These dishes are normally of an off-set fed design, until the photographs, Fig. 1. One problem with an off-set fed dish is that the main lobe of the antenna pattern is pointing upwards (in the sky) by typically around 25° because they are designed for reception from satellites.

In Cornwall the typical elevation angle for a satellite is 30° (in the Shetland Islands it is around 20°). Having obtained the main lobe of the antenna pattern is pointing upwards (in the sky) by typically around 25° because they are designed for reception from satellites.

Although the use of an off-set dish is quite attractive I would not recommend you use a large one (greater than 600mm) until you have gained some experience in aiming a smaller dish.

Many contacts are probably lost due to the inability to point the dish in exactly the right direction than for any other reason. An old off-set dish or one of the new 450mm Astra dishes will be ideal for initial experimentation.

**Front-Fed Dish**

Another type of dish antenna you could use is the front-fed parabola as shown in the diagram, Fig. 2. However, before obtaining this type of dish it is worthwhile making a few calculations to confirm how easy it is to feed with an external radiator. You need to work out where the focal point of the dish is (i.e. where you place the radiating element). The f/D ratio of the dish ultimately dictates what beamwidth the radiating element should possess.

The focal length (f) of the dish is derived from the formula shown in Fig. 2, where D is the dish diameter and c is the depth of the dish. The units of f are the same as those used to measure the diameter and depth. As an example the much sought after PW/DXE dish $\phi$ has a diameter (D) of 465mm and a depth (c) of 103mm. The chart shown in Fig. 3, shows that beamwidth or subtended angle the radiating device (such as a horn or dipole) should possess for this particular f/D ratio. As you can see, for maximum antenna efficiency an f/D ratio of between 0.4 to 0.6 is considered to be ideal. It then only requires a simple feed possessing a beamwidth ranging somewhere between 90°-130°, dependant on the actual f/D ratio.

You should be aware that dishes with a low f/D ratio are increasingly difficult to illuminate. For example a dish with an f/D ratio of 0.25 requires a feed beamwidth of 180° which can produce some undesirable effects. The reflecting dish will often be over-illuminated (power falling outside of the dish edges) giving rise to a degraded sidelobe performance and a subsequent decrease in efficiency both on transmit and receive.

**Penny Feed**

One type of feed suitable for dishes with an f/D ratio of between 0.25 and 0.3 is the classic 'Penny Feed' design originally developed by G4ALN. To create a 'penny-feed', two slots, 14.5mm wide and 1.5mm deep are filed in the broad end of a section of WG16 waveguide as shown in the photograph, Fig. 4. A 30mm diameter copper or brass disc is then soldered across the end of the guide.

Fig. 1: Off-set fed dish - the dish is 'looking' 25° above the apparent line of sight.

Fig. 2: A front-fed parabolic dish and how to calculate the various parameters.

Fig. 3: Charting the f/D parameter of a dish against the beamwidth of illuminating horn radiator. Based on a graph in the 1971 edition of Microwave Engineers Handbook Vol.2 (Horizon House-Microwave Inc.).
used had a circular 30mm collar exactly the same size as the reflector disc. I therefore cut a hole very slightly larger than 30mm in the centre of the dish and mounted the feed into the dish with the waveguide flange at the rear as shown in the photograph Fig. 5. Four small bolts then fixed the feed to the dish surface.

Focal Point Accuracy

Before soldering the waveguide into the rear flange I assembled all items and then adjusted the length of the guide until the radiating slots were exactly at the focal point of the dish. With the PW dish this is at a distance of 122mm from the focal point of the dish. And although I didn't set mine exactly, it is important that you pay attention to the focal point accuracy.

Experiments have shown that, when using a 600mm dish of 0.39 f/D at 10GHz, an error of only 5mm results in a 1dB loss of gain. Dishes with a low f/D ratio are very critical in this respect. Although a larger f/D is better it is still vital to have the phase centre of the feed exactly positioned at the focus of the dish.

If you have a front-fed dish you can use the following method to confirm that the feed is correctly aligned in the dish. The method is extremely easy, you point the dish at the sun and listen for an increase in solar noise. The sun, of course, is an excellent wide-band signal generator (note that you can only use the sun-pointing technique if you are able to take a signal from the feed system via a suitable down-converter into a v.h.f. or u.h.f.) receiver set in s.s.b. or c.w. mode. Then all you need to do is take into account the directional off-set from the true bearing. Don't forget to alter the feed horn polarisation by 90° if you are using a feed that has no additional support mechanism (such as a penny feed) you need only carry out this latter adjustment and you don't need a sunny day either. Similarly if you have an off-set fed dish you can make adjustments to the feed horn position to maximise your antenna gain.

Maximum Noise

If you then adjust the feed to produce maximum gain, you can then adjust the feed to produce maximum noise. If you are using a feed that has no additional support mechanism (such as a penny feed) you need to carry out this latter adjustment and you don't need a sunny day either. Similarly if you have an off-set fed dish you can make adjustments to the feed horn position to maximise your antenna gain.

You may be fortunate to possess a feed assembly that has dual polarisation, both horizontal and vertical. Now would be a good time to check that changing polarisation has little effect on the received solar noise. If there is a large disparity between the two polarisations you will need to check whether it is the feed horn mechanism, polariser and associated waveguide.

Whilst on the subject of polarisation, it should be noted that if you use a waveguide as a feed mechanism (such as the G4ALN Penny feed) horizontal polarisation occurs when the open end of the guide is in a vertical position. Don't forget this fundamental point!

Optimised Dish

Now that you possess an optimised dish, there are still some other considerations that are worth noting.

First I'll turn to practical use of the off-set fed dish. Earlier I mentioned that these type of dishes need to be angled down by some 25° before the main lobe is in a horizontal plane. Having made this adjustment you will notice that the open-ended feed horn is placed in an almost perfect position to act as a rain collector!

So instead of angling the dish down, towards the sun's horizon, the other option is to rotate the antenna so that the feed assembly is above the dish with the feed horn pointing downwards. The dish is then adjusted upwards until the beam pattern points into the horizontal plane. Another way of overcoming this problem is to rotate the dish through 90° and mount the dish sideways onto the mast.

Then all you need to do is take into account the directional off-set from the true bearing. Don't forget to alter the feed horn polarisation by 90° if you want to exploit this method or else you will wonder why you cannot hear anyone. If you intend to operate permanently from your home location it will be necessary to waterproof the antenna feed system to stop rain entering the waveguide.

Recommended materials for rain-proofing include Mylar sheeting or very thin fibreglass. However the chosen material must be loss-free at microwave frequencies. One way of checking its suitability is to put into a microwave oven (along with a glass of water) for a minute or two. If the test sheet becomes hot then reject it.

No matter what type of antenna you use it will normally need to be rotated just like you would on the lower frequency bands. However because of the much narrower beamwidths involved (5° or less) you need to pay much closer attention to mechanical details. If you're going to use the antenna for portable activity it might be useful to fix a simple visual sighting aid onto the side of the dish.

This need only be a simple narrow tube and can be aligned when carrying out the sun noise adjustments. Take care not to look directly at the sun thought! You will also find it useful to mount a small bubble spirit level onto a suitable part of the antenna to ensure it is mounted horizontally. Make sure the mast or tripod to which you attach the antenna is really vertical or else
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Please mention **Practical Wireless** when replying to advertisements.
The New Year is fast approaching and because this issue is our first of 1999, the PW Editorial team are taking a serious look at the technology which is up now and will take us into the Millennium! Microwaves are a fast growing industry, with a high percentage of the world's population carrying a mobile phone nowadays. Microwaves will be the topic that many will need to know more about. So see the New Year in by discovering that microwaves do more than simply warm up your Xmas turkey leftovers! Go on, treat yourself or someone special with a last minute serious Christmas stocking filler.

You may not think that one topic could be so versatile, but this month the PW Editorial Team will attempt to show just how microwaves can be used for more than cooking! Seriously though, we are aware that all you Radio Amateurs out there will know something about microwaves and their uses in communication and so on, but this month we have a wide selection of books for you - whether you are an 'amateur' Radio Amateur where microwaves are concerned, or if you make a living from them - there is bound to be a book here that you just won't be able to 'function' without.

**Microwave Engineering With Wireless Applications.**
S. R. Pennock & P. R. Shepherd. £54.99.

This up-to-the-minute guide has its foundations in basic microwave engineering. Beware though, the use of the word 'basic' here does in no way mean that this book by Pennock & Shepherd is easy to digest! In its own words, the book states that it "... offers engineers and advanced students a clear understanding of microwave engineering in: Radar; Communications; Antennas and Mobile Radio".

Published by McGraw-Hill Telecommunications, Microwave Engineering With Wireless Applications is a volume from their telecommunications series. It claims to cover all necessary information needed in order to develop circuits and systems for the "newest" applications and claims to have "complete coverage" of a number of interesting topics relating to microwave technology. Just a few examples of what the book covers are as follows: Transmission Lines; Electromagnetic Waves; Matrix Representation of Circuits and Signal Flow Graphs; Passive and Active Devices; detectors and mixers; Amplifiers and Oscillators and Microwave Management.

As you may have gathered from that small selection of ingredients, this book is rich in information and is supported by the wealth of illustrations which take a mainly diagrammatic form. If you have more than just a basic knowledge of microwaves already and would like to learn more about this ever expanding aspect of technology, then you would be wise to consider purchasing this book. At £54.99, it may feel like you'll need to take out a mortgage in order to afford it, but it will more than likely pay back dividends! Highly Recommended to the keen and determined microwave enthusiast.

**An Introduction To Microwaves**
F. A. Wilson £3.95.

If you have absolutely no idea what a microwave is or how it affects you as a Radio Amateur, then this could be the book for you! It does, however, ask one thing of the reader - that you have absolutely no knowledge of microwaves or their uses! As astounding as this may seem, it's true. It claims that all you need in order to read and understand this book is a little electronics experience. Even the mathematics is fairly straightforward. Therefore as a Radio Amateur, you should have little (or no) difficulty in following this book.

Not a book for the microwave expert, it nevertheless covers everything which you'd need as a beginner. If an introduction to microwaves is what you are looking for, then this might be just what you need. However, if you are more knowledgeable about them, then you wouldn't find anything in this book that you didn't already know. Most of what you need for an appreciation of microwaves is in this book. From technical explanation to microwave generators and amplifiers leading on to the practical uses of microwaves in communications, mobile communications and TV. Recommended.

**Microwaves & Wireless Communications Technology.**
Joseph J. Carr. £27.50.

Mainly aimed at the students of new technology, Joseph J. Carr's book on microwaves takes the reader through the basics of
microwave technology such as microwave signal propagation, transmission lines and wave guides. It then gently steers you through the more involved aspects of microwave systems like transmitters, receivers, radars and wireless communication devices.

Joe Carr is an author who is well known for his ability for displaying the facts in a clear and concise manner and you would do well to take a closer look at this book if you are hoping to broaden your horizons in communications.

With more and more household items becoming involved in the developments of microwave technology, technicians and engineers would also benefit from reading this book, it claims. It has quite a 'hands-on' approach because it encourages the reader to tackle some of the equations involved. Highly Recommended.

The ARRL UHF/Microwave Experimenter's Manual.
Various Authors.
£15.50.

This manual contains dozens of construction articles ranging from transmitting and receiving equipment to low-level amplifiers, oscillators and multipliers, antennas and test equipment. Some of the articles are previously unpublished but others are ones which have already been published in Proceedings, QST and QEX. So, if you would like to own a handy reference manual about microwaves, then this could be the one for you! Once again well illustrated with diagrams, circuits and black and white photographs (which seems to be a characteristic of most ARRL handbooks) you could do a lot worse then to add this to your collection. But remember to bear in mind the fact that it was first published in 1994. Recommended.

The ARRL UHF/Microwave Projects Manual (Volume Two).
Various Authors
£11.50.

Slightly smaller than its predecessor, The ARRL UHF/Microwave Projects Manual Volume Two is an updated version of Volume One.

Whereas the earlier version had eleven big chapters, the newer version has only three. You should be able to see from this, the reasons why Volume Two is cheaper. However, having said that if you have purchased the first volume then you would be very wise to 'top up' your library with the second volume. According to David Sumner K1ZZ, Executive Vice President of ARRL, since publication of the first volume (which has continued to be in demand) "More and more components are becoming available...
...and many commercial parts and subassemblies are starting to appear in v.h.f./u.h.f. and microwave equipment and many 'hams' are jumping into an area previously thought to be only for a few experimenters". Once again, excellent use of diagrams and pictures to help explain the theories involved. Some of the information which you'll find in Volume Two will be on antennas and transverters, using a TVRO feed, converting a radar detector, 2W 10GHz amplifiers and updates on the popular no-tune transverter. If you want to keep up-to-date with all that is happening in microwave projects then you could well do with this book. Recommended.

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LOW POWER CONTACTS

Hopefully, the following reports will show you that you don’t need a large system on the 50MHz band to work some good DX. Sean Gilbert G7UCJ (IO92) has improved his 50MHz station since he last wrote in to the column. He is now using an H89CV beam in the loft instead of a quarter wave vertical located in the shack although he is still only running 4W from an Alinco DX70 transceiver. In two months of operating, Sean has contacted stations in 109 locator squares and 30 countries. His best DX contacts on the 50MHz band have included IS0, IO9, OY, JO, SS, ZB, 9A and 1AIKM.

Peter Lowrie G7JYK (ID0J) uses a Yaesu FT-60R transceiver running 3W into a 2-element beam matched with an HF antenna tuning unit (a.t.u.). The beam is a simple dipole-reflector arrangement at six metres above ground and fixed towards central Europe. With this simple set up, Peter has made many contacts from Europe including stations located in Prefix areas DL, F, HB9, HB0/HB9QO, OE, OK, OM and SP.

A warm welcome to \( \text{Martin Medcalf G1EFL (JO01) who has written in to the column for the first time.} \)

A warm welcome to \( \text{Martin Medcalf G1EFL (JO01)} \) who has written in to the column for the first time.

50W but sometimes increasing it to 100W output.

Although the station has limited capability, Martin (shown in the photograph) Fig. 1) has a total of 128 locator squares and 38 countries confirmed. He has also received several awards including the ARRL and the RSGB 100 squares certificates.

Some of his numerous contacts made last summer with the indoor dipoles include the stations of EH6SA (MI19), ES1M (KO29), E5WMI (KO32), IM6KRIKG (MI49), IL2B (KO14), SOOGULUP (IO74) and YL3AG (IO26). Although the 50MHz band is not open all the time it is surprising what can be worked with low power and small antennas. All you need is dedication and a little luck!

CONTEST ACTIVITY

Colin Smith reports that he was active as G6MC/1NJP (IO85) during the RSGB 144MHz cumulative contest on October 1. He described the conditions as very poor with only eight contacts being made over 100km!

Running 80W from a Microwave Modules solid state amplifier driven by a Trio TR-9130 transceiver and a 14-element MET Yagi, his best contacts included the stations of GB8FSG (IO91) at 529km, G6HAS (IO81), GD0WU (IO82), G6RYG (IO82) and M1AFL (IO92).

David Dodd decided to operate on the 430MHz band as GM4WLY/P during the IARU Region 1 Contest in March.

On October 4 the 50MHz band seemed to be quite poor and activity low, but nonetheless he succeeded in working GB8HMP (IO82), G0EHW (IO94), M6A (IO92) and G8P (IO31) for his best DX at 583km.

The equipment used was a Yaesu FT-290 MK1, a Microwave Modules transverter, a Microwave Modules 50W amplifier and a 24-element Yagi. David admits it was all thrown together very quickly but he was encouraged by the distances worked so much so that he intends to make the portable station a bit more competitive next time. Look out for him during the 144/432MHz contest in March.

I decided to make use of the increased activity during the contest on October 4 to make my first contacts on the 10GHz band from my home QTH (IO81). I was using the latest

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DB6NT transverter driving a G3WOG amplifier giving 1W output into 460mm FT dish. All this was mounted on top of my tower at 20m above ground. External feeds to the masthead unit consisted of a 3-core cable for the 12V transverter supply,24V for the 10GHz coaxial relay and press-to-talk (p.t.t.) control and a coaxial cable for the 144MHz drive from a Yaesu FT-221 transceiver in the shack. Without any system adjustment (just plug and play) the following stations were worked in a two hour period - G4MAP/P P9 59 over a 61km path, G4ERP/P P9 59 at 64km, G3UKW/P S7 439 at 84km, G8VOP/P S5 51 at 178km and G1RUP/P S5 51 also at 178km. (By the way, all contacts were made on s.s.b. [one on c.w.] just like you would on any other band.) Interestingly, I didn’t need to line-up up the 10GHz dish other than point the 144MHz beam (used for talk-back) in the direction of the wanted station. I couldn’t understand this as the 460mm dish should have a beamwidth of around five degrees and would require some very accurate adjustment of the antenna rotator. However, when I checked later I noticed that in my hurry I hadn’t lined up the dish exactly in a horizontal plane. I was therefore probably receiving stations on a broader vertical sidelobe. These initial results were very pleasing and I am now engineering the system properly with a larger dish and elevation control.

**MOONBOUNCE CONTACTS**

If you think you need a very large antenna to make earth-moon-earth (e.m.e.) contacts then you’re completely wrong. Chip Margell K7JA reports that on October 2 he contacted the W5UN has an enormous array of approximately 17dBd of gain. Results such as these on the 144 MHz band are made possible by using propagation mechanisms such as ground gain and libration enhancement.

Joop Mutter PA0JMV reports that many operators have proven that there is no absolute minimum antenna gain required to make e.m.e. contacts at 144MHz. In his opinion, it really depends on how easy you want to make your contacts. If you don’t like to work hard and struggle for each QSO then the figure of 20dBd suggested by W2RS won’t be enough and you might need 23dBd or more. However, if you are smart and take advantage of many phenomena such as low sky noise, ground gain, perigee, an excellent ‘clean’ antenna pattern, polarity rotation, digital receiving techniques and above all persistence and patience you will be able to make dozens of e.m.e. contacts with antennas of only 14-15dBd gain.

Joop mentions that he made 1020 e.m.e. QSOs with his old 2-Yagi system (17dBd) before moving to a new QTH last summer. Since then he has operated temporarily with a single 12dBd gain Yagi and worked thirty stations, ten of them being 4-Yagi stations. Of course, if you move up in frequency to the v.h.f. bands then the antennas get physically smaller. Recently, Neil Whiting GA4BRK mentioned on the Moon-Net reflector that he made a partial e.m.e. contact on the 430MHz band some years ago with the station of DL9KR. At the time, Neil was using a single 21-element Yonka Yagi and 400W. A few months ago he put up a small array of four very old 21-element Yagis at a fixed elevation. He was not, however, rewarded by his efforts by making his first e.m.e. contacts with the stations of DL9KR (who gave GA4BRK a report of 549), K1FO and OH2PO. Andreux IK5QOL is also interested in making e.m.e. contacts on the 430MHz band. He is using a pair of 28-element Yagis each with a six and a half metre long boom. In two years of operation he has worked 36 different stations via the Moon.

Andrea does mention that if you are using small antennas then you must optimise every part of the station. You should have very low cable losses and the minimum number of coaxial connectors.

It also helps to plan your schedules so that contacts are made when the Moon is nearest to the earth (periapse) and the sky noise temperature is low. Having polarity adjustment at the far end is also very useful. This is more normal if the other station is using a dish with a feed that rotates.

**CORONAL DISTURBANCES**

An unexpected vigorous interplanetary disturbance impacted the Earth on October 19. The disturbance was thought to be related to the coronal mass ejection (c.m.e.) from a recent eruption of a solar filament. This action produced reasonably strong levels of auroral activity particularly for operators located in Scotland. By the way, a c.m.e. is often associated with flares and with erupting prominences but many occur independently of other phenomena.

The outer solar atmosphere, the corona, is structured by its magnetic fields. Where these field lines are closed and loop back to the sun, as is often the case, solar material is confined by the magnetic fields. The confined solar atmosphere sometimes suddenly and violently releases bubbles or tongues of gas and magnetic fields. These are the so called coronal mass ejections. A large c.m.e. can contain ten billion tons of matter which can be accelerated to more than 1000km per second in a spectacular explosion. Solar material and its permeating magnetic field flow radially out through interplanetary space impacting any planets, spacecraft or slower material in its path and all of this occurs just to give v.h.f. DXers a few hours of excitement!

On the 50MHz band, the stations of GM1H (IT076), GM1W (IT087), MM0AWM (IT053) and MM1DD (IT053) were heard working into central Europe from Wales. Activity was also noticed on the 144MHz band with GM7QOIN (IT05) and GM8LF (IT088)
GMB2ZCS (I08S) putting in an appearance around 144.300 MHz, the s.s.b. calling frequency.

John Peters PE1OGF mentions that he was active in the aurora on the 144 MHz band with 400W and four 11-element Yagis. Between 1400-1600 UTC he contacted stations in DL, LA, LY, PA, SP, G3MMW (O91I) and G4WLS. All of his contacts were on c.w. which was a bit of a problem for John as he has a v.h.l. license and is not very fast with Morse.

Nevertheless, he recognised the value of using this transmission mode during auroral openings. Udo DK5YA (IN49) was also active on c.w. during the event. He uses an array of four 9-element Yagis and a G535B amplifier. Just like the station of PE1OGF he heard the aurora between 1359-1605 UTC. Very similar contacts were made with stations in DL, LY, OZ, PA, SP and G0WGM (BD07).

SATELLITE NEWS

Now for some news of what's happening in the amateur satellite world. The Phase 3D spacecraft has recently undergone pre-launch testing to analyse the satellite's ability to withstand the harsh environment of space.

The satellite was placed in a large chamber for thermal-vacuum tests which required the spacecraft to be subjected to a maximum temperature of 45°C and a minimum of -20°C over five testing cycles. This was to simulate the harsh heating and cooling environment that P3D is expected to encounter whilst in space.

The satellite is now scheduled to undergo vibration testing in early 1999. The vibration testing is designed to simulate the stresses the spacecraft must endure during launch - if ever it does get launched!

A new Amateur Radio satellite SEDSAT-1 was recently launched on October 24. The satellite's name is an acronym for Students for the Exploration and Design of a Satellite. It was built by students at the University of Alabama.

The spacecraft package includes a Mode-A analogue repeater and a digital packet store-and-forward transponder. The Mode-A frequencies are 145.915-145.975 MHz uplink and 29.350-29.420 MHz downlink. Mode-L frequencies are between 1268.175-1268.250 MHz uplink and 437.850-438.000 MHz downlink, frequency shift keying (f.s.k.) at 9600 baud.

However, the satellite was in serious trouble after fewer than two dozen orbits around the Earth. Intermittent telemetry suggests that the batteries were not storing their specified 8Ah charge although the solar panels appear to be producing as much power as expected. At one point, the spacecraft's power had dropped to zero and the satellite had reset itself. For more up to date information, you can visit the SEDSAT-IT Web site at http://www.seds.org/sedsat/

Another Amateur Radio satellite, PANSAT, was also launched in the same period. This is also a digital store and forward system but because of its low inclination orbit it will never be visible from the UK.

A satellite you should be able to hear was scheduled to be launched on November 11. Readers of this column may recall that on November 3, 1997, a one-third scale model of Spuntik was hand-launched from the Mir Space Station to commemorate the 40th anniversary of the first artificial satellite, Sputnik-1.

Two working models of the Spuntik were made as a joint project by Russian and French students but only one was launched. The unused unit is virtually identical to the one launched in 1997. It is solely battery powered and runs 150mW output on a frequency of 145.820 MHz.

This time, instead of a 'beehive' beacon it will incorporate a digital voice playback unit. The previous satellite ran on its dry batteries for a period of 55 days so if all went to plan you should be able to hear the satellite until the end of December 1998. Last time I received a number of reception reports so I look forward to receiving the same this time.

DEADLINES

That's it again for another month. Please forward any news, views, comments and especially photographs to the address and by the date given at the top of the column. Alternatively you may find it more convenient to make a simple telephone call.

THANKS FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.

73 David G4ASR.

RE-ACTIVATED CALLSIGN

I've received news via Dave Griffiths GW0UF1 of a well known callsign being re-activated here in Wales. Danny Phillips (formerly GW1VVK) has cracked the c.w. test and taken out the callsign GW8HF, once a well known callsign belonging to the late Alf Laws, of Pontypool.

Danny was hospitalised shortly after gaining his callsign, but I'm sure that he'll be back on his feet and using it pretty soon!

Incidentally, the original GW8HF was once the Manager of the Redifusion Cable TV service in Pontypool just after the Second World War and, as Dave explains "Contrary to popular belief, Cable TV or 'piped' TV as we used to call it! was developed here in Pontypool, well before the USA had adopted the system. In fact, Pontypool was the first place in the world to have a Cable TV system". So now you know!

NEWS SNIPPETS

Now over to the KG8KX DX News Sheet, and there's news that Jacky ZL3CW continues to be active from Eritrea as E131AA using a damaged TS-50 rig, with no s.s.b. above 22MHz. His length of stay is not known, but QSLs should be sent to ZL3CW.

In Mongolia, Baator IX7DFA from 0400UTC on the 3.5MHz band, and will QSY to 7.029 MHz with 50W and a dipole antenna. IQSLs should be sent direct.

For low band enthusiasts, Per LA7DFA is on the air as ID0TDA from 0400UTC on the 3.5MHz band, and will QSO to 1.8MHz on request (QSLs to be sent to his home call).

Finally, from the Ivory Coast there's news that TU2MA is now operational on 1.8MHz but no times given, and there's also news that Dave the bear is now active from Tanzania as 5H3US during his three year stint at the US Embassy there. (QSLs should go to W5BCO).

PROPAGATION REPORT

Time to go over to our regular 'Propagation Report' from Don
because he's a keen QRP'er, but also because his wife Jaynie has passed her Novice RAE and the Novice c.w. test and is patiently (or should that be impatiently) Jayning waiting for her licence to drop through the letterbox! Well done Jayne, and welcome to the bands! Now I'll probably get two reports each month from the Gilbert household eh! Next comes John Constance G0VGD of Aylesford in Kent who, using an IC-706 transceiver and an Outbacker mobile antenna...

The short path to Europe with much of radio interest.

The 18MHz Band

Incidentally, Sean has another s.s.b. contact with PT7WX (Brazil) at 1158, while Ted (G2HKU) spent quite a hit of time on 24MHz this month, swapping c.w. with HFOPOL (Antarctica), A45XR (Oman), C91RF (Mozambique), T9A (Central African Republic), KU9C, 5W0BA (Honduras) at 1647UTC. Also logged were T9A2KZ (Turkey) at 1610, TO9NX (Guatemala) at 1300, TLA5 (Central African Republic) at 1300 (QSL via PAGTW), and TK5RD (Senegal) at 1630UTC. Sean G4UCJ offers QRP c.w. contacts with N2KK/6 in Los Angeles at 1501 and PJ7WX (Brazill) at 1516, while Ted G2HKU spent quite a bit of time on 24MHz this month, swapping c.w. with HFOPOL (Antarctica), A45XR (Oman), C91RF (Mozambique), T9A (Central African Republic), KU9C, 5W0BA (Honduras) at 1647UTC. Also logged were T9A2KZ (Turkey) at 1610, TO9NX (Guatemala) at 1300, TLA5 (Central African Republic) at 1300 (QSL via PAGTW), and TK5RD (Senegal) at 1630UTC.
college work. But he did manage to spend some time at his low power station.

Using a 10W Yaesu FT-7 transceiver and a W3EDP wire antenna, Eric reports his 28MHz s.s.b. contacts with KJ3DP (Azores Islands) at 12:20, KA6AR (Russia) at 15:00, EA6AT (Balewic Islands) at 17:00, CN8IEC (Morocco) at 18:30, as well as 9J2FQ (Zambia) at 16:48. Not bad for your low power, Eric! Keep it up! (And the college work tool)

Another single-band report comes from John Wheeler GOIUE of Melksham in Wiltshire. He runs 100W into a GOIUE of Melksham in RA6AR (Russia) at 15:00, (Azores Islands) at 12:20, and hooked up with - yes, you guessed it - another new country, XE1EZM (Mexico) at 17:20, a first for him on 28MHz s.s.b., & 3.530 or 3.560MHz and 18.105MHz QRP C.W. using an Alinco DX-70 transceiver and a long wire Marconi antenna.

Don McLean G3NOF operates:

1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665MHz s.s.b., with his mobile rig.

George Woods G3LPT (Suffolk) operates:

0500 - 0700 on 7.061MHz s.s.b. with an NRD-525 receiver & sloping wire antenna and is also busy with his mobile rig.

Leighton Smart GW0LB1 operates: Some weekday evenings at around 2100 - 2330 on 1.949MHz s.s.b. using a Yaesu FT-777 transceiver at SW and a long wire Marconi antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800 - 1830 on 3.7MHz 100W s.s.b., & 3.530 or 3.560MHz and 18.105MHz QRP c.w. using an Alinco DX-70 transceiver and a long wire antenna. Also at 2300 on either 3.560, 7.025MHz (c.w.) or 3.7MHz s.s.b. (All operation dependent on PW workload!).

Sean Gilbert GAUCJ operates: around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz using an FT307 and Alinco DX-70 transceivers at 3/30W output and a GSRV dipole antenna in the loft space.
It's an absorbing hobby!

WORKING WITH YOUNGSTERS AS A TEAM

Within and outside the 'ham' radio community. The husband and wife team of Rip and Ellie Van Winkle (NV4M and N0QCX) are the stars. They have been members of BARC (Boulder Amateur Radio Club) for many years. Boulder is a fairly progressive university city next to the Rocky Mountains, known also for high-tech industry. The Van Winkles live on the edge of town, with a large house and fine antenna system.

In 1985, Rip and Ellie were invited by BARC to start a radio organisation for local youth. Ellie is a retired teacher and she approached a local school to see if they were interested in licence classes. The venture was very successful, leading to several new 'hams'. They decided to continue, forming an offspring of the club called BARC Junior. The classes moved from the school to their home and they broadened the scope to cover not just getting a licence, but all aspects of amateur radio.

Such was the interest locally, Ellie and Rip soon had to find others to help. They recruited a cadre of Elmers, who have varying skills and can instruct in many topics. They kept BARC Junior vital and growing.

HUGE RANGE OF ACTIVITIES

When I went to talk to Ellie and Rip, they were eager to tell me about the Club. This was by no means the first time they had been interviewed for the media, but they were keen to spread the 'Gospel'. Ellie began: "As well as a Radio Amateur, Rip was an electrical engineer and on retirement, we were looking for a way to combine his talents with my teaching experience. From the start, we knew that we would have to include all sorts of activities to keep kids interested. Of course radio is already a huge field, but you need to wrap it around things children are already familiar with."

I asked for examples and the reply was: "We love to have FOX HUNTS, which are really just electronic forms of HIDE AND SEEK. Most children like talking, so we introduce them to the CLUB NET right from the start and all kids like eating, so events often include a break for pizza or something similar. Of course we spend quite a bit of time giving instruction, but we try not to make the 'lessons' too much like school. We've developed a good combination of seriousness and fun over the years."

Fox Hunts are a form of Direction Finding on 144 or 430MHz. A hidden transmitter a mile or so away sends out a signal on a pre-arranged frequency. Using hand-held antennas and battery rigs, the competitors take bearings and then proceed on foot to try and find the transmitter. Naturally, obstacles such as fences and houses get in the way. As they get closer, they must reduce their signal level and get more accurate bearings.

The winners, usually running at that stage, are the first to find the transmitter. At BARC Junior, more experienced members and Elmers join with newer children to form teams of three or four.

"They have a great time and pick up some radio knowledge" said Ellie. "They learn how to use simple radios, where the hands are, how to tune, variation of field strength, how antennas work and the meaning of polarisation. We also involve parents, some of whom have become licensed as a result."

What about the Club Net? This takes place on Sunday evenings on the club's 144MHz repeater and is run by one of the members. There is no age limit on amateur licences in the USA so the controller could be very young, or perhaps just inexperienced. In that case, a parent will deliver the controller to Rip and Ellie's house to operate under supervision. A 'theme' is suggested for discussion, sometimes radio related, sometimes not.

PARENTS' SUPPORT CRUCIAL FOR YOUNG AMATEURS

It's clear that parents must be closely involved with BARC Junior. Ellie was emphatic: "Yes, we can't do all this without their support. Occasionally a parent will be indifferent, but most are thrilled to find something their kids like. One of them said she was grateful to have found a spot where her 'nerd' can get together with a bunch of other 'nerds'. Well, I would just say that we provide a focus for children with technical interests, where they can get together with like-minded friends."

"It's of the greatest importance that parents are reassured their child is in a safe environment. Parents can attend every activity and there are some events such as overnight stays (depending on child's age) where their attendance is compulsory. We have up to 30% of members who are girls and parents are obviously concerned that everything is above board. Needless to say, we are very particular about Elmer". (In view of all the outings I heard about, it was clearly essential to be fully insured. The Club is covered by the main BARC insurance, which is a back-up in case something goes wrong).

For their part, the children are expected to act properly at the Club. "We provide a consistent environment and a light but very clear discipline. Once or twice we have asked kids to leave because they couldn't behave, but this is rare. Of course radio is not for everyone and a kid who drops out has probably found some other interest. Everything is voluntary."

I wanted to know about the format of the Saturday meetings. Rip told me: "We divide the 90 minutes into four sessions. First we have announcements and administrative matters. Then we do Morse practice. We cover zero to twenty words per minute in several groups. Next we have theory classes, covering the five exams in the incentive licensing system. We use almost every room in the house for this (including the large basement), since kids are all learning different things at different times. Then we have a practical demonstration, usually...

**"Elmer" - "Radio Amateur who voluntarily helps others to make progress in the hobby. Origin: obscure, but thought to be named after a real person"**
conducted by me. This might be something straightforward like Ohm's law or measuring output from a dynamo. Occasionally, I'll arrange the kids in a more spectacular way - perhaps connecting an electrolytic capacitor to a high voltage the wrong way round - don't try this at home! They love noise and explosions!

There are about 16 Elmers at present and they fit into the Saturday timetabled as organised by the Van Winkles. The Elmers teach each of the Morse and theory sessions for about twenty minutes. This seems to fit in well with the children's attention span, especially when they are only seven or eight years old. There is often homework to do so a few kids just lap up (and progress very rapidly) and some ignore. Nobody minds too much either way, but an average of more than one new licensee every single month for seven years shows that the system is working.

RADIO-RELATED OUTINGS

Once a month, the Saturday meeting is replaced by a 'Field Trip'. This may be a visit to a local company, or participation in an event such as 'Jamboree on the Air'. Because of the number of technically oriented organisations locally who are usually enthusiastic about promoting themselves, there is no problem in finding things to do. Ellie showed me the 1999 schedule, already completely full. These were outings that an adult club would be happy to offer, including an amateur television demonstration, a visit to an antenna company and a presentation from the 'Federal Aviation Administration'.

Other popular activities have been a trip to the police emergency dispatch centre, a hike to the mountain where the emergency dispatch centre, a later, etc. But there are children and adults who find it extremely generous. They also contribute, sometimes make presentations and take questions. It's a really big deal for the children and we have to hold a selection procedure to see who will go. This is normally the first time they will have had to speak in public. It's an experience they won't get anywhere else, especially at such a young age. Even those who don't succeed in going will have learned a lot and we have them make their prepared presentations later. It's a lot of work, for everyone, including the Elmers, but very rewarding.

I wanted to know how the Club managed to arrange funding for all its diverse events and Ellie explained: "We get donations and rarely have to ask. Parents put cash into a coffe cup each week and amateur and adult contributions, sometimes extremely generous. They also give us gear they no longer need. Companies supply books and equipment at cost and organisations are frequently willing to help. We're lucky that the community appears to recognise our accomplishments and to support us in this way." It seemed to me that there is little luck involved - mainly hard work and enterprise. The impressive results achieved by the Van Winkles and their Elmers are a model of what can be done. Not everyone could contribute the amount of time they put into the BARC Junior, but I think the example they set is an ideal to work towards.

MANY THANKS TO N1VM, N1OQC & W1MG FOR THEIR HELP IN PRODUCING THIS ARTICLE AND PROVIDING PICTURES. I AM ALSO

DATA SCAPE

ROGER J. COOKE G3LDI
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THIS MONTH, ROGER COOKE G3LDI TAKES YOU THROUGH MORE OF THE INTERNET LOOKING AT A PROGRAMMER'S KIT, AMATEUR RADIO SITES ON THE WEB AND MUCH, MUCH MORE!

PROGRAMMER'S KIT

A Programmer's Kit is probably just the thing for those among you who are into, or would like to get into, programming. If you have the time and fancy a DIY course on C and C++ programming, then why not consider this book written by Peter Brunning: Experimenting With C and C++ Programs.

Peter Brunning's book teaches the reader to program using C to drive simple hardware circuits which the reader constructs using a supplied plug-board, components and software supplied in the kit of parts.

The circuits plug onto the end of your PC's printer lead and the programming techniques for the experiments are kept as simple as possible, making the programs easy for a complete beginner to follow. Even the final program driving the storage oscilloscope circuit employs relatively simple C techniques, although the overall program is by no means simple. None of the experimental circuits require soldering. The author wrote the book as he himself was learning to program and has written it in several stages, thus catering for the absolute beginner in the field of programming.

Locating the front cover of the book is shown in Fig. 1. The 338 page wire-bound book costs £24.99 and there are three kits available: Kit CP2a costs £46.00, Kit CP2b costs £39.99 and Kit CP2 which costs £22.99. The kits include two Compilers, one of which will run on any 8086 compatible PC. This should be a minimum of a 386 with 14Mb of free hard disk space.

If you are interested, then the address to contact is: 138 The Street, Little Clacton, Clacton-on-Sea, Essex. CO15 9RS. Tel: 01255 862308.

Located in Russia

Octavia Company Ltd. is a privately held company located in Mailkop, Russia and has been producing software, QSL cards, etc. for Radio Amateurs since May 1989. They have now produced a Visual Callsign Database CDROM Vol 2. It covers all over the CIS and provides instant access to over 62,000 licenced amateurs in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldavia, Russia, the Ukraine, Uzbekistan, Tajikistan and Tumenistan.

The new 32 bit version has a radically new interface and lots of new features including contexts, special event calls, clubs, Silent Keys and nearly 13,000 cross references from old to new calls. There are over 700 high resolution personal and DX photographs and QSL cards with slide show facilities.

Also provided are 25,000 Ham and packet radio addresses, WWW URLs and over 4000 telephone numbers with dialup codes for club member and so on. Screen shots, a free demo.

GRATEFUL TO DAVE, KE0OG, WHO SUPPLIED PHOTOGRAPHS AND GAVE PERMISSION FOR THEIR USE. IF YOU HAVE ANY COMMENTS, PLEASE LET ME KNOW. THE COMPLIMENTS OF THE SEASON TO EVERYONE, AND A HAPPY NEW YEAR.

73 Ed Need

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NETSCAPE REVISITED

Following my first experiences with Netscape, I thought I was doing quite well until, that is, I needed to look at some of my saved GIF files. I could not find them at all. Asking around, it became evident that Netscape is very versatile and stores these files in what is not the most obvious place! If you have the same problem, you will find your cache holds all the html/gif/jpgs, etc., that you see on a web page. In my case, it's located at C:\ProgramFiles\Netscape\Use.

You can also have more than one Navigator window open at a time. If, for instance, you find a page of interest you can save it or just open another window (File-New Navigator Window) and continue "surfing" from there.

If you don't close Netscape down when you disconnect from the Internet you can use the back button to step back through pages in your cache. This is limited by the size of your cache and how often you clean it out. Even after a few weeks of visiting various sites, you can have a lot of files in there and the file names are quite meaningless.

All the settings are under Edit-Preferences-Advanced-Cache. Looking at each file takes time, but it is worth the effort as some of them could be quite useful to keep after renaming and store in Case you are designing a Web page.

AMATEUR RADIO SITES

One site that is a must to visit is http://www.acktv.com Here you will find just about anything you will ever want in the Amateur Radio world. There are 88 pages to browse through and if you don't find what you are looking for there, 3000 links to other sites will help. I spent a happy hour just reading what was available. There are some interesting propagation programs, loads of DX information and much more - too numerous to mention, Fig. 2 shows the site heading.

Another quite fascinating site is: http://www.sunspotcycle.com
This one not only gives the sunspot count every day, but also provides interesting solar information in the form of articles, pictures and other relevant descriptions of solar events that have an effect on our hobby. There are some very nice graphics on this site too and these tend to make the site very attractive. (See Fig. 3.)

TRANSLATOR

For those amateurs that want to brush up their linguistic skills, I've found something that could be just what is needed. Power Translator Pro. It's not cheap, but it does work in a similar way to a word processor. Opening a window, you are asked to select the language pairs that you require. Selecting English and German for example would entail typing text into the top window in English and at the click of a button, the translated text appears in German in the lower screen. It comes with Italian, Spanish, French, German and Portuguese plus many ex-colonial countries.

Power Translator Pro can integrate with other programs, has an extensive set of utilities and can import RTF and HTML text. Linking Into E-mail and the Web is possible using the browsers. It also comes with more than 30 specialized dictionaries covering technical and business areas in French, German and Spanish.

Flexible and powerful, it is not cheap at £200 and it might be outside the budget of most people, but it's very tempting as I've said. If you want further information, try www.globalink.com

COMPEITION FROM LINUX

Microsoft expects to face more competition from Linux and is worried at the gathering pace of indirectly supported, low-cost operating system. The latest software supplier to throw its weight behind Linux is IBM and Big Blue has announced that it is willing to offer its DB2 Universal Database for the operating system with the possibility of more applications to follow.

Linux has a following in the amateur world too and this will be good news for the devoted few who are using it, although that few seems to be increasing In numbers. I can't really believe that Microsoft is worried though, can you?

SPAM AND MORE SPAM

Not tinned spam against Don't worry... it's nothing to do with Monty Python this time, Spam is the pseudonym given to Unordered Commercial E-mail (UCE). This is the Internet's version of the notorious telephone call offering free double-glazing! It's the much-hated practice of sending out millions of copies of a message, typically advertising get-rich-quick scams or pornographic Web sites.

The first rule is to never respond. In many cases, a promise to 'remove' you from a list merely validates your address for further spam. Most Internet Service Providers (ISPs) now prohibit relaying, which is causing some of the problems. Sending junk mail back is a fruitless task too as the return address is usually fake.

Software is available to detect spam and erase it before...
the user sees it, but it would be nice to see some ethical standards on the Internet, with a proper approach offering a "Don't send me any more" box that can be ticked!

NEW RTTY PROGRAM

The new version RC2Rtty V1.21 is available. RC2Rtty is a comprehensive program for logging and administration of RTTY and CW-QSOs with simultaneous control of transceiver and real-time operation with Packet-Radio. It runs on any IBM PC or compatible with Windows 95/98 or Windows NT system.

The current program and further development (Beta-Version) can be downloaded from the homepage of Walfur DL4RCK at http://www.qsl.net/dl4rck/index.html.


Supported Transceiver: Kenwood, JCOM

Simultaneous Packet-Radio (DX-Cluster): TNC's with Terminal-Mode or with WABED Hostmode (The Firmware)

THAT'S ALL FOR THIS MONTH. SEE YOU ON THE INTERNET AND HAVE A HAPPY CHRISTMAS!

73 Roger J Cooke G3LDI

BROADCAST

REPORTS AND INFORMATION TO ME PLEASE.

PETER SHORE
C/O PW EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

E-MAIL: petershore@pwpublishing.ltd.uk

THIS MONTH, PETER BRINGS THE READERS OF PRACTICAL WIRELESS A REPORT OF A NEW INITIATIVE FROM DEUTSCHE WELL'S DIRECTOR GENERAL, A WORLD FIRST AND INFORMATION ON NEW STATIONS AND OLD AND WHERE TO FIND THEM.

A new initiative has been announced by Dieter Weirich, Director General of Germany's international broadcaster, Deutsche Welle. He wants to launch an international radio service from the whole of Europe, targeting Latin America in the first instance using Spanish and perhaps Portuguese. The new station would draw on Deutsche Well's output, plus material from Radio France Internationale. BBC World Service and Radio Netherlands, and the programmes would be produced in Brussels.

This seems to mirror the Radiote project which is funded by the European Commission, and their African services via this radio programmes each week.

The English-language version of this is called Weekend and is broadcast by a good number of Europe's English-language international services. EC funding for RadioE Ceases at the end of this year (1999) and so the main participants are looking for a new funding line for a new project from Europe.

A WORLD FIRST!

International radio broadcasting could be on the threshold of a new age with the launch of the first Worldspace radio satellite. The AfriStar satellite was sent into orbit from French Guyana at the end of October last year on board an Ariane 5 launch vehicle. The satellite is now in position at 21.745 degrees west for beam programmes in 'digital quality' to the whole of Africa and the Middle East, as well as parts of southern Europe.

The satellite will carry programmes from a range of African broadcasters and negotiations are continuing with major international stations - including BBC World Service. Deutsche Well and others - over the potential carriage of their African services via this new digital satellite system.

However, despite the hype surrounding the launch, there are still many industry observers who cannot see how the project will work. High technology products have ever been rolled out in Africa before and the satellite power does not allow reception of the digital radio signals under heavy foliage or inside buildings.

With receivers costing around US$300, it is difficult to see how many Africans will be able to afford the sets needed to access this potentially enriching technology advance.

'MERLIND' JOINS THE NETWORK!

Merlin Network One, the new station operated by the privatised BBC World Service transmission company, is making full use of the UK short wave sites it runs. It is on the air with English seven days a week:

0000-0030 (UTC) on 9.36 and 3.985MHz
0300-0600 on 9.895 and 3.985
0600-0700 on 13.72 and 6.11
0700-0800 on 21.55, 17.63, 13.72, 13.66 and 9.915
0800-0900 on 21.55, 17.63, 13.72, 13.66 and 9.915
1200-1400 on 21.55, 17.63, 13.645 and 9.915
1400-1600 on 21.55, 17.63, 13.68 and 9.915
1600-1700 on 21.55 and 6.185
1700-1800 on 31.55, 6.185 and 3.965
1800-1900 on 21.55, 6.125 and 3.965
1900-2000 on 9.69 and 6.125
2000-2200 on 11.985 via the UK and
11.755 via Sackville, Canada
2200-2300 on 9.835, 7.17 and 7.12
2300-2400 on 9.835, 7.17 and 3.985

Merlin Network One programming is principally music-based and includes shows like 'The Album Show' and 'Radio Caroline output'. The station is also aired via m.w. on Ascension Island in the Atlantic Ocean, home of the Merlin short wave transmission station. Try to catch the signal on 1485kHz!

Merlin can be contacted at 20 Lincoln's Inn Fields, London WC2A 3ES, or via E-mail at mrellon@ic.ac.uk

There is a Web site with quite a number of errors at www.mrew.on.net

MORE FREQUENCY NEWS

Radio Tirana from Albania has English programmes. 0245-0300 (UTC) on 7.16 and 6.115MHz; 0330-0400 on 7.16MHz; 2015-2030 on 9.65 and 7.18MHz and finally at 2230-2300 on 7.16 and 6.02MHz plus 1215kHz m.w.

Radio Prague is on the air with English: 0000-0027 (UTC) on 9.465 and 7.345MHz; 0100-0127 on 7.345 and 6.20MHz; 0300-0327 on 9.435 and 7.345MHz; 0800-0827 on 15.26 and 11.64MHz; 1000-1030 on 21.745 and 17.485MHz; 1130-1157 on 21.745 and 11.64MHz; 1230-1257 on 21.745 and 6.055MHz; 1400-1427 on 21.745MHz; 1700-1728 on 7.1485 and 5.93MHz; 1800-1827 on 7.315 and 5.93MHz; 2100-2127 on 7.345 and 5.93MHz and finally at 2230-2357 on 9.435 and 7.345MHz.

Radio Vlaanderen Internationaal has a new mailing address of 1043 Brussels, Belgium. The station's listener letter programme has been renamed to reflect this change, it is now called simply 1043 Brussels!

The station is on the air with English at: 0830-0900 (UTC) on 9.94 and 5.915MHz plus 1512kHz m.w.; 1130-1155 on 13.745 and 9.925MHz plus 1512kHz; 1300-1330 on 1512kHz; 17200-17255 on 13.65, 12.08 and 5.915MHz; 1830-1900 on 13.745MHz and 1512kHz; 2100-2130 on 1512kHz and finally at 2230-2300 on 13.67MHz.

Look out for the return of French-language programming from Belgium this year. The Danish Shortwave Club reports that RTBF is planning s.w. transmissions in French to Central Africa and to the Mediterranean. No frequency information has been given, or details of what sort of station might be used. The French community ceased s.w. broadcasting more than eight years ago and the transmitting station used was closed at that time.

Channel Africa from Johannesburg is on the air in English to Africa: 0300-0325 (UTC) on 9.525MHz; 0400-0430 on 5.955MHz; 0500-0530 on 5.925MHz; 0600-0630 on 5.915MHz; 0800-0830 on 11.745MHz; 1000-1030 on 17.8MHz; 1600-1630 on 6.00MHz; 1700-1730 on 17.37 and finally at 1800-1830 on 17.87MHz.

THAT'S ALL FOR THIS MONTH. KEEP YOUR EARS TUNED TO THE SHORT WAVE BROADCAST BANDS FOR THE LATEST NEWS FROM AROUND THE WORLD AND LET ME HAVE ANY INTERESTING SNIPPETS FOR OTHER READERS OF PRACTICAL WIRELESS. GOOD LISTENING!

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