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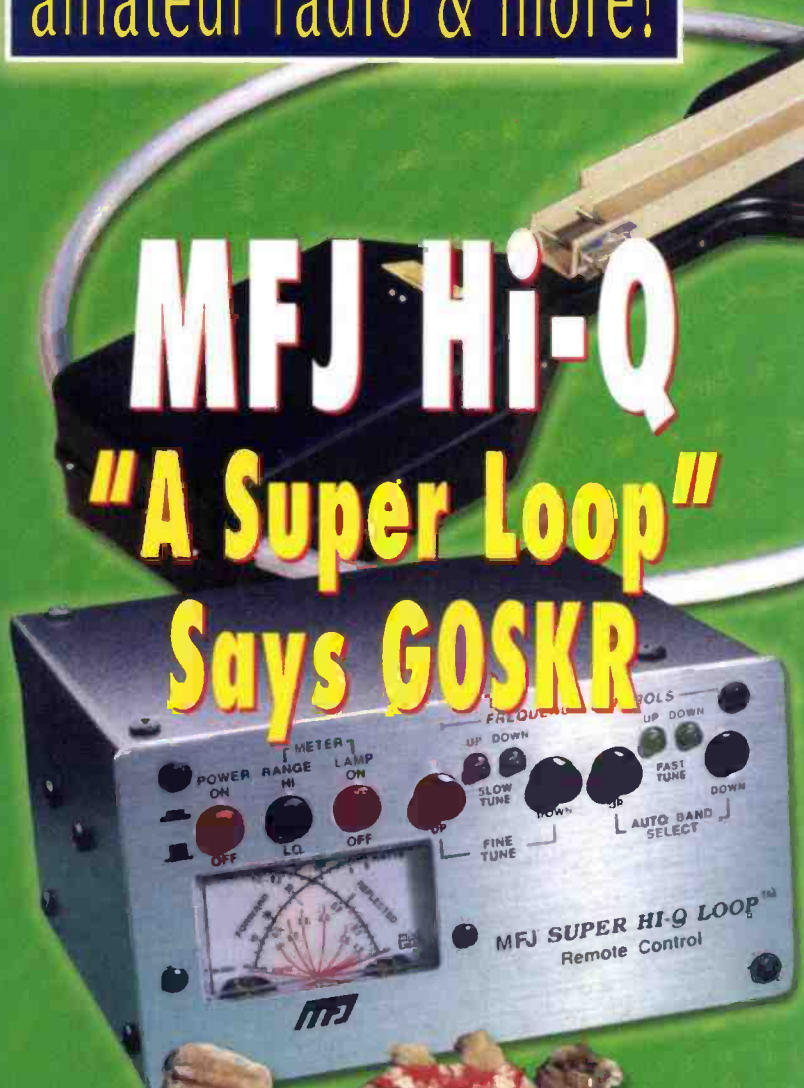

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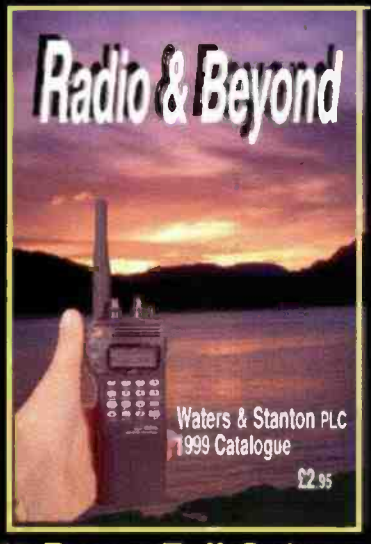

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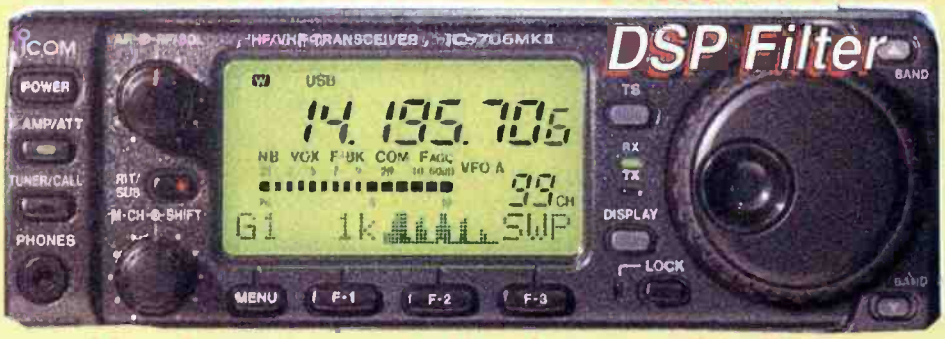
IC-706 Mk II

Fitted FREE DSP Filter



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* 151 channels or 75 Alphanumeric
* 7 channel steps
* 4 power levels
* 5W @ 9.6V DC
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* Audio: 1W output
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* Size: 150 x 57 x 194mm
* 1.2Kg (less FBA-8)

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FT-50R 2m/70cms Handy

* Wideband Rx (AM Airband)
* FM Broadcast receive
* CTCSS & 1750Hz
* 112 Alphanumeric Memories
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* 7 channel steps
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* Alphanumeric
* DTMF
* CTCSS (optional)
* Automatic batt. saver
* 4 - 12V DC
* 57 x 102 x 25.5
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* Nicad and charger

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~~£1899~~

PRICE MATCH

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PRICE MATCH £339

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MFJ-784B

£176.95

Hear those weak signals - Get rid of the QRM - works better than any Internal rig DSP - 16 memories - totally programmable

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£139.95

- *CW 50, 100,200,500Hz filter*
- *Suits all data modes*
- *Full adjustable pass band & filter*

Rotary Inductor ATU

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- 1.8 - 54MHz 300 Watts
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- Wire - balanced or coax
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- Active PEP meter (PP9 Batt)
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MFJ-418

"It's an Amazing Idea!"

- *Displays words, letters and numbers*
- *3 to 35WPM with natural CW note*
- *Various modes including Farnsworth*
- *Enormous vocabulary of words*
- *Actually sends QSOs as well!*
- *Individual characters or groups*
- *Headphone socket; Power from PP3*
- *Sends text just like an actual test.*
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- 1.8 - 30MHz * 2kW Power
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- Wire, Balanced or Coax * 6-way antenna switch * Crosse-needle meter
- Built-in 4:1 Balun

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1.8-30MHz 300W ATU

MFJ-948

- *300 Watts PEP 150W CW*
- *1.8 - 30MHz - with ease!*
- *Wire, coax or balanced line*
- *Balun included for best match*
- *30 / 300W power meter - PEP / RMS*
- *Antenna selector, by-pass etc.*

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Lets your Auto ATU match any coax aerial .

MFJ-914

Auto-Tuner Extender

Connect between transceiver and antenna - no more problems with G5RVs and all those difficult antennas - 160 to 10 metres

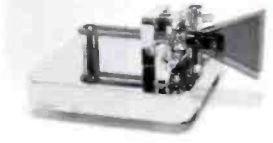
MFJ- 901B HF Atu

£54.95

- *160 - 10 ATU 300W PEP*
- *Very easy to adjust and match*
- *Wires, Coax and Balanced Feeder*
- *Well rated components*
- *A really low cost winner from MFJ*

Nothing Compares £58.95

MFJ-564 Paddle £59.95



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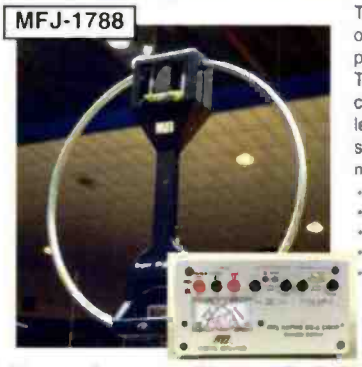
MFJ-949 New Version

Same as MFJ-948 above but with internal dummy load.

£115.95

Amazing Magnetic Loop Antenna for Loft or Garden

MFJ-1788



The antenna for those with small gardens or no gardens at all! Just 3ft in diameter it performs as well as a full-sized dipole. Tuning control signals are sent up the coax cable. The only extra you need is a length of coax cable to go between the supplied control box and the loop. 2" mast mounting brackets included for loop.

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- *Remote control head included*
- *auto band select Fast/Slow tune*
- *Cross needle VSWR meter*

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Other Model

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- *Recovers signals below the noise!*
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- *Kill that thermostat problem*

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- *Built-in dummy load*
- *Thru position * Size 257 x 85 x 197mm*

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300 W Dry Load
DC - 600MHz
SO-239 Socket

£32.95

We stock a wide range of dummy loads up 2.5kW. Phone for information

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- *"T" network with 4:1 balun*
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- *By-pass and Antenna select switch*
- *270 x 375 x 115mm*

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EDITORIAL OFFICES
Practical Wireless
Arrowsmith Court, Station Approach
Broadstone, Dorset BH18 8PW

☎ (01202) 659910
(Out-of-hours service by answering machine)
FAX: (01202) 659950

Editor
Rob Mannion G3XFD
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX
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REGULARS

The Ten-Tec Review scheduled for this month has had to be held over until next month, my apologies. Editor.

Mark Haynes 2E0APH faces a test - Page 50

The Club Spotlight Competion Results - Page 17

75 Radio Scene

We have a new column in Radio Scene for you this month: Data 'Scape is the replacement for Radio 'Scape and is written by roger Cooke G3LDI – we hope that you enjoy it!

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- CTCSS encoder
- Noise blanker
- Quick offset for DX pile-ups
- IF shift control
- Separate HF & 6M antenna sockets

The DX70 TH packs a hefty 100W punch on all Ham bands 1.8 - 50MHz. It is backed by a superb receiver with narrow filters fitted as standard. Make no mistake - this is a real DX operators transceiver ideal for use at home, in the car, or for that portable DXpedition. General coverage receive is included and wideband transmit facilities for export customers. The detachable front panel allows remote mounting and additional security.

£699.00 £8 P&P

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- Covers all HF Amateur Bands
- General coverage receive (150kHz - 30MHz)
- 100 memories
- 100W. SSB, CW & FM, 40W AM
- Built in speech compressor
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- QRM/QRN reduction with IF shift. RF attenuator and optional CW filter
- Two VFOs + memory operation mode
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  EJ34U CTCSS
  EJ35U CW filter

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A rugged easy to use 70cm mobile transceiver with optional extended receive coverage.

- 400 - 490MHz
- 35W RF output
- CTCSS encoder
- 20 memories expandable to 100
- Frequency or channel display

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£159.95 £8 P&P

The EDX-1 is a coaxial tuner with built in Power and SWR meters. The ATU is rated at 120W and covers 160-10 meters including WARC bands.

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£289.95 £8 P&P

Quickly matches random wire antennas, mobile whips, verticals, inverted Ls. Wired for DX70 - but can be used with most HF Transceivers.

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- 200W PEP

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- Length: 2.7 metres

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Miniature speaker mic with lapel clip for use with DJ-C1 and DJ-C4.

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DJ-491

70cms handheld transceiver

A slim line 70 cms transceiver that's easy to use and has an enormous clear display. A unique feature is the ability to display either frequency readout or just a channel number.

- Up to 5W output (with 9.6V NiCad pack)
- 40 memories channels
- RX expandable to 430 - 450MHz
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- Auto power off with alert
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- Cloning capable
- CTCSS encoder
- DTMF fitted as standard
- Battery save facility
- Scan functions
- Time out timer
- Inc EBP36N 650mAH NiCad & charger

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Micro sized handheld

- 144 - 146MHz transmit
- 430 - 440MHz transmit
- Extendable receive 118 - 174MHz including (AM) air band
- Extendable receive 420 - 450MHz

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Slimline 70cms Handheld

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- Spectrum channel display
- Optional extended receive including Airband 108-173.995MHz 400-511.995MHz 800-999.990MHz
- Full VHF/UHF Duplex
- Over air cloning
- Cross band repeat
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- 100 memories

NEW LOWER PRICE **£269.00** £8 P&P

DR-140E
2 Metre Mobile/Base

NEW LOWER PRICE **£219.95** £8 P&P

The DR140 is simple to operate, easy to program and dependable in use. The clean design, large controls and display show that Alinco are listening to what operators are saying. The DR140 combines solid construction and easy maintenance with popular features and advanced functions.

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- 51 memories
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- c/w DTMF mic

DR-150 2 Metre Mobile

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The DR-150 takes mobile radios into the 21st century!

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DR-610E Twin Band Mobile

The DR-610E dual band transceiver equipped with Alinco's Advanced Channel Scope utilises a 'Real Time Monitor' on 11 different frequencies simultaneously giving you quick visual scanning capability and the potential for making numerous contacts.

£429.00 £8 P&P

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- Channel Scope
- Full duplex k• CTCSS encoder
- AM Airband RX
- Optional extended receive inc airband
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  - UHF 420 - 470MHz

DJ-191E
2 Metre Handheld

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- 40 memories channels
- Cloning capable
- CTCSS encoder
- DTMF fitted
- Battery save facility
- Scan functions
- Time out timer

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Easy to use twin band mobile TX that delivers both high power and performance with user friendly features.

- 50W (2m) - 35W (70cms)
- 100 memories
- Full Duplex
- CTCSS encoder fitted

£329.00 £8 P&P

DJ-190E
Low Cost 2mtr Handheld

A powerful super slim 2mtr handheld with a huge easy to read display.

- Up to 5W RF output (with opt. EBP-36N battery pack)
- 40 memory channels
- Includes NiCads and charger
- CTCSS tone encoder fitted
- Battery save function
- Scan function
- Time out timer setting

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VC6
6mtr V Dipole

V configuration allows both repeater and DX operation. 50 - 54MHz 300 Watts.

£39.95

while stocks LAST!

DR-M06TH
6mtr FM Mobile 50 - 54MHz

With the new 6 metre repeaters now up and running, this is the ideal radio for the Band. With an optimised receive front end, CTCSS encode and easy to use controls you will be amazed at the range achievable.

20W!

£249.95 £8 P&P

SMC

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Rodney Perry's pick of the month

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The first 'Leicester' show to be held at the Castle Donington Exhibition Centre near the East Midlands Airport took place amidst much interest and incident. And although the event was marred by a failure of the electricity supply around lunchtime on Friday 25th of September - the new venue is undoubtedly a great success.

The building is clean, with excellent access and the necessary public facilities are also clean - helping us to forget the dreadful state of the old Granby Halls. It was also good to see so many familiar and friendly faces - particularly so the helpful staff working at the ticket desks.

Getting to the show is also much easier - although the last mile or so could do with some 'Leicester Show' road signs. This comment comes from experience - because even though I had been to the site before - I found myself driving through the campsite before getting to the car parking area proper! So, a few signs could certainly help.

Several readers thanked me for the information provided in the October *PW* on the approach to the show from the south as they found it very helpful. However, I had some adverse comment regarding my instructions **on the approach from the north** - and it was quite justified because I too discovered that there's no south-bound exit at the Tonge junction on the A42 for those people who became confused at Junction 23A and found themselves heading for Birmingham!

I've used the M42/A42 route north-bound on many occasions and have also left at the north-bound Tonge A453 junction when travelling to the East midlands Airport. **However, I did not realise that there's no corresponding south-bound exit!** I discovered this when I ended up (after missing the exit to find my Hotel at Junction 23A) and found myself heading towards Birmingham on the A42. A victim of my own published directions I had to drive to the Ashby-de-la-Zouch junction and then head back to my Hotel near the M1. Lesson learned readers...sorry about the misinformation!

Light In The Darkness

Despite the valiant efforts of the power supply company the lights stayed off for the rest of the afternoon on the Friday, although large stand-by generators were in operation on the Saturday. But, every dark cloud has a silver lining and as a direct result of the problem - another was temporarily solved.

As the exhibition centre building is of the very large 'warehouse' type with windowless industrial roofing - ventilation is obviously a problem. During the Friday morning it became very hot and stuffy - as is common at such events and it got worse after the power cut.

However, the show organisers quickly arranged to have the roller-shutter type doors at each end of the building opened to provide extra light. And although the affect on the light was minimal - the improvement in ventilation was immediate and refreshing.

I mentioned the improved ventilation to the organisers. Hopefully next year, bearing in mind the large amount of electrical equipment and people attending (all producing heat!) that they try to arrange that the end doors are kept open to the benefit of everyone - especially as there isn't a 'No Smoking' rule in place.

Finally, there's an odd little incident that took place at the show which can't pass by un-reported. It involved **Bernie and Brenda Godfrey of Radiosport Ltd** (organisers of the London Amateur Radio Show at Picketts Lock) who were 'asked to leave' the building by the organisers.

Bernie and entourage did as the organisers asked - but shortly after they departed the lights went out! When I spoke to Bernie about the incident - jokingly suggesting there was some 'connection' between his sudden departure and the power failure - he in return enjoyed the joke but added that "As Moses was able to part the waters of the Red Sea to help my ancestors escape from Egypt back to Israel....surely he could arrange an electrical fault to brighten my day"?

Our cartoonist **John Worthington GW3COI** thought we'd better produce an illustration showing that the incident **was a pure coincidence**. (or divine intervention?).

So, with a smile on my face (and yours too I hope) I'm looking forward to the next Leicester Show as I'm sure it will continue to be a truly excellent event. See you there!

Radio 'Scape & Data Diary

As briefly mentioned last month - we've said 'goodbye' to **Mike Richards G4WNC** our 'Radio 'Scape' columnist. Unfortunately, due to pressure of work Mike has had to shed some load so he can enjoy a little more life with his family again. However, I'm sure that readers will join with us and wish him well in the future and that he may find time to occasionally do some work for us! Good luck Mike!

Readers will remember that 'Data Diary' often 'overlapped' in coverage of the same topics as 'Radio 'Scape' and because of this, some time ago we dropped the 'Data Diary' column. But, now that Mike G4WNC's column has ceased, I'm delighted to say that it can be re-started by **Roger Cooke G3LDI**, the previous author who is an extremely active Radio Amateur and very busy using computers, data modes and the Internet.

So, thanks again Mike G4WNC and good luck to Roger G3LDI and the relaunched column – 'Data 'Scape'.

Rob Mannion G3XFD

ROB SHEDS SOME LIGHT ON TO WHAT HAPPENED AT THIS YEAR'S LEICESTER SHOW

letters

COMPILED BY JO WILLIAMS & ROB MANNION

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by *Practical Wireless*. All other letters will receive a £5 voucher.

Amateur Radio

Dear Sir

I am responding to Mr Wilkie GM0RMT's letter in the November issue of *PW*.

In my opinion...our hobby is like going for a Sunday afternoon drive, you often never know where you're going to end up. So it is with Amateur Radio.

Preparation of equipment, fine tuning, etc. before starting off helps to provide extreme satisfaction...even if you can't reach the intended goal. The sense of achievement of making a contact with a signal generated using your own rig and antenna system is not unlike that of a lone yachtsman making a single-handed transatlantic crossing or perhaps a venture on safari through Africa. Quite a boost for the ego!

Can you really compare this with switching on the computer and dialling up the local ISN or even clamouring to join the melee a couple of miles from the repeater which is doing all the work for you? That's not my idea of a good hobby!

Thanks for a wonderful magazine - keep up the good work!

Richard Jones GW4XXJ
Llandrindod Wells

On Target With AKD

Dear Sir

I thought that the Editorial team and the readers of *Practical Wireless*, might be interested in the following.

Some time ago, I wrote you that I had bought an AKD Target HF3 receiver and what a wonderful little radio it was for the price. You were kind enough to send me a review on it that had been published in the November 1996 *PW* (thank you).

It is a good little radio but there were two things lacking. One was lighting behind the digital readout and the second was the lack of memory facilities.

Fear not, salvation was at hand! For a radio to have a two year guarantee must mean that the manufacturers have great faith in it, I thought to myself. So, I wrote to AKD asking them if any such modification to the back lighting and memories was envisaged in the near future. I had a very nice letter back from them with the good news that they would not only fit back lighting facilities into my receiver but also a ten memory bank. The price? £20 plus £6 P&P. My receiver was in the post within the hour.

I could have traded my present receiver in for an HF3S plus £70 - but I think the first option the best.

So, for anyone owning an AKD HF3, for a small outlay they can have a receiver guaranteed for two years that can compare favourably with many higher priced receivers on the market.

Also, with reference to 'Radio Basics' in the September issue of *PW*, I see the old problem has arisen. Coil winding or rather the formers.

The answer is simple. Go to your nearest supermarket, have a quiet word with the manager and I am sure they'll fit you up with a supply of the little plastic formers from inside the till rolls.

There are apparently two sizes. One is approximately 11mm outside measurement and the other is 21mm. These can be easily fitted to the p.c.b. board or chassis by carving a piece of dowel to a tight sliding fit and either glue it or drill it and screw it.

John Noble G20961
Kent

More On Morse

Dear Sir

I have followed the debate on Morse/No Morse and changes in the licensing regulations with interest over the past few months but I think that many of the subscribers miss the main point which (in my opinion) - what's going to happen to Amateur Radio in the future?

We read constantly of surveys which document the falling numbers of Radio Amateurs throughout the world. I believe that we must do something to attract new members to our hobby and that if it is necessary to relax the entry conditions, then we have to take the appropriate steps now.

We often read of 'frequency auctions' in the USA and if our numbers decline at the rate they appear to do I would not be surprised if parts of our frequency allocations are up for sale in the future.

One reader was quite worried about what the rest of the world would think if the Morse speed was reduced. I can assure you sir, nothing. Last year here in Denmark we simplified the license categories, upped the maximum power to 1kW and dropped the Morse speed for a full license to five w.p.m. I have not noticed any deterioration in operations by Danish amateurs.

So, come on you good people out there, support your national organisation's attempts to brighten the future and avoid the situation that "the last 25 c.w. operators on 80m will hold their last net on Friday before that portion of the band is sold".

Tony Woodcock OZ2ZZZ
Copenhagen
Denmark

....And The Future?

Dear Sir

My reason for putting fingers to keyboard are two-fold. Firstly, let me begin by congratulating you on such a brilliant magazine. I have been reading *PW* fairly regularly since 1984 and possess issues dating back to about 1975. The progress in presentation over the years has been remarkable, culminating in what has become a second-to-none specialist publication which everyone interested in radio can enjoy.

My second point is with regards to the many letters published in your letters column for and against keeping the Morse test as a compulsory prerequisite for access to the h.f. bands.

Callsign Number Plates

Dear Sir

I think everyone is missing the point about callsign number plates! Of course **you can save money** by having your callsign made up as a sticker for your windscreen, or printed on your actual plate where dealers sometimes have their name displayed. Anyone can do this, by having the actual vehicle registration number the same as your callsign is obviously 'exclusive', or at least it was before the DVLC got on the bandwagon by offering these numbers for sale at exorbitant prices.

However, **please remember** those poor G0 series callsign holders who will never get a chance for this so-called 'exclusivity due to there being no G0xxx formatted DVLC licence numbers. Similarly GM, GW, etc. would also miss out.

Never mind, I know of a chap near me who has called his house G0...! I would like to do the same but my YL won't let me! Excellent publication, keep up the good work.

Jon Kessel G7RWH
Boscastle
Cornwall

Top Band

Dear Sir

I read in the September 1998 issue of *Practical Wireless* that **David Perry G4YVM** of Salisbury was particularly interested in top band: 1.8MHz, for which he'd like to see more references.

I am a Radio Amateur myself (GM3VOX) and am also a professional in electronics (now specifically interested in Radio Astronomy designing). I built an RSGB article design 'Top Two' transmitter (16W) including a voice modulator to another RSGB design article. This home-brew transmitter has been tuned up by me, the 1.8MHz being v.f.o. tuneable and the 144MHz being a crystal frequency.

I suspect that the circuitry could be obtained from the RSGB archives in London. I am prepared to sell mine, with a power unit, but a p.a. power unit variable in voltage from, say, 150-350V, offering up to 100mA, would be required to permit tuning up. High voltage transistors are now easily and cheaply available.

I built the top two transceiver for use on the Oscar 6 satellite, but this was delayed several years. If this top two transceiver is of interest to any licensed Radio Amateur, I am prepared to sell it, with power unit, for £250. It would still require the PA variable voltage power supply mentioned above, however.

As there is a considerable interest in both 1.8 and 144MHz, I thought the subject might merit the publication of this letter.

Tony Thomson GM3VOX
108 Tannahill Drive, Calderwood 12, East Kilbride, Glasgow G74 3HT

Editor's comment: As GM3VOX is not listed in the current RSGB *Yearbook & Directory* (formerly *Callbook*) we've provided the full address. Readers who are interested in 1.8MHz may like to look again at the *PW* 'Chatterbox' a.m. transmitter designed by Rev. George Dobbs G3RJV, originally published in August (part 1) and September (part 2) 1991. The transceiver has proved very popular and an interesting modification (eliminating the modulation transformer) by Doug Gibson G4RGN, was published in the February 1997 issue of *PW*. Also, the 'Top-Band Tourer' by G4SLU from July 1998 *PW* may be of interest.

I should say now, that I am not yet a licensed amateur. However, I have been involved with radio since about 1980 at the age of 15, via CB. Gradually, I became interested in short wave listening and borrowed my uncle's Yaesu FRG-7 receiver. This opened up the world of Amateur Radio to me and I have been hooked ever since.

Having finally realised my education and academic aspirations, I am fully committed to taking the RAE, which I hope to do either this December or next March. However, the point I'm making is that once I have passed the RAE, **I will still be unable to join** those on the 3.5MHz net to whom I have listened for a very long time with eager anticipation of the time when I may 'rag chew with the best of them'!

I attended the Blackwood and District Amateur Radio Rally at Oakdale Comprehensive School on Sunday 4th October and was surprised - shocked would be better - at the decline in popularity of what was once a very well attended 'convention'. Many of the people attending the event were, shall we say, not getting any younger and the average age being around the late 40s mark, with only a very few in their early 30s such as myself.

I think the Radio Society of Great Britain (RSGB) and the United Kingdom Radio Society (UKRS) should be asking themselves **why?** Even the UKRS stand, advertising themselves as a young, enthusiastic and forward looking alternative to the RSGB was manned by a 60 or so year old and another fellow in his 40s. Is this hobby exclusive to retired people with the under 60s deemed to be young upstarts? I sincerely hope not!

Returning to the issue of the compulsory Morse test. Does an ability to receive and send Morse code make you a better operator than those who merely possess a pass in the RAE? Personally I think not.

The RAE is an imposing prospect in its own right. It requires many hours of careful study for those of us not well versed in electrical theory and this should be all that is required for access to the h.f. bands. The RAE has already provided knowledge of how the bands are allocated, so the operators will refrain from straying onto telegraphy only portions of the band being worked. Knowledge of Morse does not add to this appreciation of the amateur band plan in anyway!

In my opinion, if the hobby and enjoyment of all things radio is to survive into the millennium, both the RSGB and the UKRS must put their heads together and take a good long look at how Amateur Radio can be promoted and encouraged in the future.

Simply, it's my belief that the RAE should remain as it is. We all need to understand how our radios work and how we may inadvertently cause nuisance and irritation to our neighbours through poor installations which cause EMC problems. Personally, being of a musical disposition, my Morse ability isn't bad and with practice it will no doubt improve sufficiently to achieve 12 w.p.m., but why? New-comers will no doubt ask the same question and may be put off from attempting the RAE, reasoning that once passed, they will still be denied world contact, being instead relegated to a relatively short range system with the odd contact now and then if the propagation is good or someone happens to be mobile and opens their local repeater.

They will, instead, probably nip down to the local 'cyber cafe' and jack into the net, make contact anywhere in the world via video conferencing and actually see the other person for around £2 for an hour's chat.

Also and probably more importantly, why aren't true CB enthusiasts encouraged or invited to attend amateur radio clubs and societies? Radio **is radio after all. So** why be elitist at the expense of the hobby? Many amateurs (who may now not admit to it) made their way into the hobby via an introduction to radio from CB.

The millennium is looming and technology is racing to provide us all with increased access to world-wide communication and information. So how does the RSGB and UKRS aim to promote Amateur Radio to prospective licensees and keep the hobby alive and healthy into the next century?

Kevin Dawson
Gwent

Editor's comments: Another good selection of letters and opinions this month readers. But please bear in mind that by keeping yours as short and concise as possible...means we'll have room to provide even more interesting reading on these very popular pages.

Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! All letters intended for publication on this page must be clearly marked 'For Publication'.

Editor

news

COMPILED BY JO WILLIAMS

HEADLINE NEWS

MARCONI'S DAUGHTER RE-ENACTS HISTORY

In an event that mirrored history, **Princess Elettra** - daughter of Guglielmo Marconi - visited the Isle of Wight for the first time on August 31st. The Princess was happy to be at Osbourne House on the Isle of Wight where her father had spent so much time and where, 100 years earlier, he had helped Queen Victoria make broadcasts to her son, the Prince of Wales, on board the Royal Yacht.

A marquee was erected on the site of Osbourne Cottage and it was from here that the Princess, with the help of **Douglas Byrne G3KPO** (on the right of the Princess in the picture), who played the part of the operator) and Peter Botterill, sent messages by Morse (c.w. and **NOT** spark!) to **Rod Burman** on the historic tall ship, *Sedov*, which is moored in Portsmouth harbour.

Peter Boterill (on the left of the picture) constructed an authentic copy of Marconi's first spark transmitter from Marconi's original plans and it really is a shame that he couldn't use it. Still, although the messages were conveyed on a modern set, everything else was extremely authentic. Everybody got into the spirit of the historic venture and dressed up in authentic Victorian attire and played the parts of several people who were present at the original event.

THE DIGITAL REVOLUTION?

With the increase in publicity over the 'Digital Revolution' in both TV and radio, the News desk here at *PW* has received a number of interesting press releases from the BBC concerning their successes in this field and some information on digital products that will soon become available. The coverage map is an updated version which has been sent to all retailers who stock digital radios and shows who can receive BBC digital radio broadcasts.

There are five manufacturers who have already produced digital radio for use in the car but the BBC are keen to encourage manufacturers to produce home hi-fi units. Three UK manufacturers have announced that they are developing digital radio hi-fi tuners for use in the home.

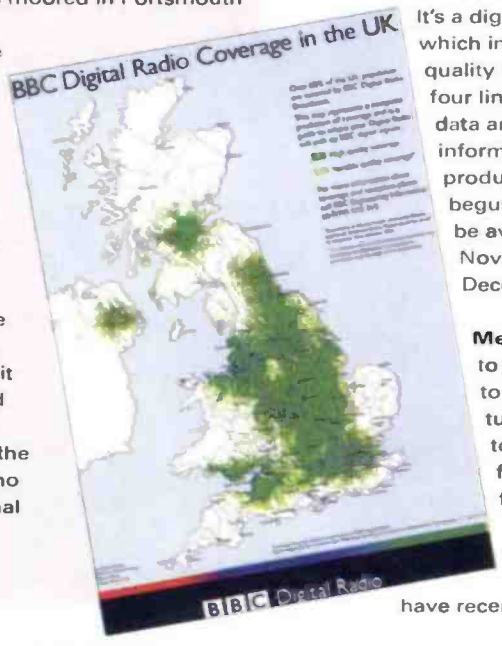
Arcam have announced their launch of a digital radio tuner (DRT) - the **Arcam Alpha 10 DRT** priced at an astonishing **£799** and is designed in

collaboration with Roke Manor Research using their **DAB Gold Card** - a hi-fi component that can be easily added to an existing hi-fi system. Initial production begins in late October and full production should start in January.

Cymbol have launched their **C-DAB I Tuner** this month! It's a digital radio tuner which includes a high-quality DAC board and a four line display for all data and text information. Full production has already begun and tuners will be available late November/early December.

Another company, **Meridian**, is looking to launch an upgrade to its existing f.m. tuner in early 1999 to provide reception for both DAB and f.m.

Still on the subject of Digital Radio, the BBC have recently won an award for: '**Most Innovative Radio Broadcaster**' for its work in Digital Audio Broadcasting (DAB), at the International Broadcasting Convention in Amsterdam. The Judge stated that the BBC was the 'unequivocal winner'.



MORE & MORSE...

One look at our letters page this month will tell you that the debate over whether the Morse test should still be valid or not is very much at the forefront of Amateur Radio politics at the moment. It is, therefore, probably very topical for **Waters & Stanton** to be promoting two new Morse code related products from MFJ.

First up is the **MFJ-414 Classroom Morse Code Tutor**. If

you are one of the Radio Amateurs who does feel that it is still worth taking the Morse test and are considering having a go, then this Morse Tutor, W & S state, has all the necessary features: memory keyer; h.f./v.h.f. interface; l.c.d. readout; 1000 character store; computer and printer ports - to name but a few. It costs just **£189.95** and is in stock at Waters & Stanton now.

Of course, if you're really serious, there's always the **MFJ-554 Classroom Morse Practice Oscillator**. Why not

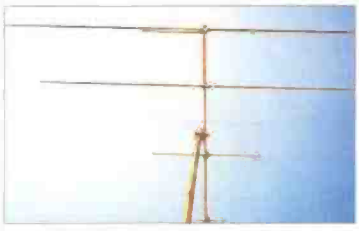
make it a pair? This also has all you need in a Morse Practice Oscillator, says Waters & Stanton. Pure sinewave, adjustable volume control, tones 400-1000Hz again to name only a few. The MFJ Morse Practice Oscillator costs just **£79.95** and is also in stock now.

Waters & Stanton also bring us news of other products from MFJ. With the countdown to the millennium being on everyones minds at the moment, a new clock which gives the time, year, month & day might be handy. The **MFJ-118** and the **MFJ-119**

are two different clocks. The MFJ-118 is an hour clock (batteries only) which has both 12 and 24 hour clock and gives you the year, month and day. Waters & Stanton say that you can also choose the language you would like: English, Spanish, German or French. The MFJ-118 costs **£28.95**.

The MFJ-119 is a calendar clock, Waters & Stanton say that it has a large l.c.d., 12 or 24 hour clock, day, month, date, and temperature. It costs slightly more than the MFJ-118 at **£48.95**. Waters & Stanton say that you can get more details by calling their **Dealer Hotline on Tel: (01702) 203353**.

Still with Waters & Stanton, they are also promoting the new **GB-3 Tri-band Base Antenna**.

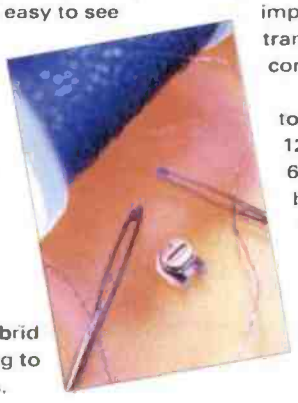


Apparently a directive array that doesn't take up much room, this new antenna (covers 6m, 2m and 70cm) is mounted on a single mast. Waters & Stanton state that if it is used with a modest rotator it is probably one of the most efficient models. At **£129.95**, Waters & Stanton say that it is "good value" when you consider the cost of a 50MHz antenna alone.

For more information on any of these new products from Waters & Stanton, you can call their **Dealer Hotline on Tel: (01702) 203353**.

MINIATURE MEGGIT 3315

As you can see from the photograph supplied by **Easby Electronics**, it is easy to see why they claim that these are the smallest SMD trimmers ever seen. Featuring a very small outline package, the **Meggit 3315** is particularly well suited to surface mounting and hybrid systems according to Easby Electronics.



They claim that it is suitable for all current solder systems including hot-plate, infra-red vapour phase and dual wave and it will, apparently, withstand a temperature profile of 260° for 20 seconds without degradation.

Also available from Easby Electronics are their new **SM diodes** which they say have ultra-fast recovery times. For more information on either product, you can contact **Ian Hepworth at Easby Electronics, Gallowfields Trading Estate, Richmond, North Yorkshire DL10 4TQ. Alternatively, you can telephone them on (01748) 850555**.

CUSHCRAFT'S NEW DIRECTIONAL PATCH ANTENNA

The communications and antennas specialists - Cushcraft - have recently introduced a **PCS/DCS & ISM Band linearly polarised dual patch antenna series**. The beauty of this antenna series, according to Cushcraft, is that they are of a low profile design making it 'an ideal choice for discreet antenna installations'. Applications for these antennas, therefore, could include industrial complexes, office environments, shopping malls, parking garages, airports, hospitals and campus settings and many, many more say Cushcraft.

Designed for the following bands: 1850-1990, 1710-1880 and 2400-2500MHz, these new Directional Patch Antennas consist of a high quality etched copper circuitry which, Cushcraft say, aims to "substantially improve the reception and transmission of communication signals".

The antennas are said to provide a minimum of 12dBi gain with nominal 66 by 25° half power beamwidth for the 1850-1990 and 2400-2500MHz frequency bands and a nominal 64 by 26° half power beamwidth for the 1710-1880MHz frequency band, with

Continued over...

AMATEUR RADIO CLUB SPECIAL

Boston's Hundred & Fifty On Line

On the weekend of **September 12/13**, Boston in Lincolnshire celebrated 150 years of their railway and in order to celebrate in style, a special event station - **GB4BR** - was set up on the railway station itself.

A senior conductor for Central Trains, **Selwyn Auty G3JRY**, set up GB4BR with the help of other people from the British Railway's ARS and, altogether, they made some 150 contacts with 18 countries. There were also a number of other things to see that weekend, with many displays and shows along the railway theme.

Congratulations on the 150 years of the railway and let's hope there are many more years still to come!

Reddish Radio Rally Report

Peter Knowles has been in touch with us to say what a wonderful turn-out they had at the Annual Reddish Radio Rally which was held at St. Mary's Church Hall in Reddish, Stockport on **September 12**. It is always good to hear that radio rallies are still going strong and that they are still getting a good turnout.

Peter reported that with all the usual home-brew 'goodies' and radio components there were new additions to the Rally this year. These came in the form of the first computer stall to ever appear at the Rally manned by **Mark M1CYW** (seen in the photo). Also new was a visit from **Dave Wilson G7OBW** and his wife **Kath Wilson M1CNY** who manned a stand for the **FM Repeater Group (Western)**. With all this going on, there was something for everyone!

A Big Thankyou!

The members of **Central Lancashire Amateur Radio Club (CLARC)** have been in touch with the *PW* news desk with a wish to express their thanks to all amateurs and s.w.l.s who helped to make **GB350BOP** such a success!

The operators at CLARC inform us that they made over 4000 contacts and worked over 146 countries over the course of the whole event which took place between May 24 and August 17. On July 18 they were on the station at Flag Market in Preston which was attended by the Mayor of Preston, Councillor **Rose Kinsella**.

The callsign was clearly well received and their publicity officer tells us that hey had some encouraging comments such as "a refreshing change from normal special events" and "a history lesson on air". CLARC would also like to say thankyou to **Martin Lynch & Sons** who sponsored their QSL cards.

Fig. 1 left to right: Alan Floyd G3PHQ, Brian Boulton G0UTJ (Chairman of CLARC), Mayor and Mayoress of South Ribble Borough Council: Councillor Jim Owen & Mrs Joan Owen, Brian Birkby G0NEI (President of CLARC), Ken Simms G0LBT and G0GVA handling the pile-up.

news

COMPILED BY ROB MANNION

an impedance of 50Ω and a v.s.w.r. of 1.5:1. Cushcraft also say that each patch antenna combines excellent r.f. performance with a discrete and stylish antenna housing which are easy to mount in all many challenging situations.

For more details and prices, you can contact the **Cushcraft Corporation on Tel: 603-627 7877 or FAX: 603-627 1764**.

MARK SHEPHERD - YOUNG AMATEUR OF THE YEAR

The 1998 Young Amateur of The Year Award has been won by **Mark Shepherd** from Brighton. Mark who holds the callsigns **M0AGO** and **G7WHL** was conferred the honour and the awards that accompany it, including a cheque for £300 from the **Radiocommunications Agency** (RA) and an invitation to a conducted tour of the RA's Monitoring Station near Baldock in Hertfordshire at a ceremony at the Radio Society Of Great Britain's HF Convention at Old Windsor on Sunday 11th of October.

Mark has done a great deal to raise the profile of Amateur Radio - particularly at Brighton College where the 17-year old is a student. He's been the Secretary of the school radio club for three years, is a GB2CW broadcaster and is also active in the RAF Cadet Force (Air Training Corps) where he teaches radio communication skills to cadets.

The 1998 'Runner Up' in the YAOTY award is 16-year old **Peter Evans M0BOO** from Orpington in Kent. He received a £50 cheque from the RA and also receives a conducted tour of the Baldock Monitoring station.

This year's holder of the Young Amateur of The Year Award Mark Shepherd M0AGQ/G7WHL (front row left) with proud father behind after the ceremony at the RSGB's HF Convention with the runner-up Peter Evans M0BOO to his left accompanied by his parents and RSGB President Ian Kyle GI8AYZ/MI0AYZ. Hazel Canter (front row left) the newly appointed Director of the RA's RA2 Section presented the awards.

The man himself! Louis Varney G5RV at the RSGB "One Hundred Years Of Amateur Radio' celebration dinner held on Friday 25th of September - looking back at over 70 years in the Amateur Radio hobby - complete with one of his rigs (in working order) from the period!

ONE HUNDREDS YEARS - CELEBRATION DINNER

One hundred years of 'Amateur' Radio was celebrated by a special dinner held on the evening of the first day of the newly-relocated 'Leicester' Show - held for the first time at the Castle Donington venue. The dinner - attended by distinguished friends and guests of the hobby was an enjoyable evening organised by the RSGB at the Donington Thistle Hotel and hosted by the Society's General Manager **Peter Kirby G0TWW**.

The event - despite the importance of the celebration was not well supported by the Amateur Radio Fraternity. However, for those who did attend - including myself and **Tex Swann G1TEX**, invited by the RSGB and representing *Practical Wireless* - were entertained by good company, had an interesting time and heard several varied speeches - and in one case a particularly inspiring challenge - by the Amateurs invited to speak during the evening.

'Top of the table' speeches came from none other than **Louis Varney G5RV** himself who - despite losing his notes - provided a splendid series of 'off the cuff' memories dating back to the 1930s. It even included one of G5RV's original rigs from the period which Louis assured us was "still in working order"!

Ian Poole G3YWX provided a brief 'guided talk' illustrating the passage of the history of the hobby before the 1997 Young Amateur of the Year **Emma Constantine 2E1BVJ** held the attention of the audience with a well-written speech announcing 'Emma's Challenge'. The challenge (further details in *PW* later) sets the task for any group or individual to produce a practical 'phone' project for the Novice for under £40. An interesting challenge indeed!

The President of the French Amateur Radio Society **Jean-Marie Gaucheron F3YP** also addressed the gathering and we were all thoroughly entertained by the RSGB columnist **John Hall G3KVA's** nonchalantly delivered humour where no personality escapes the 'verbal sword'! But joking apart...it was good to see John fully recovered from a relatively recent serious illness although it was a great shame that there weren't more people in the audience to enjoy the evening and John's 'dead-pan' delivery service!

So, here's to the next 100 years - with all the challenges we're yet to encounter!

Rob Mannion G3XFD.

PRACTICAL WIRELESS QRP COMPETITION AWARD PRESENTATIONS

Oldham Told 'Em....We Won!

Anyone who can remember the old advertising slogan: "I told them...Oldham' (it helped sell car batteries for many years) will understand the jubilant cry from the operators of the **Oldham Radio Club's G1ORC/P's** station when they learn the group came first in this year's contest!

The success of the G1ORC Group's entry was only marred by a computer problem at *PW* - when we inadvertently published two year old results in the November issue due to an unexplained computer problem! (See page 16 for the 'real results').

The Oldham Radio Club are pictured receiving the coveted winner's cup at the new 'Leicester' Show on Saturday 26th of September from myself G3XFD, and also their prize Alinco DJ-190 from **Mike Devereux G3SED** of **Nevada Communications**, who kindly donated the prize.

'I told 'em ... it's Oldham' who won this year! The operators of G1ORC/P receive the coveted Winner's Cup from the Editor at the Donington Park 'Leicester' Show.

Wafflers From Wales

The 'North Wales Wafflers' GW0NWR/P - last year's winners - came second in 1998. Always a closely fought friendly 'battle' for the group - they are shown being congratulated by the Editor minus their prize at the presentation at the show. We couldn't get the prize in the photograph because it was an 11 metre high mast - kindly donated by **Bob Keyes GW4IED** of **Key Solar Products**. They chose a mast because they already have a full range of Bob's products from previous year's wins!

The Oldham Club operators receiving their Alinco DJ-19 hand-held transceiver from Mike Devereux G3SED.

Well done 'North Wales Wafflers '...but I'm sorry - your portable mast (over 10 metres high!) donated by Bob Keyes GW4IED of Key Solar Products - is too big to get into the photograph!

Keith's 'Stereo' Pair!

The *PW* EI/GI Trophy was won this year by **Peter Lowrie GI7JYK/P** and as he won it in the inaugural year of 1997 - He's now got a 'stereo pair' of trophies for his mantelpiece in Northern Ireland.

Peter is seen photographed at the show receiving the award from me - as I'd threatened to withhold it as he did not let us have a photograph of him receiving the award in 1997! It was a very closely fought contest between Peter and **Paul Martin EI2CA** - and I'm very pleased to continue sponsoring the friendly aspect of competitions between Amateur Radio friends in EI and GI as I strongly value the friendship between the different nations within our group of Islands. So, I look forward to next year's event with interest!

Now he's got a 'stereo pair' of trophies! Peter Lowrie GI7JYK accepts his second EI/GI Trophy from G3XFD.

ROB'S RED FACE & APOLOGIES!

I'm afraid that it's very much a case of 'Rob's Red Face' this year. There was a real 'comedy of errors' at the various presentation ceremonies (they all seemed to arrive at once and I got the various parties for the 'Club Spotlight', QRP Contest' , etc., all mixed up!) and although our much valued QRP Contest Adjudicator **Dr. Neill Taylor G4HLX** and family were within earshot of the presentation - I was so busy arranging everything, I forgot them and Neill was left out of the photographs...despite all his hard work throughout the year arranging everything. So I'm afraid that I have to publicly apologise for my unintentional rudeness Neil. **We do appreciate all your hard work** - let's hope next year we can arrange the photocalls separately and that I can remember which one I'm arranging!

So, congratulations everyone you've all done extremely well...although the Editor is the only one who definitely scored 'below par' this year. Oh well...perhaps I'll get better at arranging it all next year!

Rob Mannion G3XFD

FOR A FREE MENTION ON THESE PAGES SEND YOUR NEWS & PRODUCT INFORMATION TO THE NEWSDESK TODAY!

THE REAL 1998 QRP TABLE OF RESULTS

We are aware that an unfortunate error (a computer problem) occurred in last month's QRP Results. We apologise and have reprinted the corrected tables here.

Practical Wireless 144MHz QRP Contest 1998

Pos.	Callsign	Points	Pos.	Callsign	Points
1	G1ORC/P	6216	36	GM0FRC/P	870
2	GW0NWR/P	5456	37	MI0AYR/P	840
3	GW8ZRE/P	5226	38	G4LQL/P	826
4	G7OCI/P	4530	39	GW3LNR/P	806
5	G0OVA/P	4480	40	G0OWX/P	767
6	G8DDY/P	3885	41	M1BUU/P	750
7	G8VOI/P	3422	42	G0REL/P	732
8	GW0PZO/P	3318	43	GM4YEQ/P	720
9	G3RIK/P	3150	43	G7AXE/P	720
10	GW4IDF/P	2772	44	G7LNO/P	720
11	G0HDV/P	2736	45	G3MAE/P	720
12	G1WOR/P	2675	46	M0AYB/P	720
12	G6ZYD/P	2675	48	EI9GJ/P	702
14	G1POS/P	2489	49	GW0PLP	592
15	GW7LQD/P	2413	50	G0DLR	533
16	G4RUL/P	2134	51	G3VGG/P	520
17	GM0CLN/P	1848	52	G1JGE/P	468
18	GI7JYK/P	1826	53	G0RRC	462
19	EI2CA/P	1702	53	G3HIU/P	462
20	G3BPK/P	1680	55	GW7VEU/P	456
21	EI6ARB/P	1679	56	G7MWR	452
22	G4RSE/P	1674	57	GW3OIN/P	451
23	G4NVM/P	1600	58	G7TUA	440
24	EI9HQ/P	1482	58	G7DFV	440
25	G5ZG/P	1400	60	G6WRC/P	418
26	G1WKS/P	1343	61	GX0NWM/P	408
27	G1MDG/P	1336	62	G0ECR/P	385
28	G4HRS/P	1314	63	G0GZI/P	240
29	GM4WLL/P	1292	64	GM3NHQ/P	216
30	G6MXL/P	1127	65	G3NPB	180
31	M0BAO/P	1095	65	GW7EVG	180
32	M0ACW/P	1080	67	M0BCQ/P	144
33	G4LAD	1071	68	G7PAA	126
34	G0SRC/P	924	69	G3PLE/P	92
35	G6WIR/P	896	70	G7TBJ/P	42

Checklogs were gratefully received from:
G0TOU/P in square IO83 and **G0CRW/P** in square JO01

Leading Stations

Overall Winners	Oldham Radio Club	G1ORC/P
Runners Up	North Wales Wafflers	GW0NWR/P
Leading Single Operator	Dave Hewitt	GW8ZRE/P
Runner-up Single Op.	Tony Crake	G0OVA/P
Leading Fixed Station	Leeds & District ARS	G4LAD
Leading English Station	Oldham Radio Club	G1ORC/P
Leading Welsh Station	North Wales Wafflers	GW0NWR/P
Leading Scottish Station	Cockenzie & Port Seton ARC	GM0CLN/P
Leading N. Ireland Station	Peter Lowrie	GI7JYK/P
Leading Eire Station	Paul Martin	EI2CA/P

Leading stations using a single antenna

Pos	Name	Callsign	Antenna
3	Dave Hewitt	GW8ZRE/P	7-ele ZL-special
4	John Rudd & Kevin Porter	G7OCI/P	Maspro 10-ele Yagi
5	Tony Crake	G0OVA/P	Tonna 13-ele Yagi
6	Peter Thompson	G8DDY/P	MET 19-ele Yagi
7	Bob Reeves	G8VOI/P	Tonna 13-ele Yagi
8	Charlie & Sue Jordan	GW0PZO/P	home-brew 5-ele quad
9	Rochdale & District ARS	G3RIK/P	Jaybeam 10-ele Parabeam
10	Dave Hobro & Dan Esdale	GW4IDF/P	Tonna 17-ele Yagi
11	The North East Ex-pats	G0HDV/P	Tiger 9-ele Yagi
12	Andrew Jervis	G6ZYD/P	Jaybeam 14-ele Parabeam

DON'T FORGET

The 17th PW 144MHz QRP Contest will take place on Sunday 20th June 1999.

Leading stations in each locator square

Square	Name	Callsign	No. entrants in square
IN79	David Barlow	G3PLE/P	1
IO62	Paul Martin	EI2CA/P	2
IO63	John O'Sullivan	EI6ARB/P	1
IO70	David Blackford	G3NPB	2
IO72	Declan Lennon	EI9HQ/P	2
IO74	Peter Lowrie	GI7JYK/P	2
IO75	Falkirk Radio Club	GM0FRC/P	1
IO80	Poole Radio Society	G6MXL/P	3
IO81	Dave Hobro & Dan Esdale	GW4IDF/P	5
IO82	North Wales Wafflers	GW0NWR/P	3
IO83	Dave Hewitt	GW8ZRE/P	10
IO84	Phil Davies	M0AYB/P	1
IO85	Cockenzie & Port Seton ARC	GM0CLN/P	3
IO86	Tom Harrison	GM3NHQ/P	1
IO90	Peter Thompson	G8DDY/P	5
IO91	Tony Crake	G0OVA/P	4
IO92	John Rudd & Kevin Porter	G7OCI/P	5
IO93	Oldham Radio Club	G1ORC/P	9
IO94	Hambleton Amateur Radio Society	G3MAE/P	3
IO95	Tynemouth Amateur Radio Club	GX0NWM/P	1
JO00	Alastair Turner & Peter Hutchinson	G4RUL/P	1
JO01	South Essex ARS	G4RSE/P	6
JO02	Roy Smith	G0RRC	1

Leading multi-operator stations

Pos	Name	Callsign	Score	QSO	Squ	Loc	Ant	a.s.l.(m)	TX/RX
1	Oldham Radio Club	G1ORC/P	6216	222	28	IO93	2x9Y	660	FT290R
2	North Wales Wafflers	GW0NWR/P	5456	176	31	IO82	2x17Y	560	FT736
4	John Rudd & Kevin Porter	G7OCI/P	4530	151	30	IO92	10Y	140	FT290R2
8	Charlie & Sue Jordan	GW0PZO/P	3318	158	21	IO83	5Q	450	FT290R
9	Rochdale & District ARS	G3RIK/P	3150	150	21	IO83	10Y	335	FT290R
10	Dave Hobro & Dan Esdale	GW4IDF/P	2772	132	21	IO81	17Y	420	IC202
11	The North East Ex-pats	G0HDV/P	2736	144	19	IO93	9Y	300	TR751E
12	Worthing & District ARC	G1WOR/P	2675	107	25	IO90	30col	240	IC275E
16	Alastair Turner & Peter Hutchinson	G4RUL/P	2134	97	22	JO00	16Y	185	IC251
17	Cockenzie & Port Seton ARC	GM0CLN/P	1848	88	21	IO85	3x14Y	415	IC275E

Leading single operator stations

Pos	Name	Callsign	Score	QSO	Squ	Loc	Ant	a.s.l.(m)	TX/RX
3	Dave Hewitt	GW8ZRE/P	5226	201	26	IO83	7Z	305	TR751E
5	Tony Crake	G0OVA/P	4480	128	35	IO91	13Y	295	TR751E
6	Peter Thompson	G8DDY/P	3885	111	25	IO90	19Y	240	FT221R
7	Bob Reeves	G8VOI/P	3422	118	29	IO90	13Y	270	IC211E
12	Andrew Jervis	G6ZYD/P	2675	107	25	IO93	14Y	425	IC260E
14	Jon Page	G1POS/P	2489	131	19	IO92	16Y	300	FT480R
15	Mike Baguley	GW7LQD/P	2413	127	19	IO82	2x9Y	360	FT290R2
18	Peter Lowrie	GI7JYK/P	1826	83	22	IO74	12Z	150	FT290R
19	Paul Martin	EI2CA/P	1702	74	23	IO62	11Y	400	FT290R
21	John O'Sullivan	EI6ARB/P	1679	73	23	IO63	9Y	440	FT290R

club spotlight Competition Results

As Chairman of the panel of adjudicators, Rob Mannion G3XFD presents the results of the 1998 Practical Wireless & Kenwood Electronics 'Club Spotlight' Club Magazine Competition.

Following the suggestions from last year's entrants, we're introducing a new feature to the results this time and each entrant will automatically receive a personal photocopy of the adjudication sheet so that they can see the comments their magazine drew from the panel of judges. In this way, the adjudicators hope to encourage everyone, not just those who are successful.

Now in its third year, the magazine competition has attracted entries from outside the UK - including one in a foreign language. The foreign language - you might have thought - would have been a barrier to achieving a good result...but as you'll read later it certainly wasn't the case!

Adjudicating Panel

Unfortunately, the adjudicating panel lost one of its founding members during the run-up to the start of final judging when Donna Vincent G7TZB was appointed to a new post as Editor of her own magazine. So, I had to take the decision to replace her before the '*PW* side' of the judging took place by appointing **Tex Swann G1TEX**, *PW*'s Technical Projects Sub-editor and staff photographer.

Appointing Tex G1TEX to replace Donna was an appropriate action because he's been a club magazine Editor himself and is active in the Poole Club (which did not enter the competition). He joined **Jim Bacon G3YLA**, **David Barlow G3PLE**, **Dave Wilkins G5HY**, and myself on the 'local clubs' section and we were joined by the Chairman of the Salisbury Club **Jerry Pennell G0WHE**.

National Category Winners

The 'National' Club category is open to those Amateur Radio clubs who cover more than 'local' areas. And of course... there's nothing to stop a club from overseas joining in the fun - which they did for the first time this year! There were four entries and all came with high standard magazines.

The adjudication panel were delighted to receive entries from 'national' clubs in the UK - and one which is based in Holland. In fact - despite being in the Dutch language - the panel were immensely impressed by the entry and I'm pleased to announce that The 'National' Club winners in 1998 are the **Benelux QRP Club**.

Although only two of the judges can read Dutch - everyone had something really encouraging to say about *Nieuswbrief*, **Fig. 1**, which scored **44** out of a possible 50 points. Jim Bacon G3YLA commented "I really liked this one, the print quality of the text and diagrams was very high".

Tex Swann (one of the judges able to read Dutch [haltingly] and who is also well-versed in German) said.... "Excellent coverage for a QRP Club, well laid out with good diagrams...made me want to read it even though I found it hard going to read in Dutch in places. Very professionally done". My own comments on the adjudication sheet were: "Excellent... even for the English reader. Lots to 'do', lots of news and full of 'character' and charm".

Fig. 1: The Benelux *Nieuwsbrief* which so impressed the judging panel.

Robert van der Zaal PA3BHK produces the magazine - it covers Holland, Belgium and Luxembourg - the 'Benelux' countries of course - together with four others. These include **Henk PA0GHS**, **Veronica PA3DWA** (Widow of the Benelux QRP Club's Founder **Frans PA0GG**), **Wim PA0WDW** and **Adriaan PA0ATG**.

Robert PA3BHK attended the Leicester Show at Castle Donnington on Saturday 26th September to collect the National Club category prize - the **G2FIX Memorial Trophy** - otherwise known as 'Bert's Bell' in memory of **Bert Newman G2FIX**. Presented by the late G2FIX's sister **Hilda Rusbridge** (she'd travelled from Andover), 'Bert's Bell' (made by Hilda's son-in-law and sponsored by the entire family) was gratefully accepted in the presence of many generations of the family, **Fig. 2**. In return Robert presented Hilda with a fresh Edam cheese - straight from Holland!

The photograph in **Fig. 3**, clearly shows Hilda's delight and she thanked Robert and everyone and said she (and her family) will continue to support the competition for as long as they can because they consider it to be so important and an appropriate way to commemorate Bert G2FIX who was a natural 'communicator' himself.

Fig. 2: Hilda Rusbridge (sister of the late G2FIX) presenting the Bert Newman G2FIX Trophy - 'Bert's Bell' - to Robert van der Zaal PA3BHK of the Benelux QRP Club. Hilda was ably supported by many generations of her family!

Other entries in the 'National Category' were

Fig. 3: A surprise gift from Holland! Robert PA3BHK presents fresh Edam cheese to Hilda Rusbridge.

the 1998 winners the **British Amateur Radio Teledata Group - BARTG** - (Second with 43 points), the **Royal Air Force Amateur Radio Society - RAFARS** - (joint 3rd with 40 points) and the **Royal Signals Amateur Radio Society** (also 3rd with 40 points).

Incidentally, the adjudicators were very impressed with all the 'national' entries, stating that they all offered' excellent value for membership' rates. Personally, I can also state how pleased I was to see an entry from RAFARS - because I often listened to **Bert Newman G2FIX** acting as their 'net controller'. So, well done the 'nationals' and you'll get your individual adjudication sheets soon.

Club Spotlight Trophy

As the *PW* 'Club Spotlight' magazine contest goes from year-to-year the standard of entries is also increasing at a great rate of knots. There were 11 entries in the 'Local Club' category this year - and the standard was supremely high.

However, despite the very high standard of the entries the adjudicators had no hesitation in awarding the first prize to the **Crowborough & District Amateur Radio Society** whose magazine *Crowstalk*, **Fig. 4**, won an excellent 49.5 points out of a maximum of 50!

Eric Tucker G3TXZ, Chairman of the **C&DARS** and Editor of *Crowstalk* is seen accepting the *PW* & Kenwood Electronics 'Spotlight' Trophy, **Fig. 5**, from Dave Wilkins G5HY at the Leicester Show, accompanied by a group of enthusiastic supporters from the Society.

Dave G5HY's own comments on the adjudication sheet were: "A truly excellent production...congratulations". Jim Bacon G3YLA commented "A very nice newsletter indeed, clearly set out, with sensible use of colour....in my view the best here". David Barlow G3PLE said: " Wow - this is it - fantastic annual subs for 11 issues a year, value great, layout great - colour great - 10 points (maximum) no bother"!

My comments were "Truly Superb editorial, presentation, style and approach. Best club magazine I've ever seen". However, I'd like to leave the last words to Tex Swann G1TEX as they are most appropriate! Tex commented: (amongst other things) "...they deserve to win. Offer the perpetrator a job on *PW* - quick"! So, well done Crowborough, the adjudicators have no doubt you'll look after and 'treasure' the trophy until next year!

High Standards

The other entries also had very high standards - and the adjudicators were impressed at the quality of editorial and design which came from (literally) 'one man' (person really!) band productions. Well done everyone.

Runners-Up (nobody 'loses' in this friendly competition!) The **Chestnut & District ARC** scored **45.5**, and the **Cheltenham Amateur Radio Association** scored **44.5** along with the **Yeovil Amateur Radio Club** who also scored **44.5**. Congratulations!

The Cayman Amateur Radio Society ZF1A (Yes - the 'Exotic DX' Cayman Islands) scored a very creditable **43.5** for their fascinating entry. Well done!

Last year's winners **Cockenzie & Port Seton** scored **43**, followed by **North Ferriby United Amateur Radio Society** (East Yorkshire - formerly 'Humberside') scored 41.5.

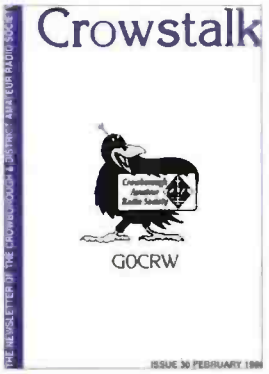


Fig. 4: Winning entry in the 'local' club category - *Crowstalk* from the Crowborough & District ARS.

A special mention must be made for the 'one man band' produced magazine *Flightpath* (**Flight Refuelling Amateur Radio Society**) which scored **41** points because of the tremendous efforts of the severely disabled Editor. **Trevor Taberner G0UGS** suffered a severe stroke some years ago and has difficulty in walking, writing and speaking - but still manages to produce *Flightpath*. An inspiration to us all so the adjudicators thought. Well done Trevor!

The **Wythall Radio Club** were awarded **38** points for their entry, and the **Warrington Amateur Radio Club** scored **37.5** points. And just to demonstrate that the last is **certainly not the least** - the **Gloucester Amateur Radio & Electronics Society's** entry was awarded **36.5** points and drew the comment "A promising newsletter with good ideas" from judge Jim Bacon G3YLA. So, hopefully...Jim's comment will encourage their entry for 1999.

In finalising the 1998 results reports - and on behalf of the judging panel I congratulate everyone who entered. It doesn't matter if you didn't win - because no matter how well you scored in our competition - you are serving your club and its members. Our hobby can only go from strength-to-strength with efforts like yours. So, keep up the good work - keep sending the magazines into us for news 'mentions' in *PW* and most importantly make sure you enter next year's competition!

PW

Fig. 5: Eric Tucker G3TXZ, Chairman of the C&DARS and Editor of *Crowstalk* accepting the PW & Kenwood Electronics 'Spotlight' Trophy from Dave Wilkins G5HY at the Leicester Show, accompanied by a group of enthusiastic supporters from the Society.

SPECIAL OFFER!

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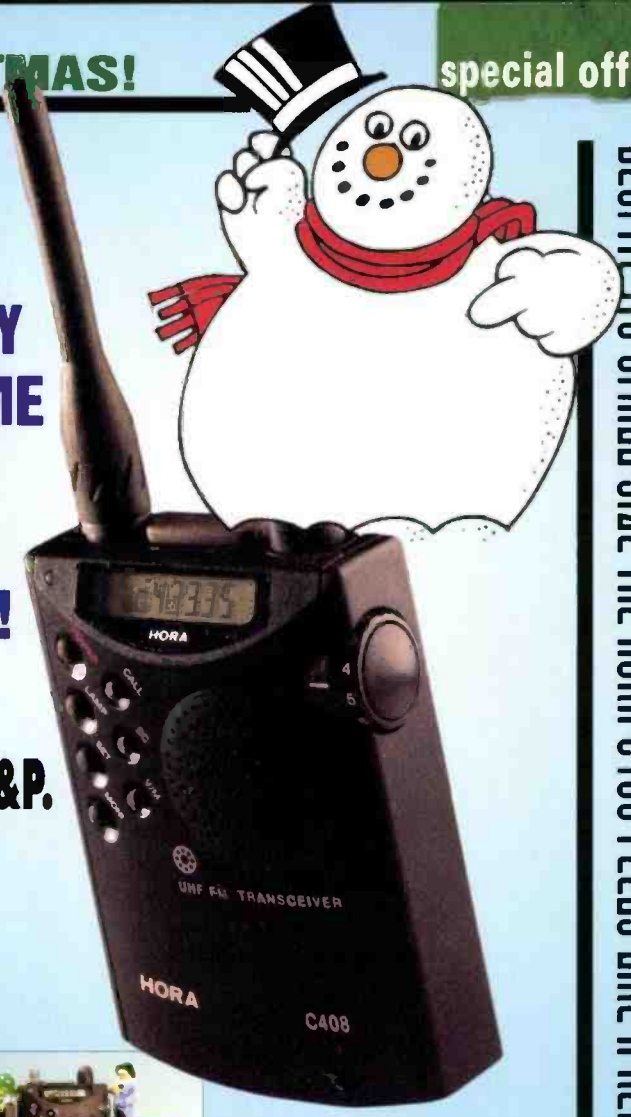

DESPITE ITS SMALL SIZE THE HORA C408 FEELS LIKE A REAL RADIO

On pages 30 & 31 of the May issue of *Practical Wireless*, Dick Pascoe G0BPS reviewed the Hora C408 430MHz transceiver. He reported that "...despite its small size it feels like a 'real' radio" and that it is "...maybe the best yet"!

So, if you cannot wait to get your hands on this little rig but didn't want to pay the full price, or perhaps you may know someone who would like a Hora C408 for Christmas! Now's your chance to purchase it. Standard price is £89.95, but we have arranged a special offer with **Waters & Stanton PLC** which gives you the opportunity to buy a Hora C408 for just **£75** plus **£3.50 P&P**.

From the May 1998 issue.

For full details on the Hora C408 430MHz transceiver you can read the G0BPS Review in the May 1998 issue of *Practical Wireless*, back issues are available from the *PW* Bookstore, Tel: (01202) 659930.

ORDER FORM

❑ Please send me ..... **Hora C408** (s) @ **£75** plus **£3.50 P&P** (UK only, overseas prices on request).

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Offer open until 31st December 1998.

SPECIAL OFFER!

Bipolar Transistor?

Ian Poole G3YWX

continues his regular series by answering the question..."What is a bi-polar transistor"?

The bipolar junction transistor is used today in vast quantities, both individually as discrete components and inside integrated circuits. It's a very versatile device, found in many applications and at a wide range of frequencies.

The bipolar transistor is over 50 years old now. Three scientists named **Bardeen**, **Brattain**, and **Shockley** working at Bell Laboratories in the USA discovered the device.

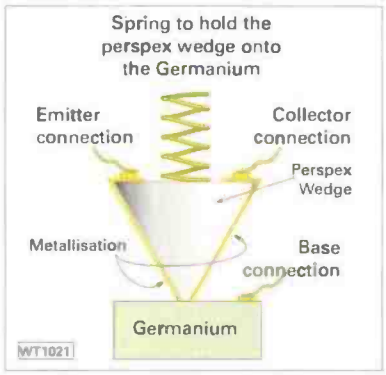


Fig. 1: The original point contact transistor - dating back to 1947 (see text).

The scientific trio had been researching an idea for a field effect device, but they had been unable to make it work. And as they had not been able to discover why the device did not function they'd decided to follow some other lines of research. In doing this they came across the idea for the bipolar transistor, **Fig. 1**, and they quickly succeeded in making it work in late 1947.

Only A Week

It was only a week after their initial discovery that the team demonstrated it in front of a group of executives at Bell Laboratories. The form of device they demonstrated was called a 'point contact transistor' because it consisted of two metal contacts placed very close to one another on a piece of *n*-type germanium.

During the 1950s, other types of transistor based on the same principle were developed. These included the junction transistor which is 'grown' from two junctions fabricated on the same substrate.

It took some while for transistors to become generally accepted. Initially they were very expensive and their performance was poor. However, at the beginning of the 1960s transistor prices began to fall and their use rose dramatically. Now the world would not be the same without them!

The Structure

In practice, the internal structure of the transistor can be made either in a *p-n-p* format where an *n*-type region is sandwiched between two *p*-type regions. Alternatively it can use an *n-p-n* format where the centre section is of *p*-type material, as illustrated in **Fig. 2**.

The centre region is called the **Base**. It derives its name from the first point contact transistors where the centre connection also formed the mechanical 'base' for the structure.

It's essential that the base region should be as thin if high levels of current gain are to be achieved. Often it may only be about 1µm (one millionth of a metre) across.

A variety of different structures are used to make transistors today. The diagram, **Fig. 3**, illustrates two of the many variations that are used.

How They Work

So, let's now look at how the bi-polar transistor works. And simply speaking, the transistor can be considered as two *p-n* junctions that are placed back-to-back.

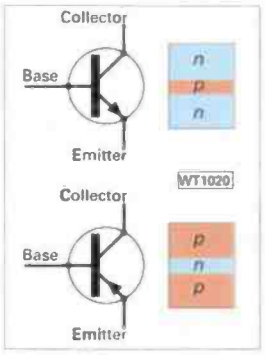


Fig. 2: Transistor symbols and diagrammatic structures.

In operation, the base emitter junction is forward biased and the base collector junction is reverse biased, as shown in **Fig. 4**. When a current flows through the base emitter junction...a corresponding and larger current is seen to flow in the collector circuit.

To understand how the effect occurs, I'll take the example of an *n-p-n* transistor. (The same is found to be true for a *p-n-p* transistor except that holes are the majority carriers instead of electrons and the voltages are reversed).

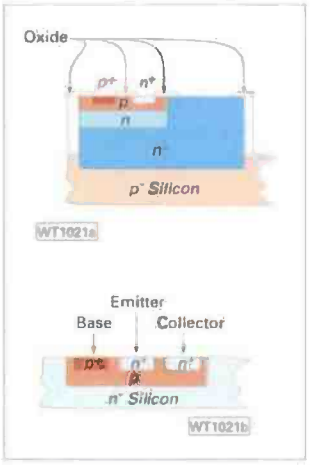


Fig. 3: Some transistor structures in use in today's electronics.

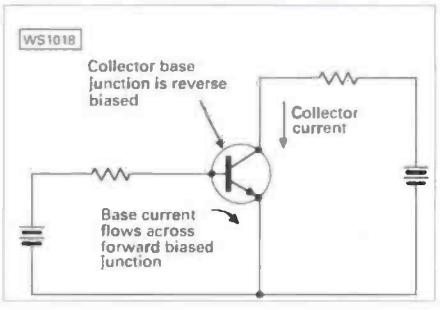


Fig. 4: Transistor operation (see text).

Collector Base Junction

Now let's take a look at the collector base junction. This is reverse biased and (as I described in 'What is a PN Junction' in the April 1997 issue of *PW*) it will be remembered that the majority carriers in the *n*-type region are electrons and in the *p*-type region they are holes.

In other words in an *n*-type region there are free electrons that are able to move around the lattice structure of the semiconductor. Similarly in a *p*-type region there are free holes.

When the junction is forward biased the electrons move from the *n*-type region towards the *p*-type region and the holes move towards the *n*-type region. Finally, when they reach each other they combine enabling a current to flow across the junction.

When the junction is reverse biased the holes and electrons move away from one another resulting in a depletion region between the two areas and no current flows. In the case of the transistor the second junction between the base and emitter plays a vital role.

In use and when a current flows between the base and emitter, electrons leave the emitter and flow into the base. Normally the electrons would combine when they reach this area however, the doping level in this region is very low and the base is also very thin. This means the most of the electrons are able to travel across this region without recombining with the holes.

As a result the electrons migrate towards the collector, because they are attracted by the positive potential. In this way they are able to flow across what is effectively a reverse biased junction and current flows in the collector circuit.

It is found that the collector current is significantly higher than the base current. The ratio of the base to collector current is given the Greek symbol ß. Typically the ratio ß may be between 50 and 500 for a small signal transistor. This means that the current in the collector will be between 50 and 500 times that flowing in the base. For high power transistors the value of ß is likely to be smaller, with figures of 20 being not unusual.

Current Amplifying

The transistor is a current amplifying device, unlike the thermionic valve and the field effect transistor (f.e.t.), both of which depend upon voltage changes to operate.

It's the amount of current flowing in the base circuit that controls the amount of current flowing in the collector circuit. And although it is a current operated device, the bi-polar transistor can be used in just as many applications as f.e.t.s, proving to be more suitable in many applications. *PW*

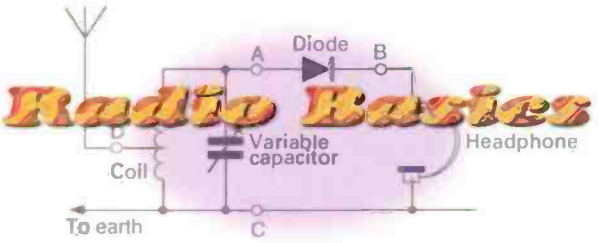
Next time I'm going to answer the question "What is a Thyristor"?

Introducing....

The 'Tinny Dipper'

In the first part of the 'Tinny Dipper' project, I'm going to introduce you to an extremely simple and effective method of making the plug-in coil units required for the project. The plug-in coils will be fabricated from the Synthetic Resin Paper Board (SRPB) printed circuit board material I've recommended you to use in the past.

The 'Tinny Dipper' project - so called because it's built into a Mackerel, Herring or Kipper tin (oval shaped, fabricated from aluminium type with the 'peel back the lid' opener) is designed to cover all the useful frequencies from l.f. to h.f. And by following my design approach, very little in the way of calibration will be needed - resulting in a very useful little instrument to help you create further projects.



The circuit - I claim no originality here because it's been around for perhaps 30 years or so - only requires one MPF102 field effect transistor (f.e.t.) and by now you'll be very familiar with this device! Incidentally, although **I think I first saw the circuit** in the *ARRL Handbook* in 1970 - it's been published so many times it must be one of the most popular (and reliable) design of its type and can work with moving coils meters ranging 50µA full scale deflection (f.s.d.) to 500µA f.s.d.

The coils are extremely easy to make - but they do take time so I suggest you start making the basic units now ready for the electronic construction stages. Incidentally, the plug-in type of coil I'm introducing in this project will also feature later on in the series - in early 1999 - in use with a small valved receiver project.

The valved receiver will use the plug-in units - and they have proved so successful that I've managed to make a coil unit with eight (yes eight!) connections! Interested...?...just read on...you'll be surprised just how easy and effective the coil units are.

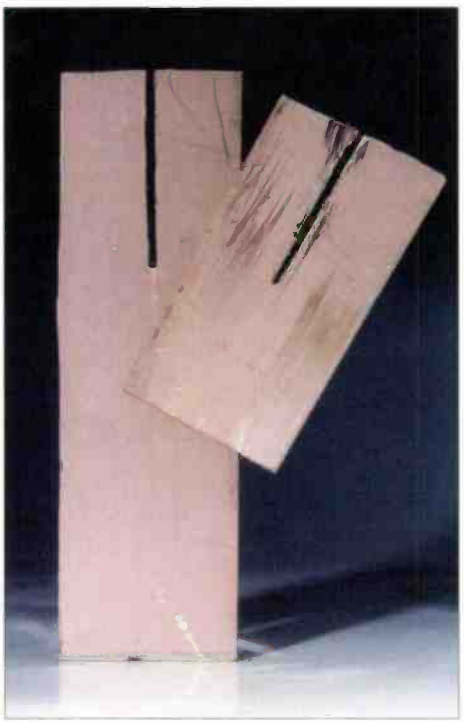


Fig. 1: Sections of the synthetic resin paper board (SRPB) p.c.b. material cut for use as coil formers. Both sections are 30mm wide, the longer section is 100mm long and the shorter is 55mm long. The slot in both sections is 35mm (see text for description of assembly technique).

Basic Board

By making the plug-in units from basic p.c.b. material the coil formers can become virtually standard and if you follow my instructions you should end up with the same results. The first job is to cut strips 30mm wide from the large board. (You'll need around a dozen of these strips).

It will be to your advantage to cut the strips from the main sheet by using the file scraping/grooving method I've described in the previous projects using the material. This is because the file-cut edges provide a 'chamfer' which eases insertion into the eventual p.c.b. style 'sliding socket connector'. (make sure you cut from the backing material towards the copper plated side of the p.c.b material).

The photograph, **Fig. 1**, shows the p.c.b. material cut to length ready for the coils to be assembled. The shorter strip is 55mm long. The longer strip is 100mm long.

The slot on both sections of p.c.b. strip is 35mm long **and it's important to use a full size hacksaw blade to ensure the resulting slot is wide enough to take the second part of the coil**, as illustrated in **Fig. 2**.

You'll see that on the left hand side of Fig. 2 that the two sections are in the process of being slotted together to form a cruciform section of material. And although it's not easy to see in the right-hand side photograph - the two sections are forming a free-standing cruciform former.

If you make a fairly neat cut, the p.c.b. material will form a firm (end profile) 'cross' (cruciform) shape. But don't worry if you don't make it that neat (perhaps it 'wobbles' slightly?) because you can stabilise the assembly in the final stages with very small amounts of epoxy resin adhesive.

If you don't have access to a full size hacksaw you can buy suitable blades for mounting inside a standard 'Stanley' knife. And in fact that's just what I used myself when making the prototypes.

Etching Contacts

After you've cut the p.c.b. material to size, and tested the assembly to see if all is well you can proceed to the next stage – etching the contacts and tracks. However, you'll find that they're a tight fit (a very stiff push-to-fit, although gently tapping them together with a tack hammer or the back of a dust-pan brush will work) but with the slot length suggested the assembly should work extremely effectively.

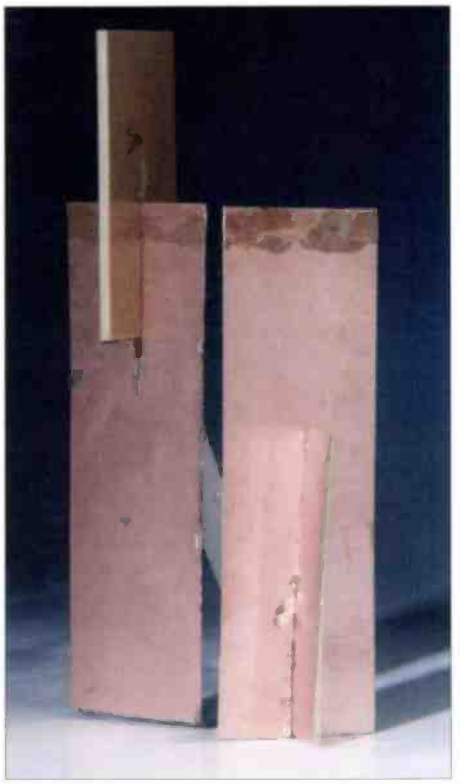


Fig. 2: The prepared section in process of assembly (see text).

Warning: Do not exceed the length of slot recommended because although a longer slot makes assembly easier - the finished result is not so stable. The measurements I've given are those that have proved reliable in practice.

Once you've tested your batch of former assemblies - it's time to prepare the longer unit (100mm) for uses as the 'plug in' element. The diagram, **Fig. 3**, shows one of these sections of material ready for

This month in Part 1 of the project, the Editor Rob Mannion G3XFD, introduces the 'Tinny Dipper' transistorised dip meter project. But before you start soldering - it's time to make the coil units and prepare the main board!

Fig. 3: Completed prototype plug-in coil unit (left) showing coil wound over cruciform former unit. Plug-in section (right) ready for etching. Note pvc masking (2mm in from edge of board) to provide final copper track 'plug-in' contacts, and etch resist tracks for coil connections. (See Text).

Fig. 4: How the 'plug in' coils worked. A demonstration unit made from a completed coil unit and a pieces of scrap p.c.b. material. (See Text).

etching in the ferric chloride (on the right) with a completed unit with a demonstration coil wound on the cruciform former.

Note that the section of copper track which is to form the 'plug in' element on the right is protected by *pvc* masking tape (you can use ordinary insulating tape for this purpose). The shorter track to the wire anchoring point terminates with a small drill hole with a larger area or etch resist around it. The longer track, as shown in Fig. 3, goes to the top of the p.c.b. material strip where it too terminates at a wire anchoring point.

Note also that the *pvc* masking tape on the section awaiting etching is narrower than the earlier prototype. This is to provide a final narrower etched p.c.b. etched track to avoid the opportunity of short circuits between the unit and the main board and supports - in practice I found a 2mm gap to be adequate.

The completed coil illustrates how it looks when etched, assembled, and with the coil wound. In practice, the wire can be fixed with very small amounts of wax and/or by gently winding coloured *pvc* insulating tape which then also acts as a colour code identifier aid. Now it's time to look at the 'socket' end of the assembly which is to be on the main p.c.b. of the project.

Raised Contact Points

The 'socket' end for the plug-in coil bases are simplicity itself and rely on raised solder pads on the printed circuit we're to etch onto the board. The photograph, **Fig. 4**, shows the basic idea demonstrated on a piece of scrap board and a completed coil unit- with the top 'cover' of the 'socket' (a section of p.c.b. material which is held down by self-tapping screws or small nuts and bolts) removed for clarity.

The plug-in coil unit slides in between the two sections (track side facing downwards) until the 'shoulder' of the coil unit reaches the top of the main p.c.b. The two large solder pads are tinned with solder (as illustrated) so as to be 'proud' of the p.c.b. itself. These make contact with the p.c.b. tracks on the underside (represented on the demonstration board by a 'track' illustrated by dotted lines on what is of course the reverse side of the material).

With the top section of the p.c.b. acting as a restraint the naturally slightly 'springy' p.c.b. material is forced slightly upwards. And once in place, the same natural springy effect ensures that contact is maintained until the coil unit is pulled clear.

I suggest that you make up a 'dummy' socket arrangement to ensure that all your coils fit snugly and that there's no short-circuiting. The experience won't be wasted because you'll be familiar with how it works when it comes to the final assembly of the main p.c.b. - and we're now going to start the preparations by looking at how the board is prepared!

Fig. 5: Prepared p.c.b. section (copper side up) to provide lid and eventual 'chassis' for the 'Tinny Dipper'. See text for preparation details.

Template Time

It's template time - that is after you've got hold of the empty tin to use as an external casing for the project. (If you don't like tinned fish - you can always buy a tin and donate the contents to someone in the family who does. However, my Labrador, Mandy, shares my love of tinned fish...as did our cat Ginger. So, you shouldn't find it too difficult to get hold of a tin if you've got pets and none of your family like tinned fish!

Turn the empty and cleaned tin upside down, place a sheet of paper underneath and run a soft pencil around the perimeter. Cut the resultant oval shape out of the paper and then measure (or cut, judging by eye) a slightly smaller template (using the first as a guide) in stiff card until it makes a slightly stiff 'push fit' as a lid. (Don't dispose of the template - it'll come in handy later on in the series for future projects).

The photograph, **Fig. 5**, shows one of my prototypes ready for use and posed with the p.c.b. 'lid' (the copper side on which the components are to be mounted is shown) to show the cut and folded down section required for the plug-in coil unit to be mounted in. You should use the 'Ring Pull' end for this purpose carefully cutting the (soft) aluminium down 10mm (the tins seem to be a standard 20mm deep on the inside) and fold the metal over to form a double thickness.

Finally, with the help of a 'Self Grip' wrench (usually known as 'Mole Grips' in the UK) set the jaws to squeeze the metal 'sandwich' and crimp them together. This re-stiffens the end of the tin and forms the entry port for the plug-in unit. Carefully file the exposed container edges so they're not sharp.

Incidentally, it's worth having a pair of 'Mole Grips' in the workshop. They're extremely versatile and can hold p.c.b. material for cutting (clamped to your workbench) among many other jobs - including the task I've already mentioned.

Next month I'll describe the final assembly stages of the 'Tinny Dipper'. However, in the meantime there's more than enough to keep you busy. Cheerio until then! *PW*

Interested? Want to join in and 'have a go yourself'? You can....by just sending a large s.a.e. (with 50p stamp) asking for the free 'Radio Basics' Guide - Issue 1, 2 & 3.

Radio Basics November

Up-date & Corrections: Annotated photograph - p.c.b. design for the 'Radio Basics' 3.5MHz to medium wave converter. Please see the 'Errors & Up-dates' on P61 of this issue.

Rob Mannion G3XFD.

The Reluctant DXer

John Worthington GW3COI, our reluctant DXer, describes why he will probably stick to "simple natter either on the key or the microphone" and steer clear of DX from now on.

I have never wanted to be a rare DX, but in 1988 I had to attend the birth of a grandchild and I found myself wielding the callsign VK7COI in Tasmania. What a flight! I had been to Sydney some three years before on a similar mission and knew all about jet lag and thought I knew what to expect, but the 'jet lag' symptoms on this VK7 trip made the Sydney one feel like a pleasant afternoon.

However, after a month's recuperation I set about setting up my set which I had bought with me in my hand luggage. It consisted of a Kenwood TS-120S, a mains 25A p.s.u., an a.t.u. (home brew, he added proudly), a multi-meter, a field strength meter, a Sony 7600D pocket h.f. band receiver, headphones and various bits like crocodile clips, insulation tape, small screwdriver, side cutters, electronic keyer and microphone.

For folk planning a similar trip, I should advise them to take a three month course of body building in the UK. You have to man-handle your 'hand' luggage quite often in many types of climates and when I staggered out onto the tarmac of Hobart, there were onlookers who thought they were witnessing the homecoming of a Beirut hostage.

I had been led to believe that our quarters in VK7 was to be a pleasant bungalow overlooking the harbour with ample space for a rhombic. But in fact, it turned out to be a single storey, tin roofed pioneer's joint with no garden at all, and squeezed into a narrow street packed with similar dwellings. However, I was not dismayed as I have had QTHs that were just as bad in the UK.

Cartoon by John Worthington: Calling CQ relentlessly!

Price Shaker

The first thing I did was to buy an antenna wire, the price of this was a 'shaker' which worked out at 50p per foot for electric twin flex. My tight-fisted alter-ego cursed me for not having bought a length with me.

However, swallowing hard I erected - or rather 'placed' might be a better word - an '80m' and '20m' band dipoles on the same feeder with its centre on a telephone pole in the street. The 'legs' came away higgledy-piggledy (posing as telephone wires) to the house and I rehearsed my story for when the VK7 telephone men arrived. They never did come, probably because the street was a mass of mains, wire guys and phone wires, a common sight in VK.

Well, you'll want to know about all the DX I worked, or perhaps not. I'm not really a DX man as I prefer a simple natter either on the key or microphone, but in VK7 I found this simple pleasure was not available during daytime due to lack of activity. In the evenings it was not a great deal better and '80m', my favourite band, appeared as a huge stretch (3.5-4MHz) of very little except static crashes every night. It was possible to get a QSO but I had to call 'CQ' relentlessly and search diligently as if I'd been paid handsomely. The reason for this lack of stations is simple...a lack of stations!

The Australian mainland lay hundreds of miles away and even there, as I knew from my Sydney days, you had to work at it to get a QSO. The VKs have a c.w. net every Sunday morning in order to drum up stations, but it involves CQ after CQ and on a few occasions I was asked to take over from the fagged out net master. It wasn't a real net at all, but merely a rallying point for what few c.w. blokes there are on the VK scene.

I was thus driven to trying '40' at the DX hour for G land (about 5pm VK7 clock time). One evening, I was rewarded after several fruitless shouts by a QRZ from a Manchester station who soon lost patience with my weak signal and told me not to come on the band with such a lousy antenna and thereafter ignored my calls.

Chastened, I resorted to '20m' and in six weeks I managed to work 35 chaps who all gave me poor reports, but at least they got the callsign right. I began to get homesick for the racket of 'eighty' in the UK with its breakers and tuners.

I felt only pity for the poor VK lads and their empty bands and realised that the reason we Gs sometimes find it difficult to work VK is because there just aren't many about and the few that are make jolly sure they hang on to whoever they're in contact with. Come to think of it, a nice Christmas gift for a VK would be a cassette of what things are like over here on '80' and '40m' - or '20' or '15m'. They'd be amazed! PW

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November 14: The SAMS '98 Computer & Electronics Show is to be held in the Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road), signposted from junction 14 on M6, (bus shuttle from Stafford Railway Station). Doors open 1000 to 1600. Admission for adults is £3, children under 14, 50p, Concessions, OAPs, RSGB Members, Student Card, UB40, £2, (Advance Tickets £2 plus s.a.e.). There will be masses of free parking, a licensed bar from 1100 and refreshments, meals and a cafeteria. A great day out! **Sharon Alward, Sharward Promotions, Knightsdale Business Centre, 30 Knightsdale Road, Ipswich, Suffolk IP1 4JJ**, Tel: **(01473) 741533**, FAX: **(01473) 741361** or E-mail: **services@sharward.co.uk**

November 22: The Bishop Auckland Radio Amateurs Club (BARAC) Rally will take place at Spennymoor Leisure Centre. **Please note that this is a new venue**, ideally suited for both trader and disabled as it boasts good parking and easy access to large ground floor hall. There will be the usual radio, computer, electronics and Bring & Buy stalls as well as catering and bar facilities. Morse tests will be available on demand. As you can imagine, there is lots to do for all the family within the confines of the leisure centre for those of the family not quite interested in radio. Doors open at 1100 (1030 for any disabled visitors). Admission is £1, and under 14s go free of charge, if accompanied by an adult. Talk-in on S22. **Keith M0BLN** on **(01388) 601401** or **(0374) 417660**.

November 28/29: The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9 0AS. Doors open 1000 until 1700 each day. Admission is £3 for adults, £2 for OAPs and under 14s. There will be free parking for 2000 cars, a large trade show, Bring & Buy, catering, licensed bar, on-site camping, special interest groups, disabled facilities, cloakroom, Morse tests on demand, a talk in on 2m and 70cm and family attractions. **Steve Blayer G4UKR.**

December 5: The Rochdale & District Amateur Radio Society are holding their traditional radio rally at a **new venue**, two miles NW of Rochdale Town Centre on the A680 Rochdale to Edenfield Road at Cutgate. Look for the orange arrows. Talk-in on S22. There will be components, vintage radio and junk. More information from Rochdale & DARS, **John G7OAI** on **(01706) 376204** or **(0973) 689077** or E-mail: **johng7oai@which.net**

December 13: The Leeds & District Amateur Radio Society is to be held at the Pudsey Civic Centre (Dawsons Corner). There will be all the usual traders. Doors open at 1100 (1030 for any 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) 265572**.

1999

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) 846143** or **0161-652 4164**.

February 7: The 14th South Essex Amateur Radio Society Radio Rally is to be held at the Paddocks, Long Road, Canvey Island, Essex. The Paddocks is situated at the end of the A130. Doors open at 1030. Features include Amateur Radio, computer and electronic component exhibitors, Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for disabled visitors. **David G4UVJ** on **(01268) 697978**.

February 14: The 14th Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield. There is one large hall, just out of town on the Horbury Road. Easy access from M1 juncts 39 & 40 - well signposted and with a talk-in on 2m and 70cm. Doors open 1100 (1030 for disabled visitors and Bring & Buy). **Roy G0TBY** on **(01924) 893321** or packet **G0TBY@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 Radio & Computer Fair has changed its venue. **The new and improved venue** will be held at 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 **(01222) 832253** combined telephone and FAX number.

March 21: The Bournemouth Radio Society are holding their 12th Annual Sale at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open at 1030 and close at 1630. Talk-in from G1BRS on 2m S22. There will be Amateur Radio and Computer Traders, clubs and specialised groups, excellent refreshments and a Bring & Buy. Admission is just £1. More details from **Olive** or **Frank Goodger, 66 Selkirk Close, Merley, Wimborne, Dorset BH21 1TP** or telephone on **(01202) 887721**.

May 9: The Drayton Manor Radio & Computer Rally is to be held at Drayton Manor Park, Fazeley, Tamworth, Staffs on the A4091. The main traders will be in four marquees with a large outside traders flea market. There will also be a Bring & Buy stall, local clubs and special interest stands. Open from 1000 onwards. Trader information from **Norman** on **0121-422 9787**, other information from **Peter G6DRN** on **0121-443 1189** evenings please.

May 18: The Ripon & DARS are pleased to announce that the Northern Mobile Rally will take place at the Great Yorkshire Showground. There will be all the usual stalls, talk-in, Bring & Buy, free car park, disabled access, etc. Details on **(01765) 640229** or E-mail **M1BDZ@AOL.COM**

If you're travelling a long distance to a rally, it could be worth 'phoning 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 direct. Editor

Carrying on the Practical Way

In his last column for 1998 the Rev. George Dobbs G3RJV describes some novel ideas for Christmas Day in the workshop (despite the fact it is probably the busiest day of the year for George himself!)... accompanied by the appropriate seasonal quote!

"It was Christmas Day in the Workhouse."
George R. Sims [Song]

Christmas festivities can be a tricky time for the radio constructor. In the midst of the cold turkey, old films and wider family bonding, thoughts soon stray to the haven of the workshop! All this free time and a soldering iron laying cold in its holder does seem an awful waste. But what about family duty? 'Being present' can be a pressing requirement at such times!

Perhaps a compromise could be found? Saying: " I'm just slipping into the workshop to make something for the children/grandchildren" can sometimes work.

It may also be possible to include a project for yourself with a little novelty for the children. To this end....this month I am suggesting a novelty item for the family together with what I could a call a 'left-overs project' - something which uses up the bits.

Who's First Switch

The first idea - 'The Who's First' switch project is something like the electronic equivalent of 'Snap'. There are also of course other games and quizzes when being the first to respond gains the advantage.

Sometimes, even often - with children, there are times when there can be doubt or conflict over who responded first. This little circuit is a priority indicator which shows who is the first of two players to push a button.

The project might be used in a variety of games or even form a game of its own by being a reaction time indicator. It could become its own game by using a signal or command at which the two players must push a button. The circuit will then show who pressed their button first.

The circuit is shown in **Fig. 1**, and is very simple. Each transistor is a light emitting diode (l.e.d.) driver circuit. If either of the transistors conduct current, the l.e.d. in that collector circuit will light. So, now let's look at what happens when a button is pressed.

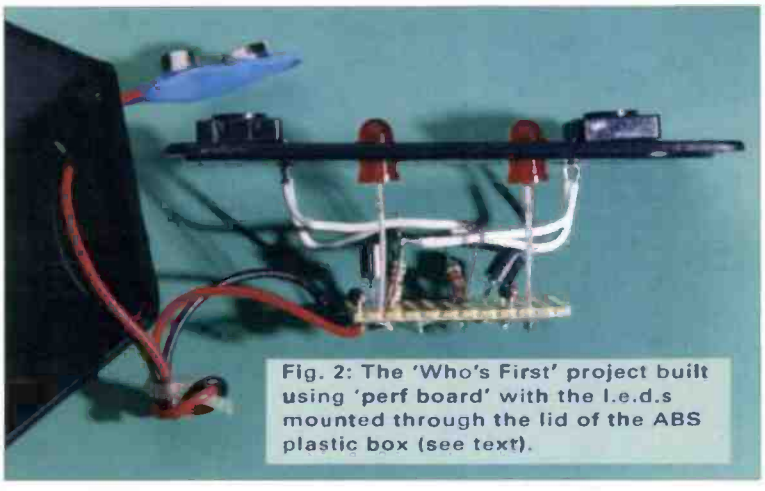


Fig. 2: The 'Who's First' project built using 'perf board' with the l.e.d.s mounted through the lid of the ABS plastic box (see text).

Positive Bias

If the left button is pushed closed, positive bias is applied, via a series resistance to the base of the left transistor. The transistor then conducts and the l.e.d. illuminates. The positive bias is taken from the collector of the right transistor. The same would happen to the right transistor if the right push button were closed.

However, if the left button is pressed first and held down and then the right push button is pressed, the right hand side l.e.d. will not illuminate. This is because the right transistor is conducting. Therefore either one of the buttons by being pressed first can prevent the other button illuminating its l.e.d.

If the two buttons are pressed quickly in succession, the first button to close the switch will light its own l.e.d. So, it's in this way the circuit acts as a priority indicator.

In practice, the value of the series resistors in the base of the transistors is set low enough to enable the bias to switch the transistor and high enough to reduce glowing through leakage in the l.e.d. on the other side. The value given does give a slight glow in the other l.e.d., but the difference is great enough to make it quite clear which button 'wins'.

My Version

My version of the project was built on a small piece of perforated plain matrix board ('perf-board') with the l.e.d.s (on full lead length) sticking out above the board, as shown in **Fig. 2**. I mounted the prototype in a small ABS plastic box.

The holes for each l.e.d. were reamed out so that the diodes would form a push-fit and hold the circuit board in place. (The push buttons I used were surplus types for keyboard applications).

A PP3 battery would not fit in the box so the supply leads, with a snap-on connector, are brought through a hole

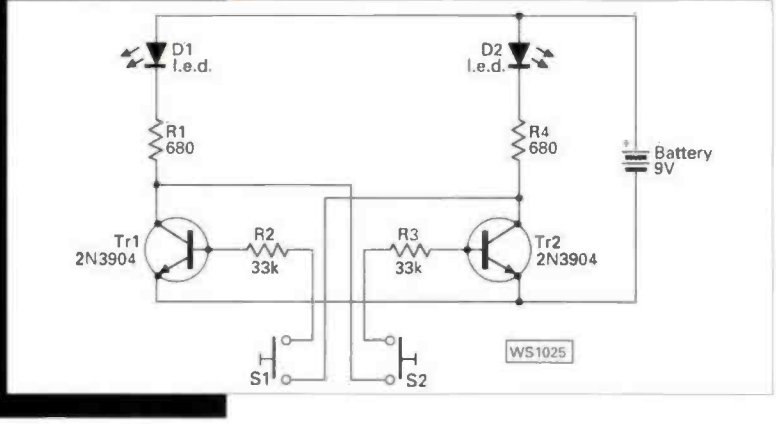


Fig. 1: Circuit of the electronic 'Who's First'? novelty project.

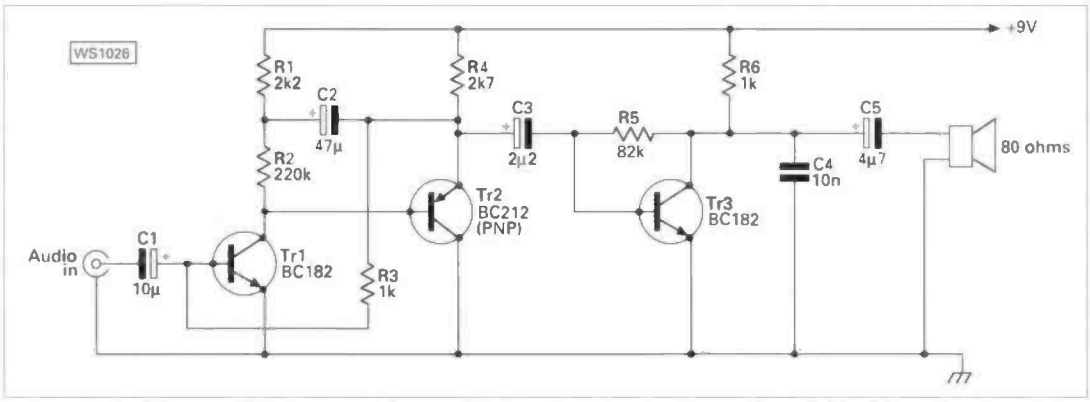


Fig. 3: Circuit diagram of the simple amplifier using a 'complimentary pair' of transistors and a surplus higher impedance speaker (see text).

in the outside of the case. This does mean that a switch is not required and to apply power the PP3 connector is simply snapped on to the battery.

Time For Yourself?

Having built a project for the family, why not take up a little more time in the workshop building something for yourself? I suggest this because sometimes it's fun to build up a circuit from bits and pieces found in the junk box!

The diagram, **Fig. 3**, shows the circuit of a small amplifier made from a collection of items I had to hand. I often buy items at radio rallies think that they will come in useful one day. One such item was a small flat 80Ω loudspeaker.

It has lain unused for several years. Then I recalled a small discrete audio amplifier circuit that I have used in the past for simple receivers that has an output impedance of something like 80Ω.

The circuit of the audio amplifier uses very few parts to give a useful amount of gain. The first two stages are *npn*/*pnp* 'complimentary pair' of transistors. (I happened to have lots of BC182 and BC212 transistors but many other combinations would do the job).

Other choices include BC318/BC321, BC319/BC322, BC414/BC416, etc. Try what you have as most pairs of *npn*/*pnp* transistors would probably work.

I built up the circuit on a piece of perf-board using the parts I had in stock. Some of the electrolytics were tantalum bead capacitors. If I had the value in tantalum bead types, I used them to reduce the space requirement as it's really not critical. Remember to be careful about the polarity of the polarised capacitors and that the second transistor is a *pnp* type used 'upside-down'.

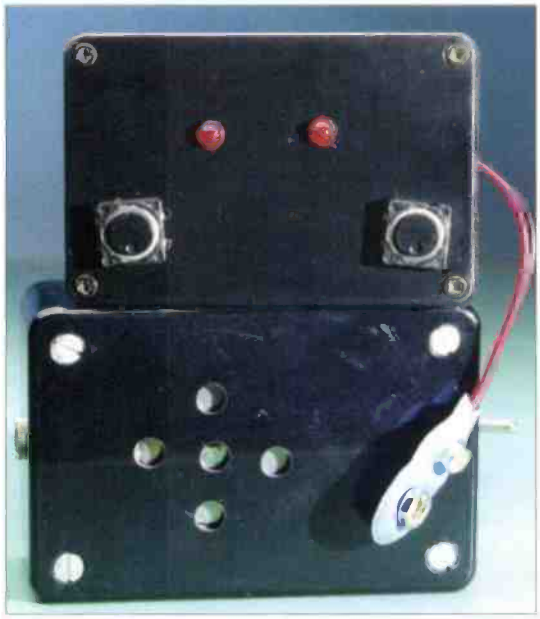
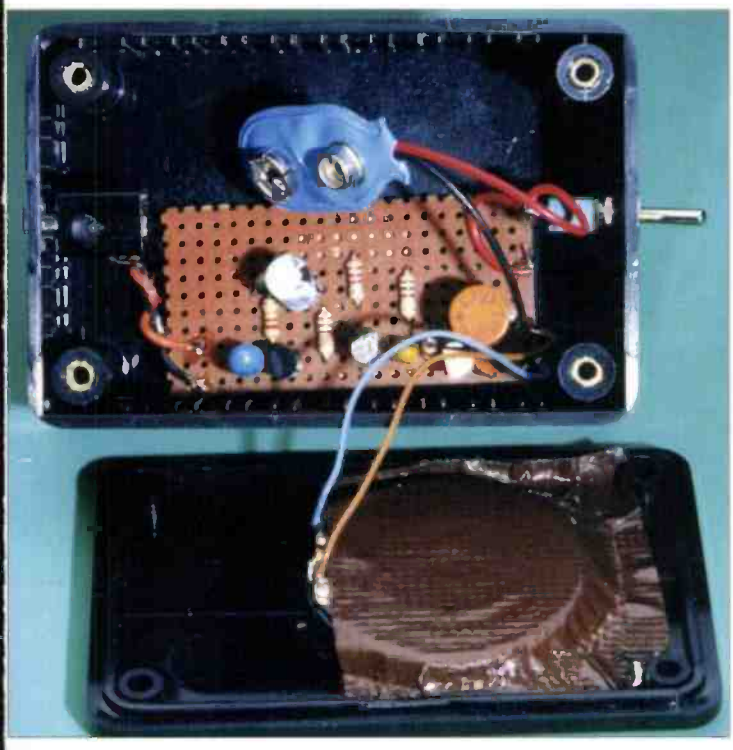


Fig. 5: The two completed 'Christmas Projects' ('Who's First' above and the amplifier below) possibly completed between Morning Service and Festival of Carols at St. Aidan's Church in Rochdale!

The little surplus loudspeaker worked well with the amplifier. A long way from hi-fi but an acceptable little circuit. I built my amplifier into another ABS plastic box, **Fig. 4**, and as there was enough space to contain the speaker and a PP3 battery as a supply, I added a small on/off switch and a 3.5mm jack socket on the input.

Fig. 4: The simple amplifier mounted in ABS plastic box. See text for possible applications.

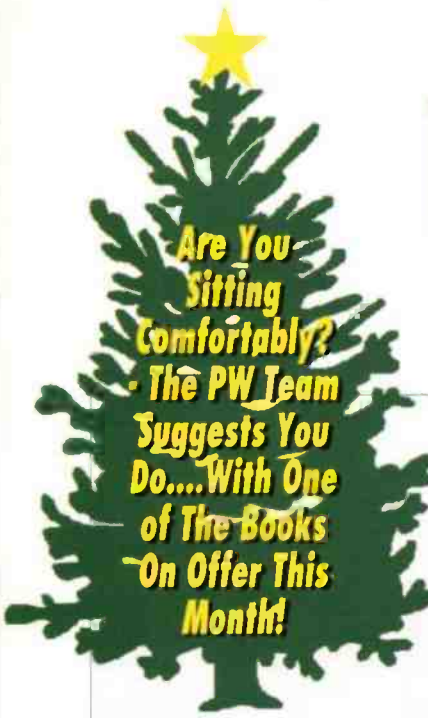


Many Applications

The amplifier could be used for many applications and one possible job is an audio signal tracer. To do this I made up a small probe: just a piece of wire on the centre of a 3.5mm plug and a lead with a crocodile clip connected to the outer sleeve.

The plug-in probe allows the amplifier to be applied to a circuit to check if any audio signal is present. The project cost me nothing to build because I had everything to hand. The loudspeaker **is an odd type** but there are plenty of miniature speakers around this impedance listed in the mail order catalogues or to be found of component traders tables at radio rallies and higher impedance speakers are often found in older scrap radios.

So, there you have them! Two little projects, both useful in their own ways and a fair excuse to attend the workbench during Christmas. Have a happy and peaceful time! *PW*



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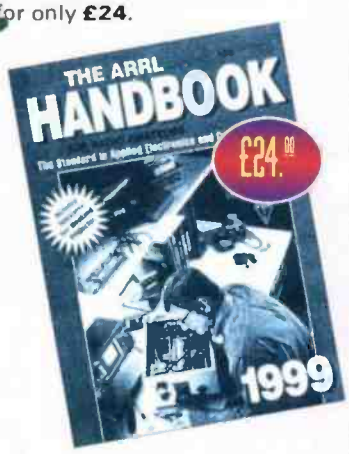

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Errors & UPDATES

Sources, 'Sinks' And Electromotive Forces, p45 September 1998 *PW*.

Geoffrey Billington G3EAE, contacted us and asked us to make the following additions and changes to his article that appeared on pages 45 and 46 of the September 1998 issue of *PW*. In his letter, G3EAE wrote:

"I would be grateful if you could bring the following points to the attention of readers who may have found the article difficult to follow.

1) The words '...but as a source of e.m.f..' occur in bold type in the section 'Alternating Current Conventions'. These words are not mine and were added without my approval. I should like readers to ignore them.

2) The graph in Fig. 5: does not match the reference made to it in 'Alternating Current Conventions'. The red curve correctly shows the *e.m.f.* **lagging** on the current, whilst the whilst the text states that *the voltage across the coil* **leads** the current and refers the reader to the graph. This is confusing.

When I wrote 'the voltage across the coil' I referred to the voltage which would be measured by a voltmeter connected across the coil in the usual way (assuming that the meter would sample the voltage at any instant).

3) Again in the section headed 'Alternating Current Conventions' there is an editorial note. Whilst not wanting to take issue with these comments I should like to point out that in the case of a series circuit, the phases of the voltages across the different circuit components is most conveniently expressed relative to the current as a common standard of reference.

4) There are a few minor misprints. The worst is the use of an asterisk ('*') instead of a plus ('+') sign in the formulas at the top of page 46."

Geoffrey Billington G3EAE

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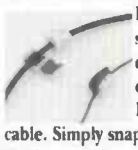

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Making Waves - In more senses than one

Causing a stir in the 'æther'! Bryan Wells G3MND asks if it's time we moved on from the 'steam-driven' antennas in use today, to more efficient systems.

Ever since I was a student at radio school many years ago I have continued to be puzzled by two unanswered questions. The first question is: Why, apparently, has so little research been carried out on alternate ways of coupling electromagnetic energy to space? Since the inception of radio, we've used nothing other than conventional resonant and travelling wave antennas.

One general, if fundamentally unsatisfactory, answer to the first question is that if a solution to a technical problem is found to provide acceptable utility in practice this does tend to inhibit further investigation, even if the solution is neither particularly elegant or efficient.

A good example of the premise mentioned, is the incandescent light bulb. They work - even if they tend to produce more heat than light. It's only recently that the need to conserve energy has resulted in the development of low-energy electric lamps.

Second Question

The second question is: Exactly how is oscillatory energy, generated in a conventional circuit and then coupled to an antenna, translated into a radio wave travelling away at the speed of light? What is the precise sequence of events that achieves this transformation?

It is now well over 100 years since James Clerk Maxwell developed the equations which showed that 'Wire-Less' communication was possible. Why, therefore, has so little work been carried out on alternative forms of antennas which might provide more elegant and efficient ways of coupling electromagnetic energy to space?

In answer to this second question, it has to be said that the mathematical explanations normally advanced are of considerable complexity and do not admit of simple visualisation. However, some comments made in print by **Maurice Hately GM3HAT** have helped me to form something more of a coherent picture.

The Beginning

But to begin at the beginning and to suppose that we have an efficient resonant horizontal dipole for 3.7MHz, erected high enough to be considered to be in 'free space'. It will have a length of about 40m and application of the usual formula suggests an inductance of about 86µH. In free space the intrinsic capacitance for quarter wave resonance either side of its centre will be about 86pF.

An air-cored coil with an inductance of 86µH should, even if made from thin wire, have a high *Q*, possibly up in the hundreds. Yet an average dipole only has a *Q* between 10 and 15 - I'll assume a value of 10. Admittedly a long, small diameter coil would have a lower *Q* than a short wide diameter coil of the same inductance and a long thin wire antenna is the ultimate in long 'thin' coils.

But a reduction of *Q* by factor of 10 seems to imply some subtle difference between the behaviour of distributed inductance and capacity and the lumped constant values. Is it possible that the desired radiation resistance lowers the *Q* and flattens the response in a similar way to resistance in a lumped constant tuned circuit? Do both 'resistances' constitute an energy drain?

We also have to think about a few more relevant constants, such as the impedance of free space which is normally stated to be 120p or 377Ω. But again the travelling wave impedance of a wire conductor is between 800 and 1000Ω - so some form of transformation is required if the antenna is to be matched to the impedance of space.

Resonant Dipole

A resonant dipole will certainly have some points along its length where the impedance is actually 377Ω. But will an effective match to space be achieved if matching is effected at a few very limited points?

If the antenna is supplied with power from a transceiver through a properly matched feedline there will be the usual magnetic and electric fields rising and falling in, around and on to the wire. This gives rise to standing waves and the so-called near field.

A view is frequently advanced that most of the energy supplied to an efficient antenna must in fact be 'radiated' - else where does it go ? What in effect has happened so far is a transfer of energy from the antenna to the near field, local to the antenna, accompanied by various forms of loss during the process.

Such losses will include a coupling factor, possibly magnetic hysteresis and electric dielectric losses, together with the continued resistance loss in the copper caused by the current flowing to maintain the standing wave and 'near field'.

No Plane Waves

So far, however, we have not arrived at the point where a 'plane wave' (a wave able to travel away from the vicinity of the antenna at the speed of light) has been produced. A 'plane wave' is usually considered to become evident at a distance of three to five wavelengths from the antenna.

One other question remains: What has happened between the near, or induction fields and points somewhere further away where the plane wave is in evidence? After all, in a radio wave the electric and magnetic fields are in phase, whereas in a standing wave pattern they are 90° out of phase.

Carrier Particle

In modern physics the carrier particle of electromagnetic energy is the photon. So on the basis of wave/particle duality, is a radio wave a well organised shower of photons? Is this a situation where the Schrödinger wave functions for each of billions of photons will finally result in a plane wave being established in a statistical sense?

The hypotheses, put forward by GM3HAT, touch on my original questions in a practical manner by attempting, in the face of some opposition, to formulate an alternative way of coupling radio energy to space. However, I have at least convinced myself that his method has some merit.

Maurice Hately's hypotheses contain two predictions. One is that the initiation of the plane wave from a dipole takes place in a relatively thin but circular interaction zone at a distance of λ/2 from the antenna centre. This zone is where the phase and other relationships become correctly ordered to start the formation of the wanted wave. Inevitably, in that formation process there will be some further transient loss as the plane wave becomes organised.

The second prediction, made by Maurice, is that a λ/2 dipole has a *Q* of 10 because the proportion of the power that was originally applied to the antenna, and that becomes evident in the plane wave, is only a relatively small part of the stored energy. If this is shown to be the

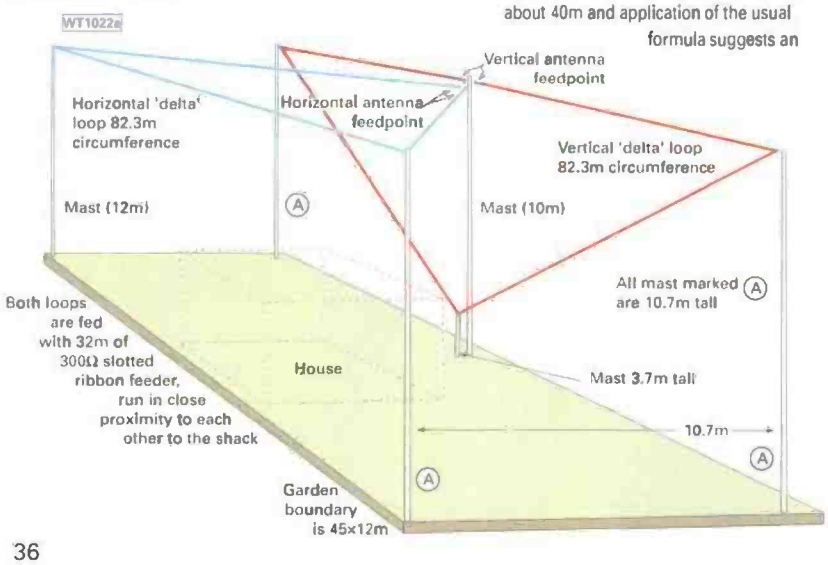

Fig. 1: Two orthogonally mounted full sized delta loops for 3.5MHz, to be fed in the 'Hately manner' with equal lengths of 300Ω twin feeder.

case, is there a possibility that we can by-pass some of this seemingly long-winded process?

For example, could the applied energy be 'persuaded' to move directly to the interaction zone without the intervention of induction fields and standing waves? After all with the antennas presently in use, there's no particular attention given to 'matching to space'. Instead the antenna system is left to achieve whatever coupling efficiency can be effected in a more or less random manner.

The Hately approach is to split output power equally between two suitable antenna elements having provided ±45° phasing to provide synchronism and orthogonality so, synthesising the Poynting radiation vector directly. Again the mathematics of this process is by no means simple, but the system does seem to have potential for saving both power and space.

I do not pretend (even to myself) that the description is either precise or complete. There are still far too many unanswered questions. Perhaps this is why antennas are so fascinating. And even with all the computer analysis and the introduction of quantum physics, achieving greater efficiency from any particular antenna is still something of a 'black art'.

However, if any reader feels that any of my approach to 'making waves' is mistaken or inaccurate then here's an opportunity to tell me, and other readers, where I am mistaken and to put forward your own views.

Indeed, if there is anyone out there who can throw real light on this subject I am sure that I am not the only person who would welcome further enlightenment.

Useful Ideas

Two useful ideas have arisen from my experiments with Maurice Hately's theories and practice. Maurice has concentrated on electrically small antennas for operation where there are space limitations. My approach has been: Can the Hately system be advantageously applied to full size resonant antenna systems? In my opinion, the answer appears to be yes.

The illustration of **Fig. 1** shows the layout of two narrow delta loops one horizontal and one vertical, which, when excited using a Hately phasing device produce on-air receive reports at least 3dB better than any other single or multi system I have tried. The main reports are derived from QSOs with **GW4CNM** (Anglesey) and **GM0IJV** (Orkney) with whom I make daily contacts.

The circuit of **Fig. 2** is a simplified phasing arrangement which should be a suitable replacement for the proprietary Hately device for anyone who wishes to try splitting power between two similar antenna elements. At the same time it provides quadrature phasing of ±45° between the two.

Correct adjustment should result in a near 50Ω impedance for the transceiver. With some configurations a little help may be required from an a.t.u. The simplified arrangement does not have the reliable matching and multi-band ability of the Hately unit.

For me there is little doubt that the Hately System can provide a modest improvement over other full size antennas. I have found it to be particularly useful at low frequency when considering the height restrictions affecting most Radio Amateurs.

I acknowledge that erecting twin full size loops requires a lot of effort, wire and feeder. However the system can be applied to any pair of similar antennas, erected in close proximity. Two full size 3.5MHz doublets, **Fig. 3**, can be excited in the Hately manner and at the same time compressed into a ground area of about 12x18m. In this configuration they showed the same degree of advantage over other compressed antennas that I have tried as that achieved with the two delta loops.

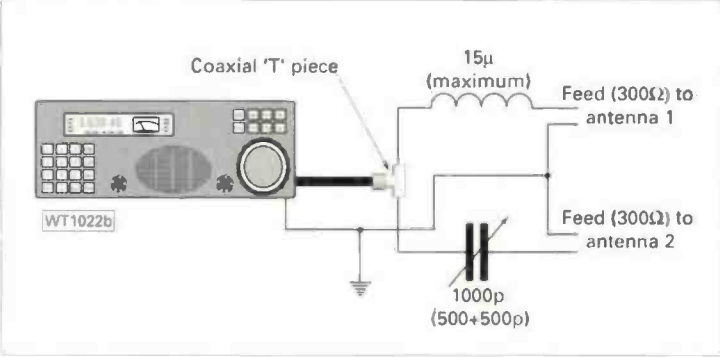

Fig. 2: A simple phasing circuit to feed either of the antenna layouts illustrated in this article.

In his 'Capacitor Dipoles' Maurice Hately has used what amounts to a capacitor balun at the centre feedpoint. I've shown a modified p-network matching unit, in **Fig. 4**, which incorporates a capacitor balun in the output capacitor position. Both antennas have a common terminal in the earth return.

In use, either capacitor pair may be connected to the antenna output connector and the remaining capacitor pair connect to the other antenna. This circuit provides the facility for feeding balanced lines without the disadvantages of the traditional inductive balun.

PW

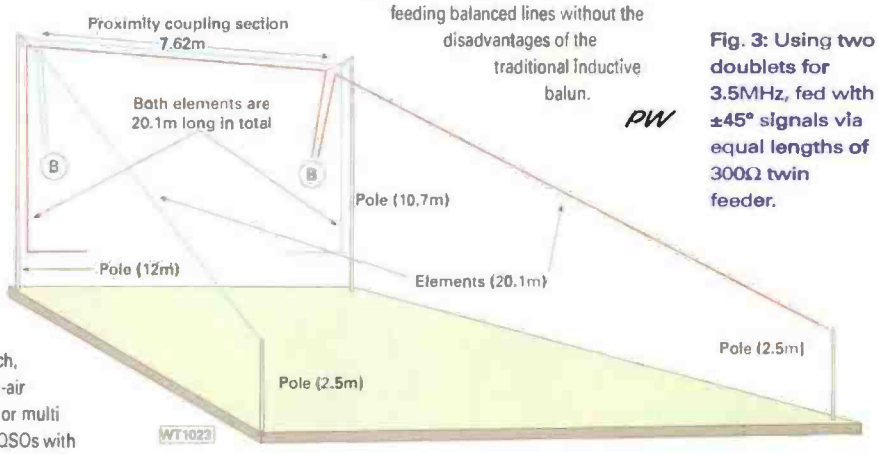

Fig. 3: Using two doublets for 3.5MHz, fed with ±45° signals via equal lengths of 300Ω twin feeder.

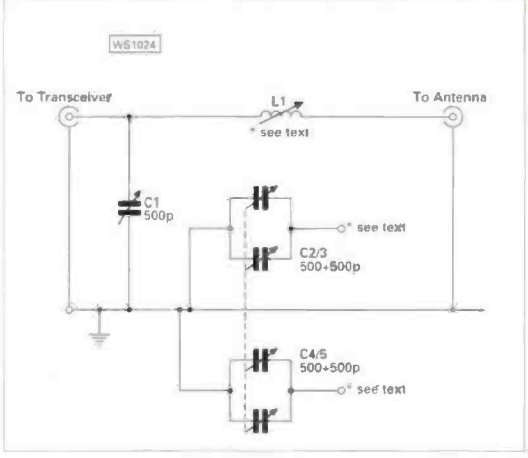

Fig. 4: A simple tuning unit and 'capacitor balun'. See text for more information.

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FOR OUR SECOND-HAND EQUIPMENT SEE TRADERS TABLE IN THIS ISSUE

The MFJ Super Hi-Q Loop Antenna & Control Box

John Goodall GOSKR takes a look at another interesting unit from MFJ's Starkville - Mississippi - factory in the USA. This month it's a loop antenna and associated control unit.

Last month I reported on MFJ's 'roller coaster' tuner, but there's no rest for the wicked! I say this because I also got the job of trying the MFJ Hi-Q Loop and control (Model 1788) which operates from 7 to 21MHz. The loop antenna is only just 1m (approximately) in diameter and constructed of thick walled, high quality aluminium.

The necessary tuning control attached to the loop, is in the form of a large tuning capacitor with the associated d.c. motor and gearbox to turn the capacitor, **Fig. 1**. The whole assembly is protected from the weather by the 'blown' hard plastic casing*, as shown in **Fig. 2**.

***Explanatory comment:** On reflection, the editorial team think this component is actually made by using a 'vacuum forming' process. **Editor**.*

Fig. 2: The 1m dia. (approx.) loop antenna (with motor drive and capacitor enclosed in the plastic housing). Below, the MFJ Super HI-Q Loop's remote control unit.

Fig. 1. The remote control unit shown (for size comparison) on top of the large motor-driven tuning capacitor used on the loop. The motor and gearbox (partially hidden) can be seen below the tuning capacitor base-plate.

The only connection to the control unit, **Figs. 3** and **4**, is the standard 50Ω coaxial cable supplying r.f. to the loop. The d.c. power, as required for the capacitor motor, is fed through the coaxial cable. In operation the control unit can be powered from either its own internal batteries (not supplied), or an external, 9–15V d.c. source (a nominal 13.8V) **which is supplied**.

Extremely Small

The loop antenna, for the bands on which it may be used, is extremely small and is ideally suited for those radio enthusiasts who have limited space. These will include flat dwellers or those who must use the loft for all their 'aluminium'!

Actually, the loop antenna is so small (approx. 1m dia.) it can comfortably be mounted vertically or horizontally...but don't be fooled by its size! (The mounting hardware supplied with the antenna allows for either method of operation).

Price of the system - I think it's low for what you get - does not reflect the high quality and effective control. **However, a word of caution at this point: Because the antenna generates very strong electromagnetic fields, this fact should be taken into account if it's used indoors, as it could cause interference - particularly in household wiring.**

Be careful also of the potentially dangerous situation with the high localised level of r.f. to anyone fitted with Medical Electronic Implants – Pacemakers and the like. And although I come into this category myself - I acted sensibly, operated safely away from the loop itself and suffered no ill effect whatsoever.

** John describes himself as being a 'bionic man' as he's one of the very few people in the UK fitted with an electronic unit placed directly*

into his body and working via electrodes into the spinal column. It's designed to help overcome very high levels of pain due to spinal injuries and partial paraplegia and helps him lead an extremely active life as I can testify! He's an inspiration to us all. ***Editor.***

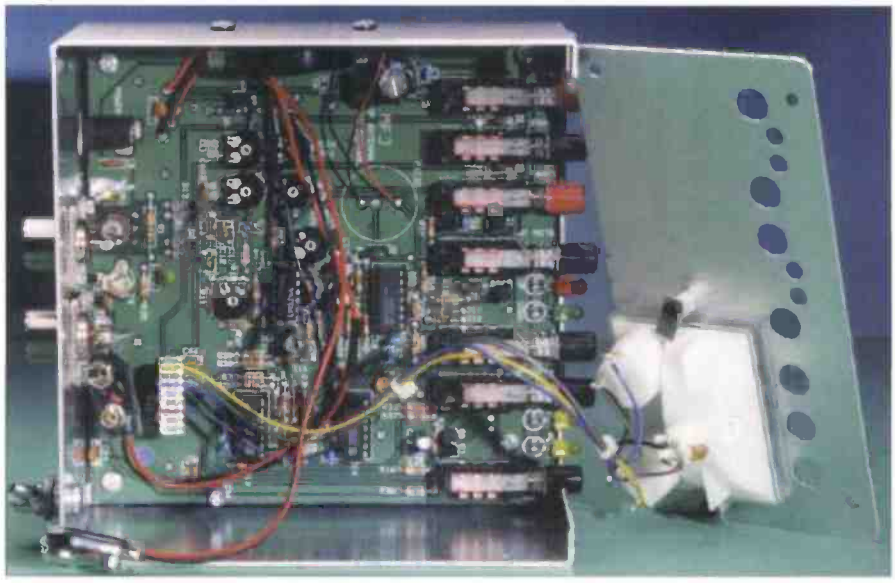

Fig. 3: Inside view of the remote control unit.

Control Box

Connecting the loop antenna to the control box couldn't be easier. Simply connecting the standard 50Ω cable between the two is all that is required. The low power, low current required for operation of the loop, is fed through the coaxial cable and the distance between the two is irrelevant.

The power source for the control box can be either eight AA sized cells mounted internally, as already briefly mentioned, or by a **non-grounded** (separate) supply of 9 to 15V dc. (The MFJ – 1315X, 240V a.c. to 12V d.c. unit being the ideal mains supply according to the manufacturers.

The controls on the front panel of the small control box or 'Head' as referred to in the instructions, are simple but effective. A row of seven push buttons to the top of the control operate the **On/Off** of the unit; **Hi/Lo Power** setting; **Lamp On/Off**; two buttons for frequency control **Fine Tuning – Up/Down** and two buttons for **Auto Band Select – Up/Down**.

There's also a small, twin cross needle v.s.w.r./power meter located to the left of the front panel. And from experience, I found that tuning is simple once I'd have got used to the automatic operation of the unit.

Testing The Unit

Once connected and switched on, I first followed the instructions for testing the unit and the loop antenna. This is simply achieved by toggling between the **Auto Band Select, Up** and **Down**, with the respective light emitting diode (l.e.d) switching off (non-illuminated) on reaching the maximum **Down** frequency and similarly with the maximum **Up** frequency when the respective l.e.d. illuminates. After this process is completed the loop is left set for the **highest frequency**.

Next, r.f. power on the desired band is applied, and pressing the **Down Auto Band Select** will start the loop's motor-driven capacitor to tune down frequency. This will stop when it reaches the frequency of the transceiver, giving an audible warning. Releasing the **Down** button will stop the audible warning. An l.e.d. for **Up** or **Down** will then illuminate and the respective button should be pressed accordingly.

The tuning on the loop is **very sharp indeed.** But practice will dictate how smoothly and quickly you can reduce the v.s.w.r. to a minimum for the frequency in operation.

On The Air

However, once on air it is surprising how quickly and efficiently the unit can be used, I was amazed at how simple it was to operate. I operated mainly on 7MHz, with a later excursion to 21MHz - and the results were very good indeed using s.s.b. at around the 100W level. (The loop is rated at 150W d.c.).

"I was amazed at how simple it was to operate"

On 7MHz I worked stations all over Europe, down as far as Italy (during the day) and as close as The Netherlands on s.s.b. Most signal reports were at the readability 5 and strength 7 (5&7) level - although I should point out that I gave them reciprocal reports because they were at the same level.

Up on 21MHz I found the loop was less 'sharp' to tune and I worked some European and one or two American stations on s.s.b. with ease and good reports. And quite frankly - bearing in mind the size of the antenna and the fact it was erected in the loft space of my bungalow- the results were in my opinion - exceptional!

"The results were - in my opinion - exceptional"

Altogether it was an interesting experience. I really do think this form of antenna can provide an alternative for anyone stuck for space or with planning problems. And I look forward to the next time I get my hands on this loop – or should I just forget to send it back?

My thanks go to Waters & Stanton Electronics PLC of 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 206835, Fax: (01702) 205843, for the loan of the review unit which is available from them at £349 plus £7 P&P. The alternative Model 1786 (covering 10 to 30MHz) is also available and costs £229 plus £7 P&P. *PW*

Fig. 4: The rear panel of the remote control unit, with important and appropriate warnings regarding the power supply (see text).

Antenna Workshop

AN 'L' OF AN ATU

Gerald Stancey G3MCK shows that the mathematics behind the L-network is very straightforward by showing how to design two a.t.u.s. It's easier than you think!

A common problem in electronics is how to couple two circuits whose impedances differ. There are many ways of accomplishing this and one of the simplest is the L-network. If your interest in the design side of amateur radio is minimal you may think that this is of academic interest only. However many amateurs need to connect their transceivers to a load that is not 50Ω. In other words they have to use a matching circuit, namely an a.t.u. This article shows how the L-network can be used for this application.

Basic Circuit

The basic circuit and the most usual representation of the L-network is shown in **Fig. 1**. As shown it matches two resistive loads with the state that R1 is less than R2. The network is reversible, that is either R1 or R2 can be the input.

The reactances of L and C are given by the following equations:

$$Q = \sqrt{\left(\frac{R2}{R1}\right) - 1} \qquad X_L = Q \times R1 \qquad X_C = \frac{R2}{Q}$$

Conversion of reactances to their respective capacitance or inductance values is by the well known formulae:

$$L(\mu H) = \frac{X_L}{2\pi F} \qquad C(pF) = \frac{10^6}{2\pi F X_C}$$

These simple equations can be easily solved using either a basic calculator or a slide rule. Frequently, radio handbooks give charts for converting reactance to either capacity or inductance.

An alternative configuration for the L-network is shown in **Fig. 2**. The equations which give the values of X_L and X_C are virtually identical to

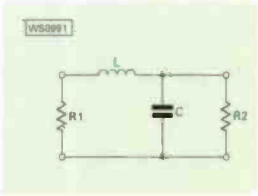

Fig. 1: The 'L-match' circuit, which works best when R2 is of higher impedance than R1.

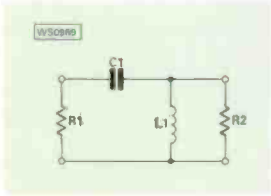

Fig. 2: The alternative 'L-match', this time R2 should ideally be of lower impedance than R1.

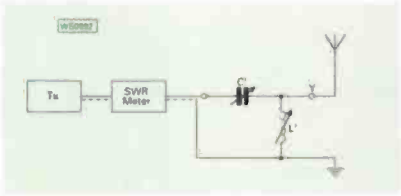

Fig. 3: The 'L-match' in use. on an end-fed antenna. (See text).

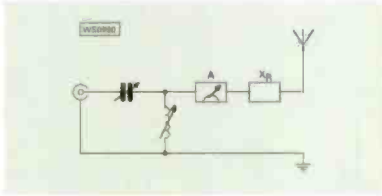

Fig. 4: If using this layout to reduce the static build-up on an antenna, then an additional impedance XR may be needed to get maximum output.

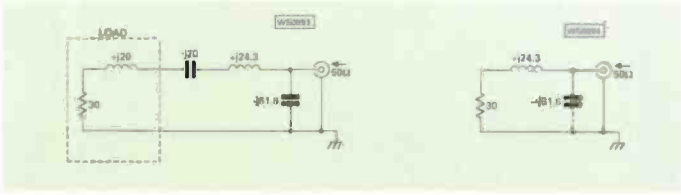

Fig. 5: If the load has reactance (+j20Ω) then this must be 'tuned' out with the 'opposite' component reactance (-j20Ω).

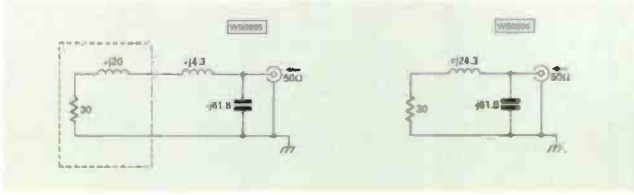

Fig. 6: An alternative is to incorporate the load reactance (+j20Ω) into the matching components so, reducing their values and losses.

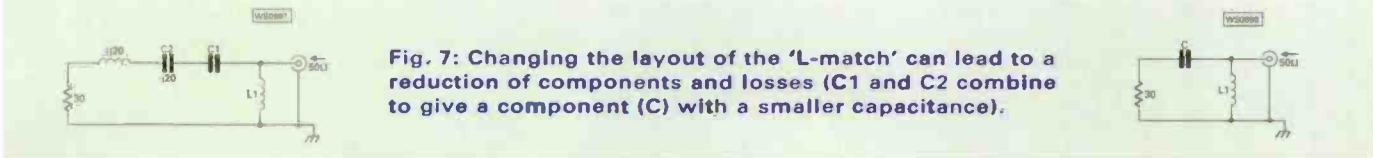

Fig. 7: Changing the layout of the 'L-match' can lead to a reduction of components and losses (C1 and C2 combine to give a component (C) with a smaller capacitance).

those given in Fig. 1. However in this case the value of X_{L1} and of X_{C1} are given by:

$$X_{C1} = Q \times R1$$

$$X_{L1} = \frac{R2}{Q}$$

There are circumstances where the configuration of Fig. 2, is the better of the two, as we shall see in a later example But let's now use these equations to design two a.t.u.s for use with a transceiver which requires a resistive load of 50Ω.

End-Fed

Let's first consider an a.t.u. for an end-fed half-wave. Let us start with our assumptions. We already know that R1 = 50Ω and a good impedance value to assume for the impedance at the end of a half wave is 2500Ω. Hence R2 = 2500Ω resistive.

Applying the equations given for Fig.1, we get

$$Q = \sqrt{\left(\frac{2500}{50}\right) - 1}$$

$$Q = \sqrt{50 - 1}$$

$$Q = \sqrt{49} = 7$$

If the a.t.u. is to be used on 3.5MHz, these reactance values convert to 127pF and 15.9μH. To allow scope for adjustment, 150pF and 20μH would be appropriate values.

Life is a series of judgements and an advantage of this design is that one side of the tuning capacitor is earthed making construction very easy. However there is no d.c. path to earth from the antenna. Hopefully, you will not operate when there is any thunder about but it is not unknown for antennas to collect high static charges which in this case will have no earth path by which they can bleed away.

This problem of build-up of static can be resolved by making the a.t.u. to the circuit which is shown in Fig. 2. I leave you to do the calculations yourself but the answers are X_C = 130pF and X_L = 16.2uH.

The a.t.u. In use, as shown in **Fig. 3**, is adjusted by adjusting L' and C' to give unity s.w.r. As there are only two variables this circuit is very suitable for amateur use where the correct settings can be found by trial and error. Indeed if the values of capacity and inductance were large enough it would be quite feasible to adjust the a.t.u. merely by trial and error.

However, having some idea of the correct settings for C' and L' will make the job a lot faster. A refinement is to put an r.f. ammeter in the circuit at position 'Y' in Fig. 3. The correct settings for L' and C' are those which give the maximum current reading on the r.f. ammeter with an acceptable s.w.r. on the coaxial cable from the rig.

In this example I've assumed a resistive load of 2500Ω but what if this is not the case? What if there is a reactive component in the load? In both of these cases if there is not too much reactance present and the load does not differ greatly from 2500Ω you should be able to adjust C' and L' to give a match.

However if excessive reactance is present in the load, it may be necessary to tune it out by adding series capacitance or inductance to the antenna as shown in **Fig. 4**. The amount of reactance (shown as X_R in Fig. 4) that's needed in this case will be a matter of trial and error. An r.f. current meter is used to show the level of antenna current.

However, in the next example, we will look at more scientific ways of dealing with the problem of a more reactive load.

Acceptable Match

Many amateurs will find that on 3.5MHz, a dipole will only give an acceptable match to 50Ω coaxial cable over part of the band. To get full band coverage some sort of matching unit is needed to ensure that the rig looks at a load of 50Ω. At one time these units were called 'line flatteners'. Note: they will only provide a resistive load for your rig; they will NOT alter the s.w.r. on the line.

Again you need to know values for R1 and R2 so you start by finding the impedance at the end of the coaxial cable in the shack. You could use a bridge that measures reactance and resistance directly, or you could estimate it from a Smith Chart. But for this example let's assume that the impedance is 30Ω resistive in series with an inductive reactance of 20Ω, which may be written as (30+j20)Ω.

Start by ignoring the reactance! Then we can say that R1 = 30 and R2 (at the input socket) = 50Ω. Using configuration 1, we calculate X_C = 61.8Ω and X_L = 24.3Ω. We now have to consider the reactive component of the load. This can be handled either by 'tuning' it out or by allowing for it in the design.

To tune the reactance out all we need to do is to add a capacitor of 20Ω reactance in series with the load to give the a.t.u. shown in **Fig. 5**. The other solution is to reduce the inductive reactance of the calculated L to 4.3Ω, (24.3-20) to allow for the inductive component of the load as is shown in **Fig. 6**. This is a better solution as we don't introduce an extra component with its extra cost and losses.

Alternatively we could use configuration 2 as is shown in **Fig. 7**. In this case the compensating capacitor C2 can be incorporated into C1 and so, enable the use of a smaller value capacitor (C) for this component (the total reactance is the sum of two '-j' values). Adopting this method could be helpful if you are making the a.t.u. from junk box components.

Quality Components

Always use good quality components with adequate voltage ratings. Even when using moderate powers the voltage present at the end of a half wave can be quite high. A roller coaster inductor is a good choice for the inductor but a tapped coil can be used as the tuning of these circuits is usually very flat. Note that if you are using a tapped coil remove the power before changing the tap!

Some idea of the inductance of either a roller coaster, or a tapped coil can be found from the formula:

$$L(\mu H) = \frac{a^2 \times b^2}{9a + 10b}$$

Where 'n' is the number of turns on the coil, 'a' is the radius of the coil and 'b' the length with the dimensions **in inches**. If you wish, you can use a metric measurements formula, but the numbers are not so convenient to use and the diameter of many coil formers is still specified in inches!

PW

GERALD STANCEY G3MCH EXPLAINS THE L-MATCH...A UNIT FOR ALL SITUATIONS

Summary

For clarity and simplicity I chose to show how to design an L-network when one of the terminations is a 50Ω resistive load. However, virtually any two impedances can be matched, either or both of them having reactive components. The design procedure is as I have shown. First calculate the network values for matching the resistive components. Then either incorporate or 'tune-out' the reactive components. Selecting the correct configuration, that is Fig. 1 or Fig. 2, may make it easier to incorporate the reactive components onto your design.

I hope that I have shown that the L-network is very easy to design and to construct. Having only two variables it is ideally suited for amateur use where the optimum settings can be easily obtained by trial and error. However a little attention to the design can save a lot of time when it comes to adjusting the a.t.u. It can also help you to understand and solve the problem in those instances where 'my antenna won't load'.

An Experimental Variometer

Dennis Wood G3EAY found that the variometer isn't dead - it can still prove to be an effective element in an antenna tuner

When I was building myself a loading and 'tuning' unit for my long wire antenna, I found that I required a 40-turn coil tapped every turn (to make it easy to adjust). I found this coil a little difficult to make and as to where I would find a switch for it! A roller coaster unit was also out of the question.

Whilst mulling over the problems I'd set myself, I read an article on variometers used in the Second World War and how they performed. I decided that this was the ideal solution and to make one out of up-to-date, easily available materials for use in place of the tapped coil.

Basically a variometer consists of two coils, with one coil fitted inside the other. The inner coil should be similar to the outer coil and able to rotate through 180°. This rotation allows the two coils to interact to give a range of inductance, from (L_1+L_2) to (L_1-L_2), created by rotating the inner coil.

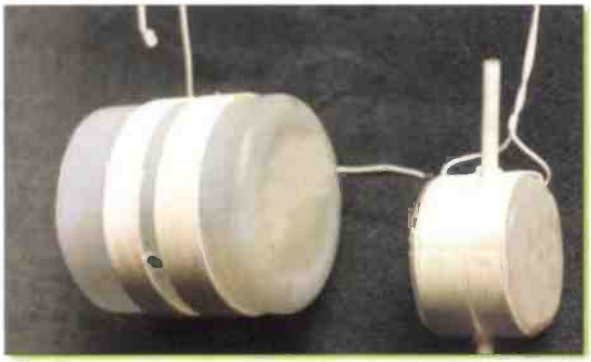

Fig. 1: The larger of the two coils is 85mm diameter and occupies a length of a little over 40mm. The smaller (inner) coil is wound with a diameter of 60mm and over a length of of 40mm. Both coils have similar numbers of turns.

I thought that this would be the nearest thing to a continuously variable coil and so it turned out to be. I have called it an experimental variometer because I have not the equipment to measure inductance and *Q* but in practice it seems to function like the desired 40-turn tapped coil and I am delighted with the results.

Fig. 2: Looking into the unit after construction. The shaft is made from a plastic knitting needle or a piece of wood dowelling.

No Special Tools

No special tools are required, just a pair of scissors or tenon saw and nails, the nails are held in locking-jaw pliers and made red hot to bore suitable holes in the plastic bottles used. As can be seen in the photographs I used two plastic bottles originally 'on loan' from my wife.

An 85mm diameter bottle was used as the former for the outer coil. The inner, rotating coil, was wound on a 60mm bottle. Both bottles were cut to size with scissors but a tenon saw could be used. Leave the bottoms of the bottles intact as this increases the strength.

Fix the first turns with vinyl bond cement, leave to set before continuing winding and the turns are less likely to fall off. (Have several cut pieces of sticky tape handy to hold wires in place temporarily). I used white coated standard wire for both coils and wound 20 turns on each former, reasoning that (L_1+L_2) equals 40 turns.

The rod controlling the rotation of the inner coil was made from glass fibre material (g.r.p.) as used in construction of kites, but wooden dowelling will do. Coat both coils with vinyl bond cement, as this also increases the constructional strength of the competed coils.

All holes were made with a suitable size red-hot nail (held in pliers heated over a gas flame until hot enough, but please take care during the procedure). The rotating rod is held in position by sliding on tight fitting pvc tubing. I also fitted two washers at each end.

When winding, don't be too concerned about the bottle formers tending to flatten out, as when coil is completed, reshaping is possible. Wire the two coils in series as per the photograph and adjust the wire tails of the inner coil so that 180° rotation is satisfactory.

The variometer took me two hours to make and seems to work extremely well, although I think a slow motion drive would be an asset. I am about to build an a.t.u. of the p-tank unit type and will use this variometer in place of the tapped coil.

PW

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M&S

Christmas is on its way and the PW Editorial team recommend taking a look at some possible stocking fillers. This month we have an assortment of books for you - an array of antenna handbooks mixed in with a compilation of callsign listings finished off with a topping of world-wide radio and TV listings. So, sit back and relax - but get that cheque book and pen out - we guarantee that you will want at least one of these books!

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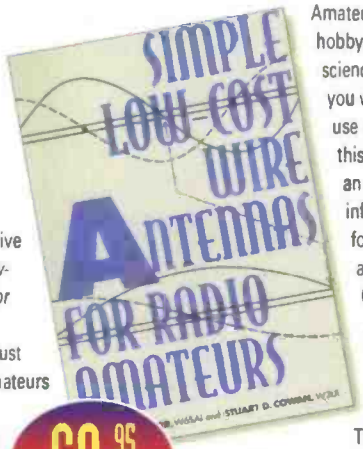
Book PROFILES

Simple Low-Cost Wire Antennas For Radio Amateurs. *William Orr & Stuart D. Cowan.*



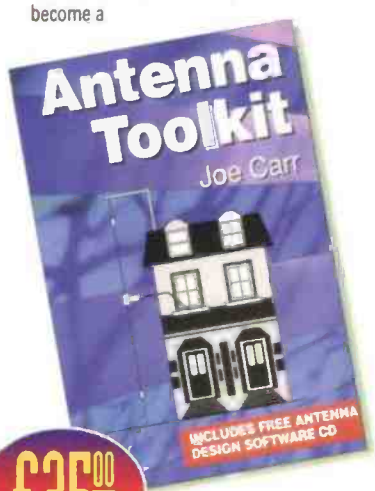
£8.95

For those of you who are looking to build a better antenna and want an efficient, yet economical, system you need look no further then **Orr & Cowan's** comprehensive handbook: *Simple Low-Cost Wire Antennas For Radio Amateurs.*

Perhaps you are just one of those Radio Amateurs who likes to keep themselves up-to-date with all the new, cheaper techniques which may help you in your quest to have the best antenna. Whatever kind of Radio Amateur you are, this book will no doubt make an interesting read. As the very experienced authors Orr & Cowan state, the antenna is a very important part of your station - although you might well have a very good transmitter but what is it without a decent antenna? In this 188 page handbook, you will find everything you need to build a low-cost wire antenna.

The book has some fascinating chapters, such as: 'Sugar-Coated Antenna Fundamentals'; 'Radio Waves And The Nature Of Things'; 'Work DX With An "Invisible" Antenna' and 'A Universal HF Antenna System'. Well illustrated with diagrams, circuit boards and black and white photos, we feel that it would make an informative read - you could be planning your New Year projects on Christmas Day with this book! **Recommended.**

Antenna Toolkit (with CDROM). *Joseph J. Carr.*



£25.00

Intended for the radio enthusiast - whether you are a Radio Amateur, listening hobbyist or radio science observer - if you want to build and use antennas, then this book would be an adequate information source for you. With the added bonus of a CDROM, this *Antenna Toolkit* could be just the book you are looking for.

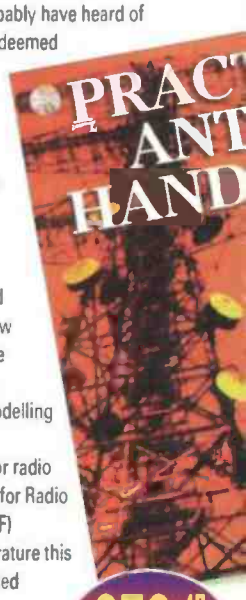
There's no doubt that you'll recognise the name, because **Joe Carr** has written many definitive books on antennas and this one is his latest. All of the antennas in this book are wire antennas which are "easy to install", "easy to get working properly" and they are "cheap"!

There is quite a bit of technical material to wade through, as Joe Carr readily admits, but unless you wish to become a professional antenna engineer, you will only need to follow a few of the simple guidelines in the book to get good results.

The free CDROM with this book is Microsoft *Windows*-based antenna software and will calculate the critical lengths and other parameters of the antennas described in the book when the user selects the antenna type and sets the frequency. Also included is a *Windows* freeware package from the 'Voice Of America' organisation called VOACAP, which is an h.f propagation predictor.

With sections covering from 'Antenna basics' to 'Limited space antennas', 'Large loop antennas' and 'Wire array antennas', you should be able to find what you need. **Recommended.**

Practical Antenna Handbook. Third Edition. (Including CDROM) *Joseph J. Carr.*



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Claimed as being 'The World's Favourite Antenna Book', **Joseph J. Carr's** *Practical Antenna Handbook* (Third Edition), is all that you would expect from this experienced author. Even if you haven't seen a copy of the other editions, you will probably have heard of Joe Carr. Some have deemed this handbook as "the antenna builder's bible"!

As has come to be expected from Joe Carr, this edition of *Practical Antenna Handbook* would be helpful to novices and experts alike. With new additions such as wire antenna construction methods, antenna modelling software (*miniNEC, WinNEC*), antennas for radio astronomy, antennas for Radio Direction Finding (RDF) antenna noise temperature this is a truly totally updated handbook.

Once again well-illustrated with diagrams and circuits it's the sort of book you probably couldn't do without - keep it in your library, or store it in your toolbox - but keep it somewhere very handy! **Highly Recommended.**

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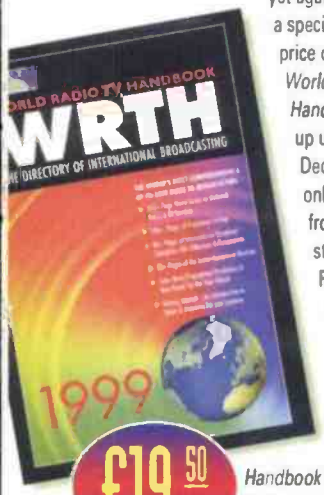
With the new year quickly approaching - yet again - there is a special launch price on this new *World Radio TV Handbook 1999* - up until the 31st December it is only £19.50 from *PW* Book store. Following its usual high standard, the *World Radio TV Handbook* is packed full of all the information you need on radio and television anywhere in the world! Completely updated, it is one of the most extensive handbooks around.



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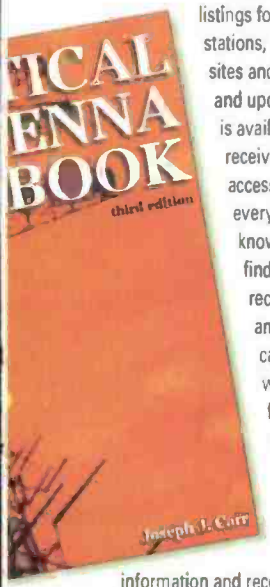
One of the main attractions of this book, is that it has more than 350 pages of international radio station listings with a graphical guide to English programmes, along with world-wide TV station contacts and addresses.

There are also new listings for clandestine stations, broadcaster Web sites and E-mail addresses and updated data on what is available in short wave receivers and accessories. Basically, everything you need to know about where to find and how to receive every radio and TV station you can think of - world-wide! You will also find specially commissioned articles by radio experts covering topics such as technical information and recommended programmes.



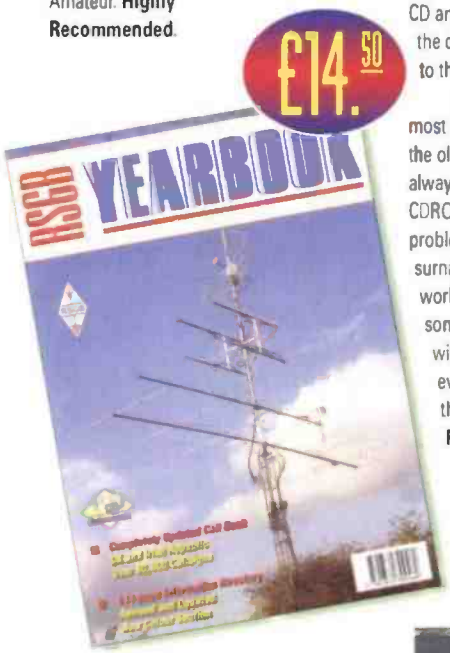
You could be of the first people to order this comprehensive handbook, this 'must-have' guide to broadcasting. You could be the first to receive it as it does not go on general release in Europe until 14th December 1998. **Highly recommended.**

RSGB Yearbook 1999. Edited by Mike Dennison.

This completely updated callbook includes the UK and Irish Republic callsigns. Altogether, there are 60 000 callsigns in this very handy reference book - we here at *PW* find it invaluable at times - and it has 144 pages of revised and updated information with a new colour section.

There's a lot that has changed from the other callbooks of years gone past. For starters, the callsigns are much more compact allowing for an improvement in quality and colour photographs have been used for the first time.

As it is with the *Call Seeker 1999* CDROM (see profile), it has its flaws, as any telephone book or listing of information does. Sometimes you just can't find that particular callsign and not everyone is in it, but it is nevertheless an essential reference book for any Radio Amateur. **Highly Recommended.**



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Call Seeker 1999 CDROM.

The **RSGB** is the latest in a long line of organisations to produce their literature in both book form and on CDROM. This CDROM is probably easier to use then the ***RSGB Yearbook***, except that you'd have to boot up your computer every time you needed to use it - if you've got a computer that is!

We would strongly recommend this CDROM to anyone who has a computer as something to go hand-in-hand with the *RSGB Yearbook* therefore, when you are using the computer and need to look up a callsign from a name, or the name from a callsign you can simply load the CD and search for it. If you are not using the computer, however you can revert to the *RSGB Yearbook*.

Again, the *PW* team think that most readers would agree that the way the old *RSGB Callbook* worked wasn't always the simplest and therefore the CDROM will solve a number of problems. You can go by callsign, surname or postcode and when it works well, it works well but sometimes you will have difficulty with certain callsigns and not everyone's callsign is in there. **Recommended.**

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A Whole New World In Two Years

The Story of a Novice

Mark Haynes 2E0APH gives an entertaining account of how he became interested in Amateur Radio, took the Novice Course and Morse test and all in two years! If you are young or old and thinking of beginning the hobby this account should help you to make the final decision.

It was August 1995. My family were in a Britannia Airbus 36 000 feet somewhere over France on our return flight from a holiday on the Costa Brava. I was looking out of the window and, amongst various things, crossing my mind was the fact that on the following Friday evening, I was commencing the Novice Licence Course at the QTH of G4OBE in Enfield, North London. Although I had watched my father operate his station for many years, it did seem rather complicated to understand at times and I wasn't sure that I'd make it to being licensed. But, the desire was there and I was determined.

My father had often talked about Radio Amateurs being the 'salt of the earth', which I really didn't understand, but I must say that it became plain once I got settled in on the course. **Robert Snary G4OBE** and his family are wonderful hosts and I was really made to feel at home. I always looked forward to the mid-way tea break when Robert would always come out with amusing stories of his various experiences with the hobby.

A Friend In Need...

Another student on the course was Andy who became 2E1EQP and has since gone on to obtain 2E0APD. He has become a great friend and a source of encouragement.

About half-way through the course, we had a mock examination and this was a sad evening for me as Andy did very well, but a lot of my answers were wrong which made me rather depressed. For a few minutes I was thinking "to hell with it", but when Robert had finished marking the papers, the 'old man' (G3WRO), who thought he'd be clever and do the paper himself also, apparently, made some silly errors. So, I then began to feel better again.

When I took the examination at RSGB Headquarters, it was quite an experience. We took the paper in the President's room, where there are photographs on all four walls of past Presidents of the Society going back many years.

I began to realise how unique this wonderful world of Amateur Radio is. All of these people, at some stage, sat their examination and went on to enjoy their hobby and now it was my turn. If possible, I was determined to do well.

Andy was the first out and I remember thinking "I hope he has passed as it would be great to have my first QSO with him as we had done the course together". At the end, we were all in the RSGB reception discussing the questions and our answers and coming away with mixed feelings as to whether we had done well.

The First QSO

Both Andy and I passed first go and we were delighted. The first QSO was made and it was a great feeling! On the day my licence arrived, my father arrived home from work and I told him my callsign - 2E1ERN. There was a big grin on his face and he said that was a very significant callsign. I then learned of G3ERN, who is now a silent key but was apparently a very well known amateur and lived in my home town of Harlow for many years. My father used to have many QSOs with him on 'Top-band' in the 1960s and 70s.

In the next few months, I became more and more interested in c.w. and went on to pass the Morse test. My current callsign - 2E0APH - was issued on 1st October 1996. My activities are QRP on 3.5 and 28MHz and simplex repeater work on 430MHz.

I can honestly say that I prefer to run 3W c.w. than run 100W using my father's callsign under supervision, because there is so much sense of achievement when you can call CQ with very low power and then hear a distant station under the QRM coming back to you.

I have set up a Radio Club at my school in Sawbridgeworth and we are teaching Morse and are gradually getting a worthwhile station together. There are so many facets to this wonderful hobby that makes it unique, but one thing that really gives me a buzz, is working through the UK repeater network. As an example of this, over the last couple of years we have spent a week at Easter time in a caravan park in Cornwall.

QSO In Cornwall

When we first went to Cornwall in 1996, I had only had my licence for a few weeks. On the way down to the West Country, as we proceeded, various repeaters gradually became easier to access.

As an example, GB3TD in Swindon. I talked to my friends in that area, which is normally only possible in lift conditions from home. Then, when we reached our destination, there was GB3CH on Caradon Hill, which was end-stop from our caravan.

Many new friends were made. Also the 144MHz repeater GB3WD on Dartmoor which I could work through using my father's callsign under supervision.

We have since been back to the same place in Easter 1997, October 1997 and Easter 1998 and it's lovely talking to the old friends again every time we go back. When we arrive, Mum and Dad go into Tavistock to get the groceries for the week. Dad and I keep in touch on 430MHz and, for bedtime reading material, Dad calls in the book shop for the current issue of *PW*. Great!

As I have put for the heading: 'A Whole New World In Two Years'. I am really enjoying my Amateur Radio. My father recently showed me a book *World At Their Fingertips* by the late **John Clarricoats G6CL**, where the last words are "Amateur Radio - the greatest of all scientific hobbies". It's true! If there is anyone of any age reading this, contemplating taking up the hobby, take my advice - go for it! You will be greatly rewarded! *PW*

The Novice Exam was taken in the President's Room at RSGB Headquarters - with all the past RSGB Presidents watching over!

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Valve Vintage

Phil Cadman G4JCP is bathed in a gentle green glow this month as he looks after the 'wireless shop'. But don't worry, the page is not radioactive...Phil's only looking at 'magic eye' indicator valves!

Autumn greetings, fellow thermionic followers! Welcome to my final column of 1998, and as you might guess, I've long considered thermionic valves to be magical. This might seem rather fanciful but there really are such things as 'magic' valves....I know because it says so in the valve manuals and I'm making them the subject of this month's column!

Actually, the valves in question should be referred to as electron ray tubes but they're more commonly known as 'magic eyes'.

Electron ray 'tubes' first came into use in the mid-1930s as visual tuning indicators in receivers incorporating automatic volume control (a.v.c.) circuitry. Their a.v.c. action caused such receivers to exhibit an apparent broadening of tuning which made it difficult for unskilled users to correctly tune in a station.

Previously, inexpensive radios had used a specialised form of neon lamp as a cheap tuning indicator but something better was clearly needed. Not unexpectedly, manufacturers were reluctant to use the obvious solution - a costly moving coil meter - in all but their most expensive sets.

In 1935, in answer to the problem, the Radio Corporation of America (RCA) introduced the 6E5. It became known as a 'Magic Eye' tube, a description no doubt coined by some imaginative marketing person. (Can anyone out there in vacuum-land confirm this?)

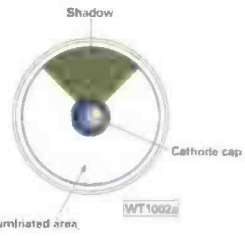
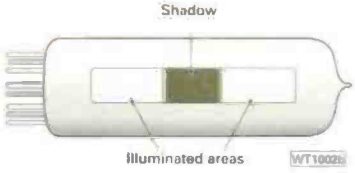


Fig. 2: Diagrams showing the difference between the circular, metallic targets of the early tubes (above) and the linear, 'on-glass' target of the EM84/EM87 (below, see text and Fig. 6).



Fluorescent Screen

Basically, the 6E5 is a small cathode-ray tube which has a tiny fluorescent screen or **target**. A control or **deflection electrode** is positioned between the cathode and the fluorescent target. By making this deflection electrode less positive than the target, so electrons moving between the cathode and the target are deflected, and a shadow appears on the fluorescent screen.

Realising that there was no suitable varying voltage in a superhet receiver able to drive the deflection electrode, RCA incorporated an amplifier triode in the same envelope as the indicator. This triode, plus a resistor or two, allowed the indicator to be driven directly from the receiver's a.v.c. line.

Unfortunately, the 6E5 could only cope with a small range of a.v.c. voltages and so a new version, the 6G5, was introduced. This tube incorporated a vari-mu (meaning literally 'variable gain') triode which allowed it to handle significantly greater a.v.c. voltages.

Later indicators introduced by RCA were the 6N5 (specifically for battery sets) and the 6U5. All these tubes had 6-pin bases and produced a fan-shaped shadow on a circular target positioned at the end of the tube.

Fig. 1: The EM81 'Magic Eye' indicator valve. Note that this valve uses an internal metal fluorescent screen (see text).

British Eye

The first British magic eye tube, the Y63, was introduced by the Marconi-Osram Valve Co. (M-OV.) in 1937. It was electrically equivalent to the American 6U5 but had an International Octal base.

Later came the Y61, Y62, Y64 and Y65. I wonder why the '63 was the first in the series and not the '61? Strange that!

Also in 1937, Mullard introduced their TV4 and TV6, equivalents of Philips' side-contact AM1 and EM1. Mazda made the AC/ME and ME920, both of which had 7-pin bases, and the Mazda octal-based ME41 and ME91. At the end of 1949 Mullard introduced the EM34, a popular octal-based indicator which found its way into many radios of the 1950s.

With the advent of miniaturisation all-glass indicator tubes appeared. The first of these was the EM80. This too had a fan-shaped shadow but the fluorescent screen was viewed from the side of the tube rather than from the end.

Similar examples were the later types EM81 and EM85 - the valve in **Fig. 1** is an EM81. Interestingly, miniature indicator tubes were very much a European phenomena with the Americans copying us (for a change).

Final Development

In 1956 the final development in the successful saga of the magic eye tube took place with the introduction of the EM84 and EM87. These indicators were unique in that the fluorescent screen was deposited on the inside of the glass envelope rather than on part of the metallic structure within the tube.

The diagram, **Fig. 2**, shows the difference between the circular, metallic targets of the early tubes and the linear, on-glass target of the EM84/EM87. (An EM84 is illustrated in **Fig. 6**, which can be compared with the EM81 pictured in Fig. 1).

One last point; if you happen to have **any magic eye tube which is not of all-glass (miniature) construction then please take care of it. These early indicator tubes really are irreplaceable.**

Theory And Elements

Let's now look at the theory and main elements of an electron ray tube, **Fig. 3**. On circuit diagrams and in valve

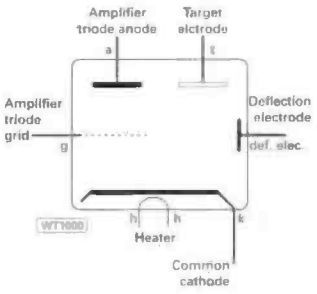


Fig. 3: The main elements of a 'magic eye' valve, illustrating a basic indicator vales' internal connections (see text).

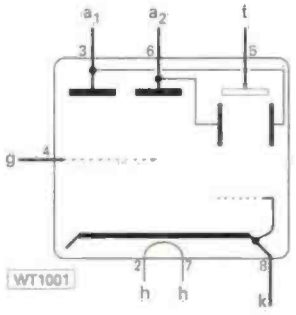


Fig. 4: Some magic eye tubes have two deflection electrodes, as in the example, the EM34, shown here.

data books the common cathode, triode grid and triode anode are usually denoted by the letters **k**, **g** and **a** respectively.

The target electrode will probably be marked with the letter **t** (don't confuse the 't' with triode, it means target) while the deflection electrode will be labelled in full or simply marked **defl.** or **defl. elec.**

Some magic eye tubes have two deflection electrodes, for example, the EM34 shown in **Fig. 4**. The EM34's amplifier triode has two electrically separate anodes - each anode being internally connected to one of the deflection electrodes.

In normal operation the cathode is operated at or near ground potential while the target will be at 200 to 250V. The triode anode is fed from the same supply as the target but **via** a resistor - see **Fig. 5**.

The value of the resistor is critical to the correct operation of the tube and is always quoted by the manufacturer. (You should understand that if you change the value of this resistor then the tube will not operate as per its published specification).

If a large negative voltage is applied to the grid, such that no significant current flows in the triode, then no voltage will be developed across the anode load resistor (R3 in Fig. 4). The deflection electrode will, therefore, be at the same potential as the target and so have no effect on the electrons as they flow from the cathode to the target. Under these conditions the whole of the target will glow.

As the grid is made less negative, current through the triode will increase and thereby lower the voltage on the deflection electrode (due to the voltage dropped across R3). As the deflection electrode becomes increasingly negative with respect to the target, the electron stream will be deflected in proportion and less of the fluorescent target will glow.

When the grid reaches the same potential as the cathode maximum voltage will be developed across the load resistor. (The triode grid is **not** meant to be run at a positive potential with respect to the cathode). By this time only a small portion of the target will be glowing.

The visible effect is a shadow which appears to fall across the target. The shadow's size will vary in sympathy with the voltage on the grid of the triode.

Significant Differences

Apart from the obvious physical differences between the various magic eye tubes there can be a significant electrical difference. (This was due to the characteristics of the amplifier triode).

The first magic eye tube had a reasonably linear characteristic. That is, the size of the shadow varied in direct (though inverse) proportion to the negative voltage on the grid.

Unfortunately, the a.v.c. voltage generated by even moderately strong signals could reduce the shadow to nothing. (Oh dear!).

The 6G5 addressed the problem by using a vari-mu triode. As the negative voltage on the grid increased, the gain of the triode decreased, thus slowing the rate at which the voltage on the deflection electrode changed.

Visually, the indicator appeared to become progressively less sensitive as the shadow got smaller. Now it took a much larger a.v.c. voltage to remove the shadow completely making it just as easy to tune in strong signals as weak ones.

Practical Applications

The most common use for magic eye tubes is their raison d'être - indicating signal strength in superhet receivers. Here, the triode grid is usually taken directly to the receiver's a.v.c. line and the common cathode connected to h.t. negative. Alternatively, if the receiver uses what is known as delayed a.v.c., the grid might be fed from the audio detector diode.

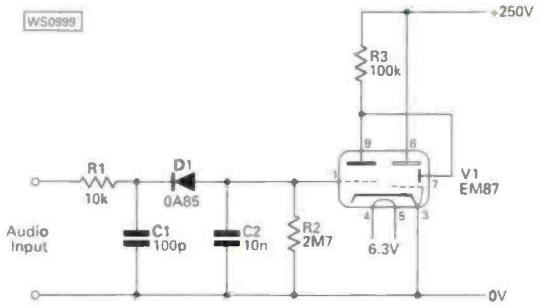


Fig. 5: In normal operation the cathode is operated at or near ground potential while the target will be at 200 to 250V. The triode anode is fed from the same supply as the target but via a resistor.

Just to fool you, depending on how the set's designer has arranged the detector and a.v.c. stages, the magic eye's cathode might be connected to the cathode of the first audio amplifier. It might even be tapped part way up the bias resistor of the output valve. You have been warned!

Magic eye tubes became incredibly popular as audio level indicators in domestic tape recorders. They provided a fast and reliable means of indicating those last few decibels before over modulation occurred.

Mullard's EM87, **Fig. 6**, (incorporating an 'on glass' fluorescent screen) was specifically designed for use in tape recorders and the data sheet shows an almost linear - though inverse - relationship between the length of the shadow and the negative voltage applied to the grid of the triode. An unusual feature of the EM87 is that at large negative grid voltages the shadow can go 'negative' itself!

Visually, the shadow gets shorter until it reduces to nothing. Further increasing the negative grid voltage makes the two columns of light (that were either side of the shadow) actually overlap. The resulting marked increase in brightness at the centre of the target is used to indicate over modulation or a similar overload condition.

The circuit shown in Fig. 5 is typical of what can be found in valved tape recorders. It's easy to build if you want to experiment but note that the sensitivity is rather low by modern standards; it needs about 5V peak to reduce the shadow to zero.

Those of you who want to try adding a magic eye to a radio can substitute an EM84 in Fig. 5; change R3 to 470kΩ and feed the triode grid (pin 1) directly from the set's a.v.c. line. Components R1, R2, C1, C2 and D1 are not required. If you make the addition permanent, please ensure that the set's power supply can provide the additional heater current (0.21A) and h.t. current (3mA).

Fig. 6: Mullard's EM87, employing an 'on glass' fluorescent screen, was specifically designed for use in tape recorders (see text).

Radio Amateur Use

Radio Amateurs, amongst others involved in electrical engineering, found several uses for magic eye tubes. They were sometimes used as modulation indicators in amateur 'phone (a.m.) transmitters.

The indicators were also popular in test equipment; resistance and capacitance bridges frequently used them to indicate 'balance'. Their high input impedance, immunity to overload and sheer simplicity, made them particularly attractive in this type of application.

Finally, how's this for ingenuity? There's at least one design of grid dip oscillator that uses a magic eye tube. The triode is used in the oscillator circuit and the deflection electrode is wired so that the fluorescent screen displays the 'dip'. I bet the designer even used a second hand valve!

Talking of hands, my watch tells me it's time to vacate the premises. So, merry Christmas, happy New Year, and cheerio until it's my turn 'in the shop' again. Please send your comments and letters to me either via the *PW* offices, via E-mail to **phil@oldpark.demon.co.uk** or direct to: **21, Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.**

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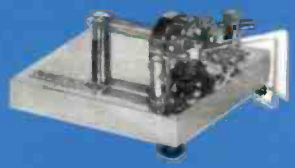

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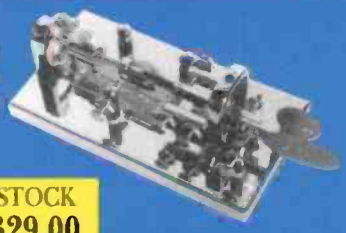

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The First Practical Detector of Radio Waves

The Coherer

Charles Miller, one of our resident 'Valve & Vintage' authors, takes a look at the story behind the Coherer with some interesting historical facts.

Sir Oliver Lodge the "True Father of Radio"?

The coherer was the first really effective practical detector of radio waves. When Heinrich Hertz began to investigate the latter, his transmitter consisted of no more than a glorified induction coil capable of producing electrical sparks and the receiver was even simpler, being merely a miniature spark gap across which tiny sparks occurred in unison with those at the transmitter.

The range of the transmitter was minimal and the receiver inefficient but this did not matter, because Hertz's aim was not to develop a new means of communication but to win a prize offered by his university professor for a successful investigation into James Clerk Maxwell's theories concerning radio waves.

For a number of years, scientists appeared to treat radio as a subject of pure research and didn't grasp the commercial possibilities of being able to send messages without the need for wires. When they did get around to considering this aspect they thought in terms of sending Morse code signals, the dots and dashes easily being obtained by simply interrupting the operation of the induction coil.

"... scientists didn't grasp the commercial possibilities of being able to send messages without the need for wires"

Increasing the range was just a matter of building bigger and better spark generators and the Victorians were good at electrical machines. What was lacking was a sensitive detector that would be able to reproduce Morse code signals either audibly or visibly. Necessity being the mother of invention, along came the coherer. (See **Fig. 1**).

Oliver Lodge

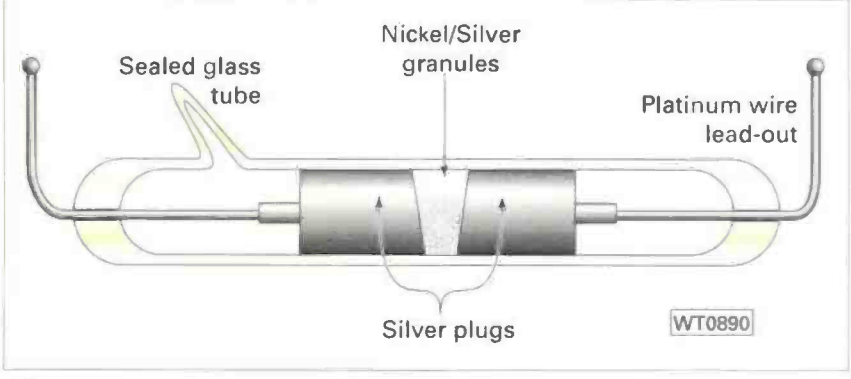
As is often the case with new developments no one person can claim all the credit but the man who perfected the Coherer was the British scientist **Sir Oliver Lodge**. I think it's he who truly deserves to be called the "father of radio" rather than Marconi, who was more the adoptive father. (Much more deserves to be said on this subject!).

During the course of experiments with various kinds of detector, Sir Oliver had noticed that two metal surfaces separated from each other by a very small air gap tended to stick together or 'cohere' when affected by wireless waves from a spark transmitter. This led to 'coherer' being adopted as the generic term for all sorts of detectors working on this basic principle.

Following on from Sir Oliver, a Frenchman called **Branly** made a coherer consisting of a glass tube containing granules of an alloy of 95% nickel and 5% silver, held between two silver plugs. At rest, the device had a high resistance between the plugs but when a signal from a spark transmitter arrived the resistance fell sharply. If, for instance, you connected an electric bell and a battery in series with the thing, the lowered resistance (when a wireless signal arrived) would cause the bell to ring.

Unfortunately, there was a snag. Once the Ni/Ag granules in the Branly coherer had stuck together they stayed that way, so the

Fig. 1: Diagram showing an original type of Coherer.



electric bell would have continued ringing indefinitely. The only way to stop it was to administer a light tap on the coherer with a handy implement, such as a cricket bat or housebrick, which made it 'de-cohere'. This process being a little too tedious if long messages were to be received, the 'self-clouting coherer' was developed.

Old For New?

A good example of old technology being adapted for a new purpose, the 'self-clouting coherer' employed the works of an ordinary electric bell less the contact breaker and gong, the little hammer that usually hits the latter being aligned to 'thwack' the glass tube whenever the operating coils were energised.

The coherer was wired between the antenna and earth terminals (with the necessary tuning coil) and in addition was connected in series with a battery and a relay. The relay contacts in turn were in series with a larger battery and a telegraphic sounder, as used for ordinary wired telegraphy. (As shown in **Fig. 2**).

In the absence of a radio signal, with the resistance between the plugs in the coherer high, the relay and sounder remained at rest. On the arrival of a signal the coherer resistance dropped, the relay operated and the sounder sounded as good sounders should sound. The coils of the modified bell were wired in parallel with those of the sounder so that as soon as it had registered a dot or dash the little hammer struck the glass tube and 'de-cohered' the Ni/Ag granules.

It's said that the the response of this set-up was good enough for reasonably fast Morse signals to be received but there were drawbacks, the most obvious of which was the necessity for an exact balance to be obtained between getting the little hammer to do its work effectively without being over-enthusiastic and shattering the glass tube. In addition the coherer was prone to spurious responses caused by unwanted nearby transmissions and 'atmospherics'.

In the search to obviate the problems, alternative types of coherer were developed. Sir Oliver Lodge found that he could use ordinary iron filings between steel plugs at a considerable saving in cost over the Branly silver and nickel-silver combination. The sensitivity was excellent and the resistance range was impressive - from several thousands of ohms at rest down to a few hundred when a signal was received.

Incidentally, one of the coherers found its way into the South Kensington Science Museum and more than 60 years after it was made, still worked as well as ever when demonstrated in a television programme. Unfortunately, it still had physically to be de-cohered.

Other Inventors

Other inventors took up the challenge of making a fully automatic self-decohering detector. In America an experimenter called **Stone** made one which was employed for a while by the US Army Signal Corps. Using carbon granules sandwiched between steel plugs, it duly self-decohered and was robust, but it suffered from poor sensitivity.

In Italy a certain Naval Officer **Lt. Salari** pointed the way to future developments by replacing granules, either metal or carbon, with a single drop of mercury between steel plugs. The **Italian Navy coherer**, as it became known, was fully self-decohering but failed to become popular.

It was left to Sir Oliver Lodge to produce the definitive automatic coherer, which featured a small clock-work driven, edge-sharpened disc mounted above a little bath containing mercury, on the surface of which floated a thin film of oil. The disc formed one terminal of the coherer and the mercury bath the other, and in the absence of a wireless signal the resistance between them was high, due to the intervening oil film. On the arrival of a signal the oil film broke down and the resistance fell sharply, only to rise again as the disc rotated and the oil film was restored.

The automatic device was built for Sir Oliver by **Alexander Muirhead**, a master mechanic long established in making telegraphic equipment and was made to exceptionally high standards. It was sold commercially and, abandoning Stone, the US Army Signal Corps became an early and satisfied user of what it described as equipment "having beautiful workmanship and extreme reliability".

The Lodge coherer was never bettered and was superseded only when the thermionic valve was perfected. As to what Marconi thought about it - well, that's another story! *PW*

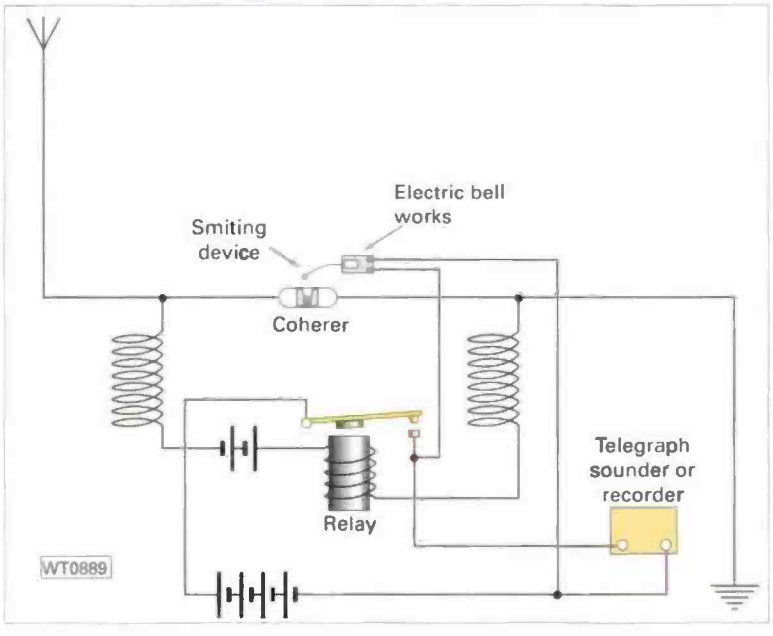
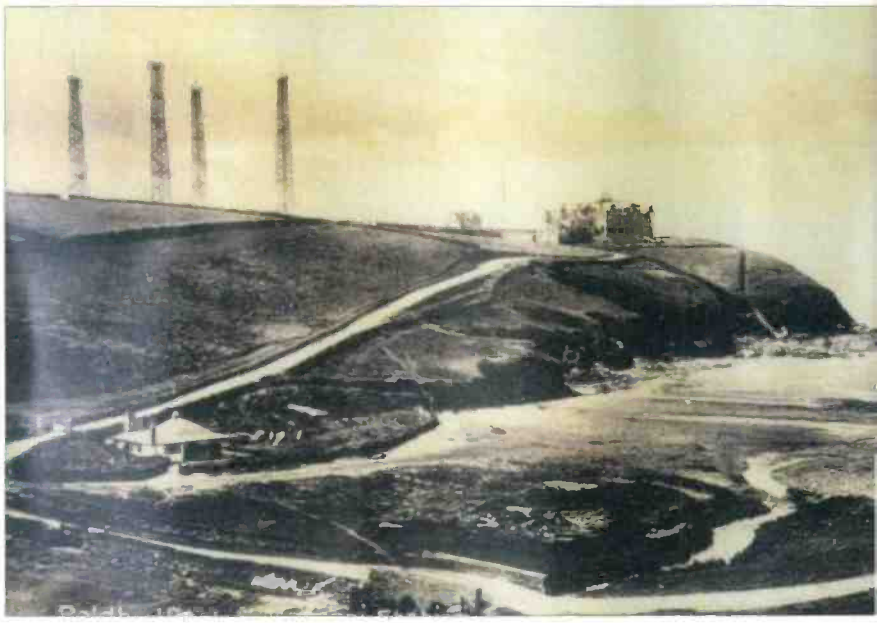


Fig. 2: Circuit arrangement of a coherer.

Poldhu, Cornwall

Cradle Of DX



Cradle of DX - Poldhu Hotel and the Marconi station as shown in a contemporary postcard in 1930.

To round off PW's year celebrating 100 years of Amateur Radio - 'Davey' L. D. Davey-Thomas G3AGA looks back at the history of the pioneering Marconi station at Poldhu on Cornwall's Lizard peninsula.

There can be few radio enthusiasts who, at some time or other, have not read the story of Guglielmo Marconi and the early days of 'wireless'. How, at only 20 years of age, he began his experiments in Italy and developed a system of 'wireless telegraphy' with a range of a few kilometres, a system which he offered to the Italian government only to have it rejected. How, in 1896, he came to Britain where he was well received, prospered and soon set up the Marconi Wireless Telegraph Company.

Towards the end of the 1890s 'wireless' was under development in several countries. There was intense commercial rivalry to build systems which could supplant the wire and cable telegraph circuits then in use.

Most scientists and engineers of that era, knowing that 'wireless waves' were akin to light waves, believed that these waves always travelled in straight lines and would not follow the curvature of the earth. Communication beyond the horizon would therefore be impossible.

However, Marconi had never subscribed to the 'straight lines' theory and the range of his equipment had been increased from a few kilometres in 1896 to well over 100 by 1899.

> "... the transmitter was at least 100 times more powerful than any spark transmitter which had ever been built"

Across The Atlantic

In 1900 Marconi persuaded the board of the Marconi Co. that it should be possible to send signals across the Atlantic - a bold gamble which, if it succeeded, would confirm the Marconi Co. as the world leader in this new technology.

Marconi decided that he needed an unobstructed path to launch his signals across the Atlantic and in July 1900, together with **R. N. Vyvyan** and the Secretary of the Marconi Co. he came to Cornwall and selected two sites to be used for the "great experiment" which, by the way, was carried out in some secrecy.

The sites selected were both on the Lizard Peninsula, one at Poldhu for the high power transmitter site and the other at Bass Point for a low power monitoring station to be used during the development of the former. (Both these sites are now the property of the National Trust). Incidentally, Poldhu is situated some 10km north of the Lizard Point, near the village of Mullion while Bass Point is at The Lizard itself.

Work began on both sites in the autumn of 1900 and the first tests were carried out at Poldhu in January, 1901 - no mean feat when you consider that the transmitter, designed by **Sir Ambrose Fleming**, was at least 100 times more powerful than any spark transmitter which had ever been built. This transmitter consisted of two Poulson arcs in series running at 20kV and it has been estimated that the output was some 10kW. Marconi stated that the wavelength as 366 metres, although there were no accurate means of checking wavelength at that time.

The first long distance test took place in February 1901 between Poldhu and Crookhaven in south west Ireland, a distance of some 360km, using a temporary antenna at Poldhu, because the main system had not yet been built. (This planned main system consisted of 20 masts, each 65m high, in a circle 65m in diameter).

In his book R. N. Vyvyan* (chief site engineer) recalls how he warned that the design of the planned antenna system was mechanically unsafe due to the planned guying arrangement but he was overruled. Once the buildings at Poldhu had been completed Vyvyan was dispatched to Cape Cod, Massachusetts in the USA, to supervise the construction of a similar station, to be used in the "great experiment".

* *Wireless Over Thirty Years* by R. N. Vyvyan.

Almost as soon as the same main antenna system had been set up at Cape Cod it could be seen that the structure was unstable. Vyvyan informed the Company of the danger, but before anything was done a violent storm on the 27th September, 1901, brought down the newly erected masts at Poldhu. Fortunately there were no injuries or damage to equipment but a few weeks later the masts at Cape Cod also came crashing down, wrecking the station building and narrowly missing Vyvyan himself!

Temporary Antenna

Marconi decided to press ahead with a modified experiment using a temporary antenna system at Poldhu. This consisted of two 50m masts (salvaged from the original wrecked antenna system) with a rope slung between them. To the rope was attached a 'fan' of 54 wires.

Fig. 1: The Poldhu antenna system as planned and originally erected for the Atlantic tests in 1901 - wrecked by a storm in September of that year.

Since it was impossible to repair the damage at Cape Cod quickly Marconi decided to take receiving equipment to St. Johns, Newfoundland, where he and his party arrived on 5th December 1901.

The story of the success of the experiment, the famous 'three dots' transmitted from Poldhu which were first received at 1230pm local time on 12th December, 1901, is well documented. Less well known is the fact that the experiment had to be cut short when the rival Anglo-American Telegraph Co., which held the monopoly of telegraph communications in Newfoundland, forced Marconi to close down.

The Canadian government (Newfoundland was not part of Canada at that time) immediately invited Marconi to construct a station on the east coast of Canada and even offered financial assistance. This led to the building of a station at Tablehead near Glace Bay.

In February 1902, Marconi carried out range tests using receiving equipment on board the SS *Philadelphia* in the Atlantic. Signals from Poldhu were received at 1100km by day and 3100km at night - an effect not previously noted.

In the summer of that year the Italian government loaned Marconi a fine naval vessel, the *Carlo Alberto*, for further tests in the Baltic and the Mediterranean. Poldhu could always be received at night but day ranges seldom exceeded 800km. The station continued to be used for tests and in 1902 the old 50m masts were replaced by four wooden towers each 70m high.

Teething Troubles

The Glace Bay station was completed in October 1902 but there were teething troubles and the first official message was not received at Poldhu until 20th December 1902, although contact had been estblished several days earlier. Experimental work continued at the station until 1905.

In 1905 Poldhu took its place as a commercial station (MPD) communicating with other Marconi Co. stations and with ships at sea, transmitting news and weather information for mariners. This role was maintained until the outbreak of the First World War in August 1914.

During the First World War, Poldhu continued to provide a reliable service for shipping, especially for trans-Atlantic convoys. By night it transmitted war bulletins and other official notices.

After 1918 the station continued as a Marconi commercial station until June 1922 when, due to the obsolescence of the equipment, commercial operation ceased. The site then became the Marconi Company's research and development centre.

Short Waves

Although the part played by Poldhu in the 1901 tests is well known, few people appreciate its importance in the development of short wave communication. Prior to 1920 little interest had been shown by professional radio engineers in wavelengths of less than 200m because it was believed that only long wavelengths and high power could deliver reliable communications over great distances.

Marconi appears to have been interested in the short waves as early as 1916 and experiments were conducted by C. S. Franklin and Captain Round for the Marconi Co. in 1920. Additionally, in 1921/1922 a group of amateurs organised tests between the USA. and Britain to see if they could bridge the Atlantic on a wavelength of 200m.

Fig. 2: Hand-coloured contemporary postcard showing a close up view of Poldhu in its later days (see text).

The tests (which were 'one-way') proved successful. In December 1923 short-wave two-way contact was made, by amateurs, between the USA and France. This achievement was largely ignored in commercial circles but Marconi set up a series of tests in 1924 using a transmitter located at Poldhu and a receiving station on board his yacht, *Elettra*.

The wavelength used at first was 97 and later reduced to 32m. Results were impressive, especially when, in September 1924, signals were received at great strength on board the *Elettra* off the coast of Syria, a distance of some 3800km.

As part of the short-wave tests work was in progress to develop 'beam' antenna systems as a means of improving signal strengths and reliability. Early efforts to concentrate radio signals in one direction had used the Beverage, rhombic or 'V' antennas, all of which needed to be many wavelengths long in order to achieve useful gain and directivity. (For example, the antenna at the long wave station at Caernavon in North Wales during the 1920s was 1.5km long!).

Poldhu, under C. S. Franklin's direction, was used to evaluate various beam systems energised by a 20kW transmitter, designed by Franklin. It was used to communicate with the *Elettra* at sea and with other Marconi Company stations world wide.

Fig. 3: Marconi's yacht *Elettra* shown on the GB2GM QSL card. The *Elettra* took part in many of the short wave tests and was obviously a stylish vessel – with a fascinating history of its own.

Imperial Network

In the early 1920s, the British Government decided to implement the Imperial Network (originally proposed by Vyvyan in 1908). This was a network of radio stations to link the parts of the (then) far-flung British Empire. The contract was awarded to the Marconi Co., which proposed to use the short wave beam system developed at Poldhu.

The Imperial Network proved a great success, meeting and exceeding its targets for transmission speed and reliability. Much of the success of the network stemmed from the research and development work carried out at Poldhu.

Pioneer work carried out under Franklin's direction included a parabolic reflector system, in-line arrays on a

Continued on Page 61...

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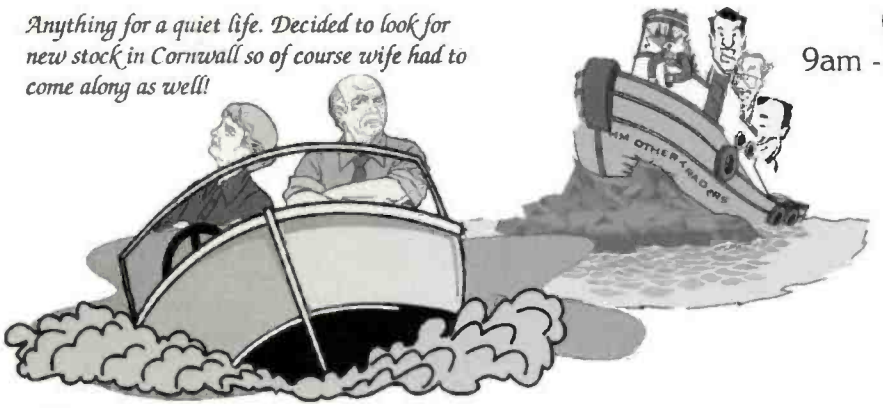

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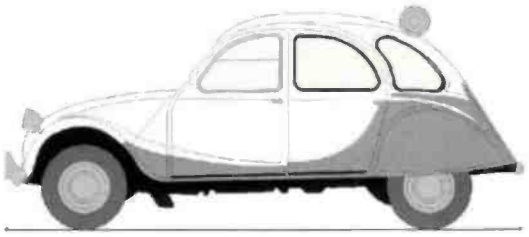

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Continued from Page 59

wavelength of four metres and arrays of multiple dipoles fed in-phase, the basis of the Franklin array. A 'revolving' antenna system was also developed in 1924.

It's also interesting to note that experiments were also carried out on a wavelength of eight metres in the late 1920s. The records show that its signals were received clearly in New York for five hours in each twenty four.

In May 1924 good quality radiotelephony was received in Sydney, Australia, from an improved transmitter at Poldhu. In the same year a commercial service was opened with Cape Tpwn, South Africa on a wavelength of 92 metres. Needless to say, beam antennas were used on both occasions.

Franklin was also the first to advocate the use of a coaxial feeder to drive antenna arrays as an alternative to the commonly used open wire feeders. Much of the success of the Imperial Network stemmed from the research work carried out at Poldhu. Incidentally...Franklin also developed the oscillator which bears his name and remains one of the most stable variable frequency oscillator (v.f.o.) known to radio engineering.

During the recession in the 1930s the Marconi Co. decided to dispense with Poldhu because its continuation solely as a Research and Design centre could no longer be justified, partly on account of its remoteness and somewhat inhospitable location. The station finally closed down in 1933.

Commemorative Pillar

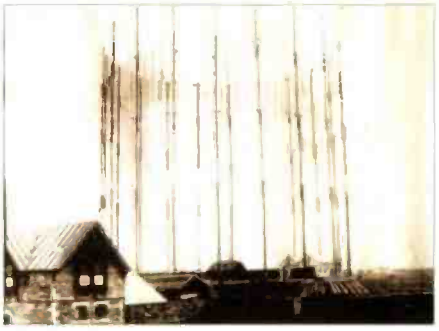
The site remained derelict for several years but in 1937 the station buildings were completely demolished and a commemorative pillar was erected on the site. The four plaques at the base of the pillar record the highlights of the station's history.

The inscriptions on the pillar read: *"One hundred yards northeast of this column stood, from 1900 to 1933, the famous Poldhu wireless station designed by John Ambrose Fleming and erected by the Marconi Company of London, from which were transmitted the first signals ever conveyed across the Atlantic by wireless telegraphy.*

The signals consisted of a repetition of the Morse letter 'S' and were received at St. John's, Newfoundland, by Guglielmo Marconi and his British associates on 12th December 1901. The Poldhu wireless station was used by the Marconi Company for the first transoceanic service of wireless telegraphy, which was opened with a second Marconi station at Glace Bay in Canada in 1902.

When the Poldhu station was erected in 1900, wireless was in its infancy; when it was demolished in 1933, wireless was yet established for communications on land, at sea and in the air, for direction finding, broadcasting and television. From the Marconi Company's Poldhu station, In 1923 and 1924, Charles Samuel Franklin, inventor of the Franklin beam aerial, directed his short wave wireless beam transmissions to Guglielmo Marconi on his yacht "Elettra" cruising in the South Atlantic.

The epoch making results of these experiments laid the foundation of modern high speed radiotelegraphic communications to and from all quarters of the globe. To commemorate the pioneer work done by Guglielmo Marconi and his research experts and radio engineers at the Poldhu Wireless Station between 1900 and 1933 the Marconi Company presented this historic land to the National Trust. Some six acres of cliff land were given in 1937 and forty acres behind the cliffs, on which stood the station and masts, were given in 1960".



The original Poldhu antenna system.

Apparatus In Museum

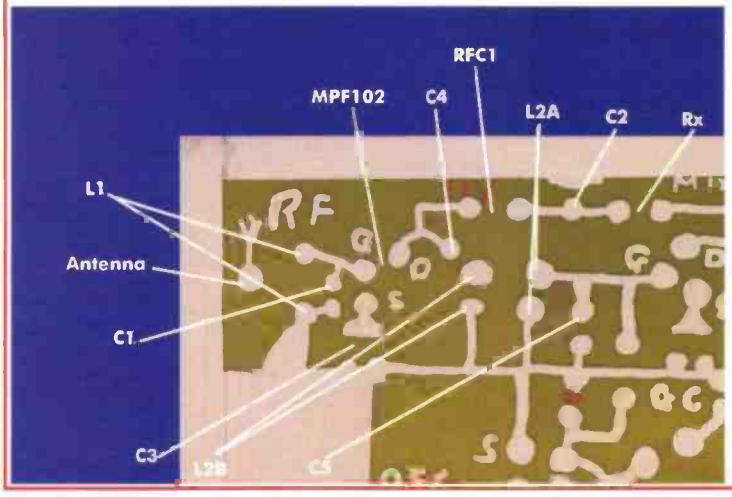
Some of the apparatus used in the early days at Poldhu is now in the museum of the Institute of Electrical and Electronic Engineers in London. Today, the famous site has been returned to grazing land.

Nowadays, the only visible signs of radio are the antennas of the adjoining Poldhu Amateur Radio Club, where visiting amateurs are always welcome on club nights - Tuesdays and Fridays. Licensed amateurs may enjoy operating the Club rigs with the callsign GB2GM or G3MPD.

You'd be more than welcome to join us at Poldhu - the 'cradle of DX'. *PW*

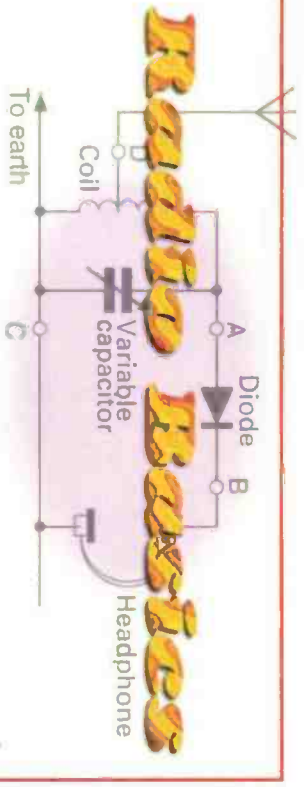
Radio Basics November - Errors & Up-Dates

Up-date & Corrections: Annotated photograph - p.c.b. design for the 'Radio Basics' 3.5MHz to medium wave converter, page 15 November issue of *PW*.



Unfortunately, the annotated photograph in the November issue shows the connections for L2A wrongly. The correct connections are as shown in the reproduced illustration. However, most readers who contacted me on this error (fortunately) were able to complete the project by referring to the circuit diagram. I've also heard from readers who were confused regarding the winding of L3 and L4 and I apologise for not making it clear to readers (bearing in mind the series is aimed at less experienced constructors) that they have to be multi-layer (wound in layers) to achieve the required number of turns. Sorry for the confusion caused.

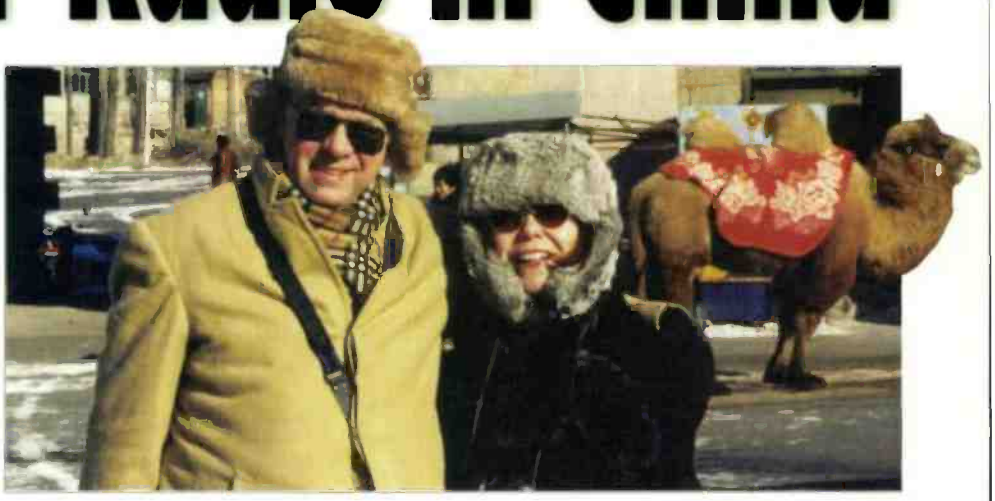
Rob Mannion G3XFD.



Long Johns in Beijing!

Amateur Radio in China

Phil Whitchurch G3SWH takes you through a tour of China from the point of view of the Radio Amateur abroad. From thermal underwear to Chinese food, there's nothing left out about his adventures with radio and Radio Amateurs in China!



Those thermals look as though they must have come in very handy!

We must have been mad to have booked a holiday in Beijing in December 1996, but we did! After we investigated the charts of temperatures and found them to be typically between 10°C and freezing, my wife Jan bought long thermal underwear for us both. Very fetching I can tell you!

Once the novelty of the underwear had worn off, I started to think about the possibility of meeting up with some of the Beijing amateur population and (maybe) operating one of their stations during our visit. With a busy sightseeing schedule and even with an XYL as understanding as Jan, I didn't believe that I would be able to operate for more than a few hours, although the prospect of meeting some 'real' Chinese people appealed to us both.

Chinese Contacts

I contacted Roger G3LQP who had attended the Beijing DX Convention in October 1995 and he gave me a FAX number for the Chinese Radio Sports Association (CRSA). I duly sent a FAX to their Secretary General, Mr Chen Ping BA1HAM and received a reply after some time requesting that I send them a copy of my passport and UK licence together with US$5, upon receipt of which they would issue an Operator's Certificate for Visitors. They also gave me an E-mail address for Mr Yao Shun BZ1LUV, President of the Tsing Hua University Amateur Radio Club station BY1QH. They also kindly sent an E-mail to Shun to introduce me.

I sent the documents by return and arranged to contact the CRSA when in Beijing to pay the fee. I also sent an E-mail to Shun, which was very promptly acknowledged giving a telephone number to contact him when we arrived. As I wasn't sure which (if any) day I would be active, advance publicity was difficult, but I did try to pass the word round the UK DX community beforehand.

We arrived in Beijing at about 0600 local time on 17th December after a nine hour direct flight from Heathrow. It was dark and bitterly cold, but we were soon whisked off to the Shangri-La Hotel and settled in. The hotel really is five star and probably the best I've ever stayed in anywhere in the world.

I'd read some horrendous stories about the Beijing telephone system and after some sleep prepared to do battle. I got through to Shun surprisingly easily and we arranged to meet after lunch on Saturday 21st December, when he would come to the Hotel to collect me and take me to the University campus which is quite close to the hotel. I also telephoned the CRSA and arranged to meet Chen during the morning of Friday 20th.

Fig. 1: The BY1BJ/BY1PK Shack.

Travel around the city is very easy by taxi which is very cheap, costing as little as one or two Yuan (one Yuan is about eight pence) per kilometre, depending upon the quality of the car. Most taxi drivers speak little, or no, English and it is vital to have your destination written down in Chinese characters before boarding the taxi. The Hotel thoughtfully provides cards in both English and Chinese, which makes it easy to get back, but getting to anywhere but the main tourist sites was fraught with problems - and great fun!

Chen also spoke by telephone to the hotel concierge, who wrote down in Chinese the directions to the CRSA offices. He also gave them to me in English. They were extremely complex, because only the main streets in Beijing have names. The five storey building is shared with the administrations of the Sports of Aeronautics and Models under the State Sports Commission of China and is down a back lane or hutong near the junction of Yongdingmendong Road and Tiantandong Road, opposite the International Tennis Centre.

However, I was sure the taxi driver had taken us to the right place when I spotted the large array of h.f. antennas of BY1PK on top of the building. Jan and I were greeted by Mr Wang Xinmin BA1OK, Deputy Secretary General of CRSA, who introduced us to Chen and his delightful assistant Miss Cao Huicong.

My Operator's Certificate was already made out. I paid my $5 and was then invited to operate. I declined this kind offer as I had planned only to talk to Chen and Wang about the current state of Amateur Radio in China during this visit and we were planning to visit the nearby Temple of Heaven afterwards.

Membership Increase

The CRSA now have a membership of over 6000, an increase of some 3000 since 1994. Apart from about 110 club stations, there are now about 500 home stations, 26 of which are in Beijing. But only about 50 or 60 of these hold licences with h.f. privileges, the remainder being v.h.f. only. Prior to 1992, only club stations were permitted, but it is now official policy to encourage the setting up of home stations. However, many operators do not speak English well and prefer to talk to each other on 144MHz.

Equipment is a major difficulty as individual wages are

Continued on Page 65...

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Continued from Page 63

unbelievably low by Western standards and the cost of imported, Japanese transceivers consequently is prohibitively high. There is some surplus military equipment of 1960s vintage which can be modified and some home brew kits available. All must then be submitted to the Radio Regulatory Commission for checking prior to use.

The club station of the CRSA, BY1PK, is housed in the same room as BY1BJ, the club station of the Beijing RSA (see **Fig. 1**). The equipment was mainly donated by Japanese, Canadian and US people and consisted of a Trio R-1000, an Icom IC-781, Kenwood TS-711A, TS-811B, TS-670 and TS-940S with HL-200A and Drake L4B amplifiers along with many peripheral items such as power meters, TNCs and rotators. There are a variety of antennas on the roof, including several yagis and caged dipoles, but I understand that they suffer badly from TVI problems.

QSLing China

Unfortunately, Chinese club stations suffer from the same problems as do many club stations worldwide: many enthusiastic operators and no-one responsible for, or prepared to deal with, the incoming QSL cards. Chen explained that when there were only a few club stations QSLs were not a major problem. There is no QSL bureau as such and with the sharp increase in the number of active stations, a huge backlog has accumulated at the CRSA. A bureau is being organised, but it is a low priority.

Outgoing airmail postage is relatively expensive at about five Yuan - equivalent to a five kilometre taxi ride! Chen recommends DXers to QSL the individual station's home address direct with IRCs or US Dollars. Incoming mail is claimed to be fairly secure from theft, but mail to BY1QH is opened by the University authorities and any currency removed. However, IRCs are safely delivered with the cards.

Chen announced that the next expedition to Scarborough Reef BS0H, was being planned for April/May 1997. The CRSA have formed a liaison with a Chinese oceanographic institute who regularly visit the area and who can provide transport at sensible cost.

As arranged, Shun BZ1LUV collected me from the hotel the following day. Jan decided not to come to the University, but we invited Shun and his girlfriend to come out to dinner later and show us some 'real' Chinese cuisine.

Shun is fluent in English, including slang! He is an engineering student specialising in fibre optics and just about to start on his thesis. Looking for sponsorship to attend a University in England or the USA, he is in touch with 29 colleges. He was born in Guangzhou (Canton) in the south, where his father is a nuclear physicist. He also told me his name was pronounced Sean (as in Connery).

Second Largest University

Tsing Hua University is the second largest of 15 Universities in Beijing, having about 20 000 students. The Chinese name is Qing Hua, hence the BY1QH callsign. The station is located on the fourth floor of a dormitory building on the campus, with yagi, cubical-quad and wire antennas mounted on the roof (see **Fig. 2**). Shun occupies the room next door. Although there are 11 members of the club, only four of whom are active, I didn't meet any of the others.

Since it is the University club station, the operators change but the equipment, antennas and location stay the same. Unfortunately, much of it is suffering from lack of maintenance: the cubical-quad for 14, 21, 28MHz had been damaged in a gale and never repaired and all of the several amplifiers were faulty for lack of spares.

Shun explained that the club only gets 1000 Yuan (about £70) per year towards its upkeep, so I was pleased to make a donation to their funds. Since returning, I've learned that the yagi has been damaged in another storm. Shun has promised to repair it, but they are now only active on 1.8, 3.5, 7 and 144MHz.

The h.f. rig is an Icom IC-750A, running 100W of c.w. and which has a built in electronic keyer. There was an interface problem with my trusty and well travelled Vibroplex mechanical bug. I've never learned to use an electronic keyer and a quick look at the manual failed to tell me how to switch the keyer off, so I wound the speed down and set the gaps wide on the Bencher paddle.

A 486 computer in the shack runs *Windows* and *LOG-EOF* as a logging program, which is the same as I use at home, although a much older version without keyboard generated c.w. I thus brought the log away with me on disk rather than paper. The Operator's Certificate ruled that the callsign to be used should be "the home call of the holder followed by '/' and the callsign of the operating station (e.g. WA1AA/BY1PK)". I bent this rule slightly and used BY1QH/G3SWH.

A few minutes practice with Bencher 'off the air' gave me enough confidence to turn the four element monoband yagi towards Europe and put out a CQ on 14025kHz at 0640UTC (1440 local). I was immediately answered by OH2BLV, followed by SP3NA. I must confess that I was looking forward to being on the end of a big pile-up, but conditions were poor, the noise level high and demand surprisingly low. I only worked 56 stations in the first hour, with just less than half being Japanese.

The first G was Fred G4BWP at 0832UTC, following up an earlier Packet Cluster spot by ON5UK. A few more Gs followed before the band began to die at local sunset, being completely dead by 0930UTC. I then wanted to try 10MHz, but Shun has no antenna, so we moved on to 7002kHz with a sloping dipole facing north. The first CQ produced a pile-up of Japanese and I worked 67 stations in a matter of about 40 minutes. Unfortunately, time was running out as I'd promised Jan that we would be back between 1800 and 1900 local time. Shun's Finnish girlfriend Marike arrived promptly at 1830 and I had to close down with 182 QSOs in the log after a total of three and three quarter hours operating.

Marike also speaks excellent English and is studying anthropology and learning Mandarin, the main Chinese dialect. The three of us went back to the Shangri-La to collect Jan and go for a drink whilst I got changed.

Fig. 2: Yagi, cubical-quad and wire antennas mounted on the roof of Tsing Hua University BY1QH.

Fig. 3: Eating Out! Phil G3SWH and his wife Jan visit a Cantonese Restaurant with Shun BZ1LUV and his Finnish girlfriend, Marike.

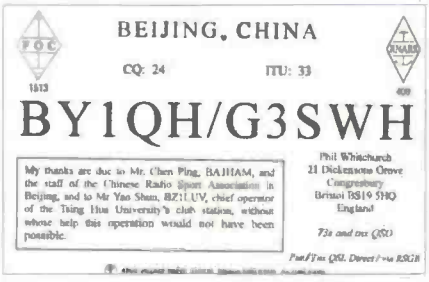


Fig. 4: Phil G3SWH's QSL card.

Authentic Cantonese?

Shun took us to an authentic Cantonese restaurant where Jan and I caused great consternation by asking for forks (see **Fig. 3**). We had a wonderful meal with century eggs, jellyfish, chicken soup, aubergines and several delicious but unidentified dishes, all carefully selected by Shun so as not to offend our Western palates and washed down with Chinese beer.

The bill for the four of us was about £25. Despite a Master Card sign clearly displayed in the window, the staff refused point blank to take mine, so I paid cash. We parted at about 2200 and took a taxi back to the hotel after one of the most memorable days of the holiday.

Special QSLs have been printed and are available either direct (G3SWH QTHR in any callbook) or via the RSGB bureau. (See **Fig. 4**).

PW

Thanks!

My thanks are due to my wife Jan, to Mr Chen Ping and the staff of the Chinese Radio Sports Association and to Yao Shun of the Tsing Hua University's club station, without whose help this operation would not have been possible.

Qualifications in China

Qualifications for an amateur licence in China consists of a written examination on Regulations, procedures and technical matters leading to three classes of licence:
Class 1 - requiring Morse code at 70 characters per minute (approx. 14 wpm) and allowing full h.f. privileges and 500W.
Class 2 - requiring Morse code at 50 characters per minute (approx 10 wpm) with restricted h.f. privileges and 100W.
Class 3 (h.f.) - requiring Morse code at 40 characters per minute (approx 8 wpm) with limited h.f. privileges and 10W.
Class 3 (v.h.f.) - requiring no Morse code, having no h.f. privileges and a 3W power limit.
There is also a **Class 4** licence for SWLs only.

Callsign prefixes designate the class of licence held, e.g. BA is Class 1, BD is Class 2 and BG is Class 3. The letters 'BY' designates a club station and 'BZ' is for the personal identification of club station operators. There is no written power limit for club stations, but this is normally less than 1.5-2kW.

The country is split up into ten geographical call areas on the same principle as the USA. e.g. '1' is the Beijing municipality - an area the size of Belgium; '4' is Shanghai and the east coast; '7' is in the south and '0' is Tibet and the west.

ELECTRONICS IN ACTION

Welcome to Electronics-in-Action (E-i-A), a section of *Practical Wireless* devoted to the very wide subject of electronics. And you the reader dictate the direction and topics that are covered in this section.
In this month's topics I shall be dealing with modifications to a solder iron control stand that featured in an earlier issue of *PW*, looking further into the working of those glass 'bottles' (valves) that people still find interesting (myself included) and looking at a few books for Christmas.
I've discovered the winner of a previous Tex's Conundrum. As in the last issue of E-i-A I didn't have space to include Tex's Conundrum, in this issue you will find a fiendish one to keep you busy over the Christmas holiday.

Safer Soldering

In the July 1998 issue of *PW* there was an article titled 'Safer Soldering' by **Walter Farrar G3ESP** in which Walter described a 'home-brew' soldering iron stand to give you somewhere safe to put the soldering iron down when not in use. Along that vein, I've had letters from both **Chas Reynolds GW3JPT** and **Michael Turnbull G7PWL** both outlining exactly the same improvement on Walter's idea.

Both Chas and Michael suggest putting another switch, with a 1N4007 diode in parallel, in line with the live connection to the iron, as shown in **Fig. 1**. The switch, which is a 'push-to break' type is mounted on an arm that supports the soldering iron when it's not in use.

Fig. 2: Chas GW3JPT has produced a complete soldering station as shown here.

The action of this new combination is to put the diode in circuit when the soldering iron isn't being used, thereby reducing the power of the iron. Reducing the power of the soldering iron (by removing one half-cycle of the mains power) has the effect of reducing the damaging effect of overheating that these simple iron types are prone to.

When the overheating is reduced the tip lasts longer and doesn't stick in the barrel of the soldering iron heating element. I've lost count of the number of simple soldering irons I've had to discard with this failing. In use, you just need to wait a few more seconds to allow the bit to come up to temperature before using the soldering iron.

Well done both of you for that simple, but elegant idea. And I have to add that I would have had trouble deciding which one of you should get this month's prize *PW* Book-Voucher, other than Chas went just a little bit further in his modification. Have a look at the picture of **Fig. 2**, where you will see a photograph of the solder iron sent in by him.

Chas has turned his into a complete soldering station, with not only his version of the soldering iron control box, but the soldering iron rests on an (power switching) arm with a safety shroud made from a short length of copper pipe. Also on the unit is a solder reel holder, a damp sponge holder and a small tin of tip cleaning flux. (The ultimate in home-brew solder stands I would say).

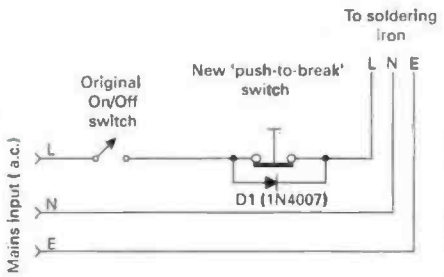


Fig. 1: This modification will reduce power to the soldering iron when not in use (see text).

Back To The Valves

Now it's time to return to the comparison between semiconductors and valves. Back in the August 1998 issue of E-i-A, there was a question asked 'if semiconductors could be used to replace some or all of the valves in a CR100 receiver'? Part of the answer was provided by an article in *QEX* and in *Short Wave Magazine* in the past and I started to outline the way valves work in the October issue of E-i-A. Now to go further!

As described on pages 59 and 60 (October 1998 *PW*, valve work on the attraction, towards the positive anode, of a cloud of electrons from a heated cathode element connected to the negative side of the power supply. And, like semiconductors, there are many types of valve available (though there's no equivalent of the *pnp*-style of operating as there is in semiconductors). Valves are simply classed as the number of elements involved (cathode, grids and anode total).

Simple Diode

The simplest is the **Diode** which has only a cathode and an anode, and like a semiconductor diode current flows in one direction only. The only controlling influence on the current flow, is that the anode should be more positive than the cathode for current to flow. I've not shown the diode in the symbols of **Fig. 3**, but imagine the triode on the left hand side without the grid inside. Adding a controlling grid (g1) gives a degree of control over the amount of current flowing (see p59 Oct '98 *PW*. Adding this new grid turns our diode into a **Triode** (three elements), now both anode-cathode voltage and grid-cathode voltage can vary the current flowing through the valve.

Adding a further grid (g2) the triode produces the **Tetrode** (four elements). This grid was added in an attempt to reduce the effect that the anode-cathode voltage had on the current flowing in the valve. It worked, after a fashion, but created a curious negative resistance curve in the valve characteristics, which could make the designer's job very difficult.

After a little head-scratching by the scientists, another grid (g3) was added into the valve to remove the negative resistance effect present in the tetrode, turning the valve into a **Pentode**. The pentode has a high and stable gain, works over a wide frequency range and is, in 'straight' valve terms the simplest 'ultimate amplifying' valve.

There are two symbols shown for the pentode, one with g3 internally connected and, on the far right, the pentode with the connection to g3 brought outside the valve. The internal connection is common in many pentodes as it is usual to connect g3 to the cathode in many circuits anyhow.

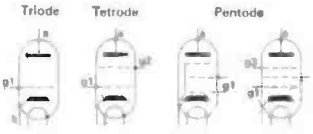


Fig. 3: Circuit symbols for various valves (see text).

There are other valves with as many as six grids in between the cathode and anode, but these fulfil special purposes such as signal mixers and display devices. However, I do not propose to go into those devices just yet.

Equivalent Circuits

Let's now look (in general terms) how the valve and semiconductor circuits are equivalent. In **Fig. 4** you can see the circuits of simple amplifiers. On the left is a junction f.e.t. and on the right is a triode valve circuit. As you can see they are remarkably similar, they differ only in the valve has a supply voltage of around 250 volts as opposed to the f.e.t.'s much lower supply of 12V.

The amplifiers shown in Fig. 4 have the common feature that the input signal (on the gate of the f.e.t. and g1 of the valve) directly control the current through the device. Shown in **Fig. 5** are the broadly equivalent amplifiers with a dual-gate f.e.t. on the left, and a pentode based amplifer on the right. In spite of the voltage differences, don't they look similar?

Curve And Points

Now let's have a look at using the curves to work out gains and operating points, and for this exercise I'm going to

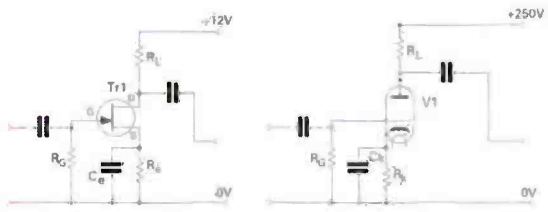


Fig. 4: Valve and f.e.t. amplifiers can look remarkably similar.

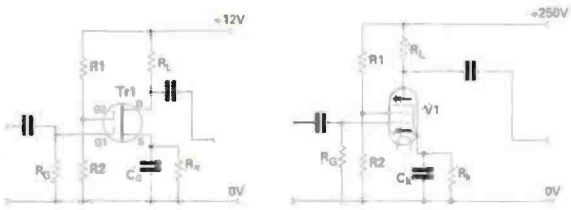


Fig. 5: Comparing a dual gate f.e.t and a pentode valve as amplifiers.

look at the valve amplifier of Fig. 4, using typical valve voltage/current (v/a) curves. I shall start by assuming a supply voltage of 250V. On the anode v/a curves shown in **Fig. 6**, I've marked the maximum voltage and the maximum current. These two points I've joined by the line marked out in green.

I also assumed that, at the quiescent (or no signal) voltage points the anode voltage will be around 125V. This equates to a standing current of around 2.5mA through the valve. Now immediately I know what value the anode load resistor R_L should have, because 125V must be generated across it when 2.5mA flows through it:

$$V = I \times R \quad \text{or} \quad R = \frac{V}{I}$$

$$\therefore R_L = \left(\frac{125V}{2.5mA}\right)\Omega = \left(\frac{125}{0.0025}\right)\Omega = 50k\Omega$$

Now turning to the grid voltage/current curve shown in **Fig. 7**. Draw a horizontal line from the current scale to meet the curve (shown in green), then at that point drop a vertical line to the voltage axis. On the curve used here this equates to about -1.5V on the grid. Now again from these two values I can work out what value the resistor R_k must be:

$$V = I \times R \quad \text{or} \quad R = \frac{V}{I}$$

$$\therefore R_L = \left(\frac{1.5V}{2.5mA}\right)\Omega = \left(\frac{1.5}{0.0025}\right)\Omega = 600\Omega$$

These two quick calculations have given us the operating points and let's now look graphically at what the gain might be. In Fig. 7, I've shown the quiescent operating point of the grid-cathode voltage (I shall assume that the effect of the bypass capacitor C_k is enough to keep this 'constant' to a.c.), and I'll show a 1V peak-to-peak (p-p) signal swing on the grid.

Tracing the corresponding points on the current axis of Fig. 7, shows a range of 2-3mA in absolute terms, which you then transfer to the anode v/a graphs. Plotting the 2-3mA points on the anode v/a graph, show corresponding values of

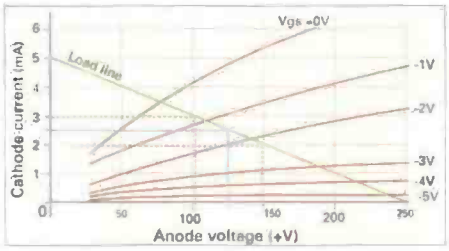


Fig. 6: Plots of the valve current when anode-cathode voltage is varied (grid-cathode voltage kept constant).

150 and 100V respectively. So, from graphical methods the gain of this amplifier stage is around 50V out for a 1V signal (this we can write just as 50, or as 50V/V).

The actual gain of our valved amplifier isn't quite 50, because we haven't taken the ra figure of the valve into consideration. The ra (or dynamic anode resistance) of the valve appears effectively in parallel with the load resistor R_L, as shown in **Fig. 8**. Now if we take this into account the *effective* load resistor R_{eff} is much lower.

I have estimated that the ra of a valve with the curves shown here would be about 100kΩ (explained on page 59 Oct '98 *PW*) and so the gain will be lower because Reff is lower than RL (Reff will be around 33kΩ, lowering the gain to around 33). As triodes have lower values of ra than pentodes (or tetrodes), that's why they also have lower overall gain figures and more distortion.

For this technique to be anywhere near accurate you must have some idea of the parameters of the valves you are dealing with and these may be found in manufacturer's data sheets. As these are difficult to find we have to make do with the minimal information that is available in the form of valve data books, such as the series *Radio Valve Guides*.

There are five books in the *Radio Valve Guides* series along with a comprehensive equivalents book in the *Handbook Of Radio TV Industrial & Transmitting Tube And Valve Equivalents* books. In these small books may be found a large amount of valve data very cheaply. I can thoroughly recommend them to you for inclusion in your library.

Book Service

I've been looking at some of the books that came into the *PW* Book Service recently and many of them would make ideal Christmas presents (for yourself or someone else). From **Joel Kleinman N1BKE** and **Zack Lau KH6CP/1** comes the new *QRP POWER* book in a soft-backed (almost) A4 size. Produced along the lines of the ARRL handbook, the six sections of this book deal with QRP itself, construction practices, transmitters, receivers, accessories and components. The simple circuits are there (including valved sets) as well as some more complex modern designs. Very good reading.

ELECTRONICS-IN-ACTION REVIEW! ELECTRONICS-IN-ACTION REVIEW! ELECTRONICS-IN-ACTION REVIEW!

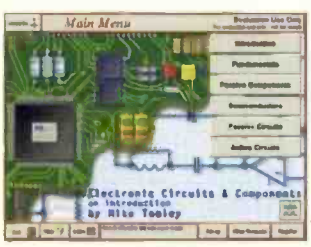
Two From Tooley

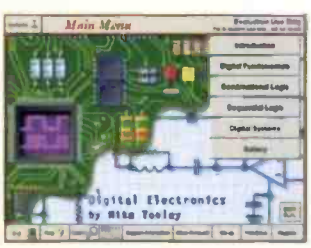
As it's nearly Christmas, and many of you may be contemplating buying yourself a new computer (perhaps someone has promised you one) you may be looking round to see what can be done with it. After all the needless worry of 'should it be Windows-95 or Windows-98?' you may like to look into what else can be run on your new machine.

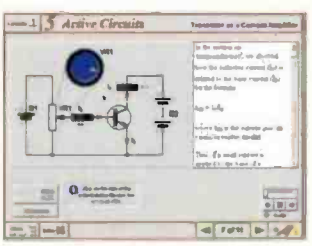
One of what I consider to be the best of the capabilities of a computer, is the ability to run software (programs) that can be used as a teaching aid or as a reference library. I've had the opportunity recently to play with some CDROMs from Matrix Multimedia that can be both reference and teaching aid.

Two of the CDROMs are by Mike Tooley who is well known as an author of electronic reference books and electronic projects. I took time to look at *Digital Electronics*, and *Parts Gallery & Electronic Circuits & Components*, both of which really need a reasonably well specified IBM PC (or clone) with a CDROM player (obviously) and a sound card. They both run on the bottom end specification PCs available today.

The programs install easily and quickly leaving you with a 'point-and-click' interface that is pleasant and simple to navigate around with. In *Parts Gallery & Electronic*







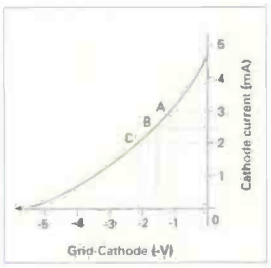


Fig. 7: The variation of cathode current when the grid-cathode voltage varies (anode-cathode voltage is kept constant).

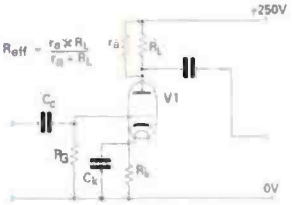


Fig. 8: Considering the dynamic anode resistance (ra) of the valve, lowers the overall stage gain (see text).

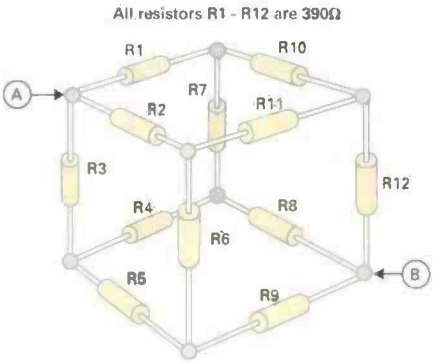


Fig. 9: The resistor cube question from Frank G4MLL (see text).

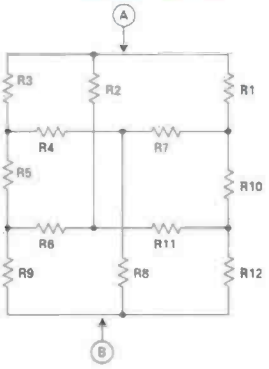


Fig. 10: Redrawing the diagram of Fig. 9 may make the problem more recognisable (see text).

From the Babani stable comes two books, one by **R. A. Penfold**, the other by **Owen Bishop** on the practical side of the hobby. Owen Bishop's *Getting Started in Practical Electronics* is almost 190 pages of advice, good ideas and general building techniques and projects. The first third of the book deals with 'The Essentials Of Electronic Construction in five chapters. The second 'half' of the book details some 30 projects to build, helping you to put theory into practice. This is an excellent beginner's book.

From the prolific Penfold pen (word processor?) comes *Electronic Project Building For Beginners*. This book is in many ways complimentary to Owen Bishop's book, as it deals with the practical side of building a project. It details the recognition of components, what tools do you need and how to use them effectively. Although there are projects within the book they take 'a back-seat' to the methods of building them. This is also an excellent beginner's book.

The Maplin Electronics Catalogue is a common sight in newsagent's shelves, and from Newnes come a book, *Power Supply projects*, bearing the Maplin name. The book features four sections called Laboratory Power, Chargers, Inverters and Miscellaneous. There are p.s.u. for all needs including a valved amplifier p.s.u. If you were at the Leicester rally recently then you should find the fluorescent tube inverter useful. With the Maplin name to this book there should be no problem with components.

This is as much as I have room for this month so, let me now turn to the subject of Tex's Conundrum.

Missing Winner

I had a FAX from the excited 'missing' winner of Tex's Conundrum No 3. The FAX was followed up by a letter from **Flavio Rossi PU3AMB** in Brazil, apologising for his poor English. My congratulations on winning Flavio. I've passed your Book token on to Michael to hold, on your behalf, until you decide which book you would like to get from the *PW* Book Service.

Now for a fiendish conundrum to keep you occupied over the whole of the Christmas holiday. This one is courtesy of **Frank Whitehead G4MLL** who sent it in. The circuit shown in **Fig. 9** is, as Frank drew it, but I've redrawn it, **Fig. 10**, to make it a bit simpler to understand. The question, as posed by Frank, is: What is the total resistance between points A and B if each of the 12 resistors is 390Ω?

Oh by the way Frank, I think I should tell you that you have to provide the specimen answer for the readers! As it's a bigger question, I think that I will make the closing date for this one by first post January 6 1999. See you in the next issue of E-i-A.

Tex

ELECTRONICS-IN-ACTION REVIEW! ELECTRONICS-IN-ACTION REVIEW! ELECTRONICS-IN-ACTION REVIEW!

Circuits & Components, there are many photographic quality images of components to be viewed. This allows someone just starting in the hobby to learn to recognise the components.

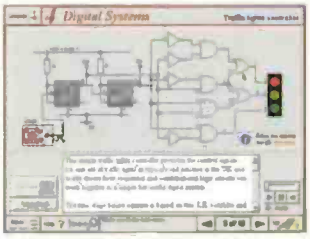
A nice touch is that most of the text blocks displayed within the program may be 'played' out as speech. So, for members of a group viewing the screen, or for those whose sight isn't of the best, this could be an ideal solution. The speech is a well spoken digitally stored man's voice rather than a computer generated voice. Obviously a sound system or card must be fitted to enable this facility.

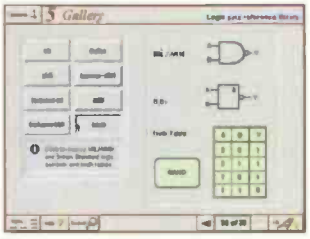
The *Parts Gallery & Electronic Circuits & Components* CDROM deals, as its name suggests, with all the parts and components that most hobbyist would need to know about in a clear and logical way. But this CDROM also deals with the fundamentals of electronics in a similar way - that is clearly and logically.

Many sections of the fundamentals have 'measurement experiments' to carry out. In a section dealing with transistors, for instance, there is an interactive 'control' to alter base current in a displayed transistor. Rotating the 'knob' with the mouse shows a varying base current and at the same time the collector current may be seen to be altering.

The *Digital Electronics* CDROM uses the same manner of displaying information on screen with Digital fundamentals, Combinational logic, sequential logic, Digital systems and a parts and component galley available on screen. Again there is the ability to 'speak' the text out loud for clarity and to carry out digital experiments and view the results.

There are other CDROMs in the series and I'll be looking at at least one of these in the next E-i-A column. My impression of these two that I've looked at so far, is that they are excellent! Both of these two programs on CDROM are very good, both as teaching aids and as parts of a reference library. They both could be very useful things to do with that new computer. **G1TEX**





* Both available from the *PW* Book Service.

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HF TRANSCEIVERS

Yaesu FT-757GX Mk I - boxed £440
Yaesu FT-980 + mic/lead/H'book £799
Yaesu FT-101ZD MkIII + FC-902/FC-902/FTV-901R inc. 2/6m modules £799
Icom IC-706 MK I - complete ..... £TEL
Kenwood TS-530 + SSB & CW filter £350
2 x Icom IC-765 - v.g.c ..... from £1300
Kenwood TS-520 + book/mic/lead £200
Kenwood TS-930 - boxed £899
Yaesu FL-2100Z HF Linear £495
Kenwood TS-830M £350
Kenwood TS-180S + PS-30 - boxed ..... £TEL

MOBILE/BASE VHF/UHF TRANSCEIVERS

Alinco DR-112 + book/mic £150
Yaesu FT-780R - boxed £250
Icom IC-229 + bk/mic/lead £225 DOWN TO £199
Kenwood TW-4100E + mic/mb/lead/book £225
Kenwood TS-711E - boxed £450
Yaesu FT-290RII - boxed £275
Yaesu FT-290R I £225
TS-770E + mains lead ..... £TEL
Kenwood TM-401A (10 watt output) - boxed £175
Icom IC-821H - immaculate condition ..... £TEL
AKD-6001 - boxed £100
Trio TR-2400 ..... £90
Kenwood TW-4000 ..... £225

RECEIVERS/SCANNERS

Yaesu FRG-8800 + FRT-7700 ..... £499
Drake R-8E - v.g.c £650
2 x Icom IC-R71E ..... £TEL
Regency MX-7000 - boxed ..... £TEL
Yaesu FRG-7700 +ATU & Memory £325
2 x AOR-7030, both in immaculate condition ..... £TEL
Icom IC-R7000 £699 DOWN TO £625
Icom IC-R7100 £800 DOWN TO £699
AOR AR-8000 boxed £199
Icom IC-R1 - boxed £125

HANDHELDS

King KX-99 Airband Transceiver £250
Icom IC-2SET £199
Icom IC-X21ET £225
Standard C-508A Dualband Transceiver £175
Kenwood TH-41 ..... £90

MISC.

Tokyo HL-66V 6m Linear, 8-15 in/60 out £125
Welz SP-200 SWR Meter - boxed £90
2 MFJ-784 DSP Filters ..... £TEL
NB-80R 3 in/60 out 2m Linear ..... £TEL

SHORTWAVE SHOP
01202 490099

HF TRANSCEIVERS

Alinco DX70 c/w EDX-2 Auto ATU (U/G) £725
Heathkit HW101 HF TXCVR No PSU £35
Kenwood TS850SAT 100W HF with ATU £795
Trio TS130S HF & WARC 100W Base HF £295
Trio TS130V HF & WARC 10W QRP + VFO120 ..... £295
Yaesu FT-847 ALL BAND ALL MODE BASE! £995
Yaesu FT707 Basic HF with VFO and PSU £395
Yaesu FT77 Basic HF with FM Board £225

VHF/UHF

Icom IC2350H Deluxe 2/70 Hi-Power Mobile £335
Icom IC281H 2M Wide RX FM 50W Mobile £275
Kenwood TM751E 2M Multimode Mobile 25W £345
Kenwood TH28E Full Feature 2M H/Held £135
Trio TR9130 2M Mobile Multimode 25W £295
Trio TR2500 2M FM Handheld £75
Yaesu FT480R 2M Multimode Base 10W £225
Yaesu FT708 70cms H/Held + NC8 Charger £115

RECEIVERS

B40 Marine HF Receiver VGC £85
FDK-TM56B VHF FM Crystralled Receiver £35
Heathkit SB301 HF Receiver £85
Lowe HF150 Compact Gen Cov Rx with Keypad £295
Lowe HF150 Compact Gen Cov Rx with Keypad £325
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Yaesu FRG7700 Gen Cov RX with Mem Unit £225
Yaesu FRG7700 Gen Cov RX £195
Yaesu FRG100 c/w Narrow CW, FM & PSU £395
Yaesu FR50B Valved HF Receiver £85

SCANNERS

Alinco DJ-X1E Compact 100Ch H/Held £135
Belcom AMR217B Marine Scanner £50
Fairmate HP100E 1000Ch H/Held Scanner £115
Lowe FS10 10Ch Marine Scanner £75
Opto Interceptor 30MHz-2GHz H/held £135
Realistic Pro2004 300Ch VHF/UHF Base £115
Realistic Pro60 200CH VHF/UHF/AIR Scanner £125
Realistic Pro38 10Ch FM H/Held Scanner £45
Realistic Pro37 200Ch VHF/UHF/AIR Scanner £75
Standard AX700 50-905MHz with Scope £295
Uniden Bearcat 120XLT 100Ch VHF/UHF £115

MISCELLANEOUS

Adonis AM508 Ex-Demo Base Mic £55
AEA PK232MBX M/Mode Data Terminal £149
Datong VLF Converter £15
Diamond SX-400 VHF/UHF 200W SWR Meter £59
Diawa CNA1001 - Auto ATU £145
Diawa AF606K Active Audio Filter £75
Hansen FS210 1.8-150MHz SWR Meter £35
Kent CW Key £25
Microset R432-90 - 90W 70cms Amplifier £199
Microwave Modules 30W 70cms Amplifier £95
Microwave Modules 144/28 RX Converter £10
Mutek SLNA 144s 2M Preamp £35
Scopex 4S6 6MHz Scope - As New £65
SEM Tranzmatch HF ATU £65
Tokyo Hy-Power HX240 - 2M->HF Transverter £145
Yaesu FRV8800 Internal VHF for FRG-8800 ..... £75
Yaesu YM-49 Speaker Microphone (FT290) £20
Yaesu FMP-1 Message Processor (FT736) £35

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HF TRANSCEIVERS

ALINCO DX-70(T) (BOXED) AS NEW £525
COLLINS S-LINE, AS NEW, COLLECTORS EQUIPMENT £689
ICOM IC-725 AS NEW £479
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ICOM IC-729 HF+6 AS NEW, BOXED £635
ICOM IC-735 AS NEW (BOXED) £499
ICOM IC-735 BOXED AS NEW £499
ICOM IC-737 BOXED £599
ICOM IC-737 BOXED AS NEW £625
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ICOM IC-738 (BOXED) £499
ICOM IC-740 GREAT CONDITION £385
ICOM IC-751 GREAT PERFORMER £469
KENWOOD TS-430S GREAT VALUE £385
KENWOOD TS-440SAT WITH ALL FILTERS £559
KENWOOD TS-440SAT WITH FILTERS £569
KENWOOD TS-520S+DG5 DIGI DISPLAY AS NEW £295
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KENWOOD TS-680S HF + 6 METERS £479
KENWOOD TS-680S HF + 6 METERS £525
KENWOOD TS-690SAT HF+6+ATU £649
KENWOOD TS-850SAT AS NEW, BOXED £869
KENWOOD TS-850SAT AVERAGE CONDITION £699
KENWOOD TS-850SAT BOXED £799
KENWOOD TS-940S GREAT CONDITION £695
KENWOOD TS-940SAT IMMACULATE £825
KENWOOD TS-940SAT AS NEW GREAT VALUE £899
TENTEC CORSAIRmkII IN GREAT CONDITION £499
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YAESU FT-747GX GREAT VALUE HF SET £329
YAESU FT-747GX GREAT VALUE HF SET £349
YAESU FT-747GX GREAT VALUE HF SET £355
YAESU FT-767 WITH ALL MODULES 6/2/70 ..... £789
YAESU FT-890 FULLY LOADED £695
YAESU FT-900 (BOXED) £599
YAESU FT-901DM GREAT VALUE £269

VHF/UHF TRANSCEIVERS

ALINCO DR-510 DUAL BAND MOBILE £199
ALINCO ALR-22E 2-MTR. 25W FM £169
ICOM IC-2350H DUAL BAND (EX-DISPLAY) £299
ICOM IC-255E 25W FM £149
ICOM IC-255E 25W FM £149
ICOM IC-275H 100W 2-MTR. BASE £659
ICOM IC-2AT BOXED AS NEW £99
ICOM IC-3200E DUAL BAND 25-W £199
ICOM ICU-16T 70CMS HANDIE £110
ICOM ICW-21E AS NEW DUAL BAND £169
ICOM ICW-21ET DUALBAND HANDHELD £189
ICOM ICW-32E DUAL BAND HANDHELD + ACCESS. £169
ICOM ICW-32E DUAL BAND HANDHELD + ACCESS. £169
KENWOOD TH-25E 2 METER HANDIE £80
KENWOOD TM-221A 50-W MOBILE 2-MTR. £169
KENWOOD TM-2550A 2 METER 70 WATT MOBILE £199
KENWOOD TM-733 AS NEW £399
KENWOOD TM-733 AS NEW WITH MEMORY MODULE £459
KENWOOD TR-751E 2-MTR MULTIMODE £299
KENWOOD TS-711E DUAL BAND MULTIMODE BASE £359
KENWOOD TS-770 DUAL BAND BASE MULTIMODE £389
KENWOOD TS-770E DUAL BAND BASE MULTIMODE £399
STANDARD C-508 DUAL BAND (EX-DEM) £199
YAESU FT-208R 2 METER HANDHELD £79
YAESU FT-290 2METER MULTIMODE £175
YAESU FT-290 WITH NICADS 2METER MULTIMODE £189
YAESU FT-726 2 METER BASE MULTIMODE £335
YAESU FT-726 6/2/70+SAT METER BASE MULTIMODE £575
YAESU FT-736 WITH 2 AND 70 AS NEW £825
YAESU FT-736 WITH 6/ 2 AND 70 AS NEW £929
YAESU FT-736R 2/70/23 AS NEW £899
YAESU FT-767GX PLUS 6/2/70 + AUTO ATU £789

ACCESSORIES

CAPCO LOOP ANTENNA 80—30 MHZ AS NEW £250
DAIWA CNW-419 500W ATU £149
GARMIN GPS-45 GPS SYSTEM, BOXED £89
ICOM AT-100 RARE ATU £149
ICOM AT-180 AUTO ATU HF+6 TO MATCH THE IC-706 ..... £269
ICOM AT-500 AUTO ATU £299
ICOM IC-2KL GREAT CONDITION £899
KENWOOD AT-250 AUTO ATU £175
KENWOOD TL-922 LINEAR AS NEW £945
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For Sale

Admiralty pattern W1516B direction finding receiver, dated 1944, as featured in *Short Wave Magazine* July 1994 issue, £100 o.n.o., buyer must collect. Tel: Mick G1BKI on Northants (01536) 260189 after 6pm. (Corby, Northants NN17 2LJ).

AKD HF-3 receiver 30kHz-30MHz, boxed, £100 o.n.o. Spectrum Communications 28MHz pre-amplifier, £10. RMS 3-5A p.s.u., £8. Spare rotator control unit for Yamoto YS-130, £10. Tel: (01975) 563833 anytime.

Alinco DJ GST/E v.h.f./u.h.f. twin band, f.m. hand-held transceiver, extend receive with waterproof case and manual, as new, boxed, £170. Tel: Vince (01487) 823879.

Alinco DJ-180E 2m (144MHz) hand-held with spare battery pack and power supply adapter, boxed, manual, £100. Dymar Manna radio telephone, type 821M, ten channel, four crystal, £90 with antenna, £115. Tel: J Davies (01524) 414820.

Alinco DJF1-T 2m (144MHz) f.m. hand-held with charger, £125. Icom 255A, 2m, 25W with Mac Mount, £45. Collins SM2 desk microphone, £35. Hyped Morse Key, £30. BC221, £20. FL-1 audio filter, £10. CDR antenna rotator, £35. Parmeko 620/330 XFMR - QRO linear? £15. Tel: Suffolk (01449) 676355.

Alinco DR-430 70cm (430MHz) mobile, new, boxed, unused, genuine reason for sale, £150. Tel: Geoff G6LYE on West Midlands (01922) 478525 (evenings) or E-mail: geoff.w@virgin.net

Alinco DX70TH only five months old, still under warranty, £525. Microwave modules, 4m (70MHz), transverter, £95. Manson 20A p.s.u., £50. Tel: Steve (01803) 665772.

ADR AR8000 scanner covers, 500kHz-1900MHz, no gaps, a.m., u.s.b./l.s.b., c.w., n.b.f.m.??, and w.f.m., £150. Tel: (01606) 557476.

AR88D in sound original working condition, little used, collector's classic h.f. set, includes photocopy manual and some valves, £90 o.n.o. Tel: Barry G7CMP on Axminster (01297) 32381.

Autech research r.f. analyst model RF1., new unmarked condition with accessories and manual, £90 (list £159.95). **KWIOT** a.t.u. unmarked with manual, £75. *RSGB 1998 Yearbook*, £5. All plus P&P. Tel: G2HKU (01795) 873100.

Azden PC7500H 6m (50MHz), fully synthesised f.m. transceiver with capability for repeater use, 50W output, 50-54MHz transmit range, boxed, £185 o.n.o. Tel: Kidderminster (01562) 754129.

Belling Lee radio interference suppressor, type L1829, £20. Tel. (01656) 783058.

Canadian 19 set MKIII in good condition, not modified, no power unit or variometer, £100 o.n.o. Also 18 set, £50. Tel: John (01639) 722099.

Codar AT5 transceiver and p.s.u. unit restored, new valves, p.s.u. OK, transceiver needs further adjustment, extra transceiver (not working) included, £40 o.n.o. plus P&P. Tel: (01234) 720591.

Commodore 64 1701 COL. MON TAXAN KP810 printer, 1541 disk drive, 1581 disk drive, two joysticks, p.s.u., all leads, £35 or best offer. Tel: (01242) 529758.

Daiwa electronic keyer, DK210, v.g.c., £25 plus P&P. Tel: (01305) 268817.

Datong FL3 auto notch filter with Datong power pack, near mint condition, receipts checked by Datong, reason for sale - bad eyesight, £50 no offers. Tel: 0191-526 7902 evenings.

Eddystone 358 coils, p.s.u., £50. Perdio Mini Six, £10. Philips p.c.r., front speaker, correct p.s.u., fully restored, £50. All plus P&P. Tel: Peter on Surrey (01372) 454381 or (0374) 128170 anytime.

Eddystone 1837/2 digital, professional, receiver, five filters, £350. Scanner PRO-28, 30 channels, £70. RN transverter, 6m (50MHz), 2m (144MHz) in, 6m out, £110. Tel: (01797) 361438, after 6pm.

FT-736/2 2/6m/70cm (144/50/430MHz) base station, brand new with MD-1 microphone, SP-102 speaker, £975. Alinco dual-band hand-held, mint condition with two NiCad packs, s/microphone, £200. Tel: London 0181-785 7314.

Goldstar 'Scope OS9020A with manuals and accessories, new, hardly used, boxed, 20MHz dual beam, £225. Tel: Medway (01634) 379140.

Heathkit RA1 receiver, £45. Codar AT5 with a.c.p.u., £450. Both working and good condition. Write to R. Q. Marris, 35 Kingswood House, Farnham Road, Slough SL2 1DA.

HRO receiver, rack model, rare, English made with four band spread coils, £40. Still wanted: HRD-5 (octal valve version) and general coverage coils - cash or swap BC342, mains, manual, superb. Tel: Peter on St. Albans (01727) 839908.

Icom 229E 2m (144MHz) transceiver, EP-925, 30A power supply, Watson W-30 antenna, boxed with manuals, all mint condition, £300 o.n.o. for the lot. Tel: (01246) 236496.

Icom 8500 as new, £995, can post f.o.c. Yaesu FT-847 as new, £1195, can post f.o.c. Tel: Bolton (01204) 700001.

Icom IC-207H dual band 50W mobile with base and mobile dual band antenna, all as new, £250, buyer to collect. Tel: GM4DHJ on Glasgow 0141-885 2022.

Icom IC-28E, 2m (144MHz) mobile, good condition, £50. Sony 2001D g.c. receiver, v.g.c., boxed, £125. Also, B40 receiver with photocopy handbonk, £100. IC04SRA, u.h.f./wide band receiver, v.g.c., boxed, £75. Tel: Richard G7MJJ 0181-690 9913 during office hours.

Icom IC-706 MkII d.s.p. unmarked, boxed, as new, £700. Autek r.f. analyst, RF1, list price £159.95, with accessories and manual, new, £90. Datong FL3, £70. All o.n.o. plus post or collect. Tel: G2HKU on Kent (01795) 873100.

Icom IC-706 MkII lots of warranty remaining, boxed, as new, £700 (may take TR751E DX). AT180 tuner for above, £250. Strumech BP60 tuner, £300. Heatherlite 2m (144MHz) Explorer linear, £350. Tel: (01453) 757467 (daytime), (01453) 757276 (evenings) or E-mail: graham@infra.demon.co.uk

Icom IC-R71E receiver, £500 o.n.o. Tel: L.B. Rogers (0118) 912476.

Icom R-7000, £475. AOR 3000, £370. Jil SX400, £80. CWR 880, £70. MA 1688??, £20. Icom R071E, £450. Also wanted R820 R7A FR101DD??, mint. Tel: Essex (01279) 815020.

Kenwood 570D transceiver with d.s.p., internal a.t.u., boxed and manual, less than 12 months old with warranty still to run, £800. Tel: Stan G7SFJ (01535) 637977 or (0498) 914655 (mobile).

Kenwood h.f. transceiver TS-68DS with PS-430 PU, carton and manual, in as new condition, best offer for Silent Key. Tel: Douglas Byrne G3KPO on Isle of Wight (01983) 567665.

Kenwood h.f. transceiver, 100W, TS-820, £275. TS-520SE, £230. 2m (144MHz) hand-held T215E, £130. BNOS 10/100 linear amplifier, £110. All g.w.o., v.g.c. Tel: G3FET QTHR on East Sussex (01892) 654156.

Kenwood R-1000 receiver complete with manuals, mint condition, boxed, £200. Tel: Jack Hood 0131-664 1312.

Kenwood R2000 fitted with v.h.f. converter, 0-30MHz plus 118-147MHz, like new, boxed with manual, purchased from Lowes, only £260. Tel: (01608) 662488.

Kenwood R2000, all modes plus v.h.f., excellent condition, original box and manual, plus a.t.u., only £270 plus post. Tel: Frank G20971 (01608) 662488.

Kenwood TH-75E dual band hand-held, NiCads charger, speaker, microphone, antennas, leads, manual, £125. Multi 700E f.m. transceiver, 25W, extras, tone burst, 12.5kHz spacing, fittings, £75. Tel: John G4JRC on Cambridge (01223) 242427.

Kenwood TS-450S built-in automatic a.t.u., filters, boxed with manual, mint condition, £675. IC-500 a.t.u., 500W full automatic, v.g.c., £850. Cushcraft A3WS, 12/17, two months old, £185. Tel: Robin (01209) 820118.

Kenwood TS-450SAT, good condition with standard microphone, leads, manuals, £630. Also 2SC2879 Finals, four available, brand new, used test purposes only, £10 each. Tel: Steve G0UIH (0589) 120150 (mobile), 9:30am-6:15pm or E-mail: g0uihsteve@compuserve.com

Kenwood TS-50S and AT50 a.t.u. quick release mobile mount, mint, boxed, manual, purchased for circumnavigation but change of plans, surplus to needs, £550 o.n.o. Tel: Southampton (01489) 582639.

Kenwood TS-830S h.f. transceiver, 1.8-30MHz WARC filters, built-in p.s.u., matching a.t.u. (AT230), with antenna switching/p.w.r. meter, SP230 speaker with filters, all boxed with manuals, £595. Buyer collects or pays carriage at cost. Daiwa electronic keyer (DK210), sold separately, £50. All p.m.o. and excellent condition, owner updating. Tel: Roy G1OWVN QTHR, Bangor (01247) 460716.

Kenwood TS-930S with SP-930, £495 o.n.o. Yaesu FT-101ZD and FV101Z v.f.o., £260 o.n.o. Yaesu FL-2100ZD linear amplifier, £350 o.n.o. Yaesu FRG-8800 receiver, £185 o.n.o. Daiwa CNA2002 tuner, £150 o.n.o. Any reasonable offers considered. Tel: Newark (01636) 830057.

Kenwood TS-930SAT with fitted internal a.a.t.u., c.w. filter, microphone and manual, excellent condition, buyer collects, £550 o.n.o. Tel: Ayr (01292) 287093.

KW-2000A transceiver, p.s.u., manual, £140. Racal RA137LF converter, manual, £85. Collector's Hallicrafters, h.f. valve, linear amp, £150. B44 valve, v.h.f. transceiver/receiver (two), £36=5 each. Roberts portable (1944), £90. RA17, mint, f.w.o., manual, £120. Tel: Yorkshire (01482) 887938.

KW2000A s.s.b., c.w. transceiver, 1.8-28MHz with power supply unit, KW-E-Zee match, a.t.u., microphone, circuits and instruction service manuals, £100 o.n.o. Tel: Neville G1PAB on Stevenage (01438) 229332.

KW202 receiver first class condition,, £100. A510 receiver, £40. WS19, working, £100. TCS-12 receiver/transceiver, £100. Packard Bell a/f pre-amps, £12. Ericsson 'phones, £15. Wanted: No.11, 21, 22 sets any condition. Tel: Ben (01562) 743253 or E-mail: 106312.1035@compuserve.com

Lowe HF-150 receiver with p.s.u., £120. Kenwood R2000 receiver worth v.h.f., £185. Tel: Portishead (01275) 845409.

Lowe HF-150 with backlight, external keypad, IF-150 computer interface and software, in excellent condition, £200. Tel: Bob (01440) 708493.

Magazines: Copies of *The Radio Constructor* from 1958 (not January or July). Also early copies of *The Radiophile* and Newnes *Radio and TV Servicing*, offers please. Tel: Aberystwyth (01970) 890563 (not on Sundays).

Marconi Apollo complete with cabinet, mint condition, £225. Eddystone 1990/S v.h.f. receiver complete with cabinet, v.g.c., £250. Eddystone EC958/12, with i.s.b., mint condition, £350. Tel: David (01788) 574099.

Marconi signal/generator model TF-2002B, m.f./h.f., a.m./f.m., 100kHz-88MHz, plus digital synchroniser model TF-2170B, g.w.o., very heavy, buyer collects or pays carriage, £85 o.v.n.o. Tel: St. Osyth (01255) 820116.

Mobile antenna MA5 by Kenwood, 35-28MHz, Valor MM3401 three magnet, MA4 mount, never used, £65. Tel: G3PTN QTHR, Leeds 0113-265 4644.

Nova 242 4m (70MHz) transceiver (two of them), ten crystal channels, a.m./f.m., 25W fitted, 70-425MHz, 13.8V, 5-12kHz spacing, £45 each with circuits and information. Tel: G8ETO on Camborne (01209) 713126.

o.n.o. Tel: Mick G1BKI on Northants (01536) 260189 after 6pm. Corby, Northants NN17 2LJ.

Offers sought for *Practical Wireless* magazines from May 1966 to December 1995 - no gaps, *HRT* January 1985/December 1988, *Radio/TV Servicing* Poole & Molloy Volumes 1-6, *ITEC Electronics/computer self-training Course*, five volumes, collect near Rugby. Tel: G3WAL on Bournemouth (01202) 434068.

Perdio Pocket transistor radio model Mini Six red cream, £10. Eddystone 770 for spares, £20, both plus carriage at cost. Tel: Peter on Surrey (01372) 454381 or (0374) 128170 anytime.

Philips Lamps PCR2, fully restored, correct p.s.u., only wants seeing, with internal speaker, £50 plus carriage at cost. Tel: Peter on Surrey (01372) 454381 or 0374 128170 anytime.

Portable computer 286 mono, canvas holdall, mouse, ideal packet programme, spare disks, books, loaded DOS 3.3, £20. *Windows 2.1*, unused, boxed, £5. Telequip 'scope, single beam 251E, books, spare valves, £20. Tel: Eric (01253) 726685.

Racal RA-1771 professional receiver, 0-30MHz, frequency selected by decade switches, no top cover, operator's manual, £225. Eddystone 730/1A communications receiver with some diagrams and instructions, g.w.o., £115. Tel: Nuneaton (01203) 730669.

Radio Bygones Magazine, issues 0-50 inclusive, bound in box files, £25, including P&P. One pair 3.5MHz antenna traps, £10 including P&P. Tel: John G3OAZ (01256) 465126.

Realistic DX394 receiver, l.w./m.w./s.w., l.s.b./u.s.b./c.w., as new, cost £200 will accept £95 or WHY? Contact Mr R Kennedy, 7 Wyatt Street, Kettering, Northants NN16 0DT.

Realistic PRO-2039 scanner 68-960MHz with gaps, 200 memories, £95. Navico AMR1000S, 2m (144Mhz) f.m. transceiver, 5-25W with 12.5-25kHz shift, £110. Tel: Ron G0NDE 0121-602 4273.

Roberts R861, perfect condition, new, all wave bands, digital/manual tuning, batteries, mains, £90. M Allen, 103 Remington Road, Parson Cross, Sheffield.

Sandpiper vertical antenna for 160, 80 and 40m (1.8, 3.5 and 7MHz), as new, c.w., assembly manual, £55. Buyer collects. Tel: Stuart G0GOF QTHR on Bedford (01234) 767904.

Sangean ATS 803A world band receiver, all mode, u.s.b./l.s.b./a.m./f.m., 150kHz-30MHz and 87-108MHz, amateur, airband, marine and broadcast band plus too many extras to mention, as new, boxed, handbook, £85. Tel: Arthur G3XBE QTHR, Bradford (01274) 728219.

Small Lathe Pultra, £175. Would swap or part exchange for h.f. transceiver, QRP preferred. 70MHz a.m. taxi radios, g.w.o., £10 per pair. Tel: G0NVF on Liverpool 0151-639 5922.

Sony CF-950S s.w. 1,2,3, f.m./m.w. cassette recorder, manual, £170 o.n.o. Tel: Reg (01348) 831203.

Sony ICF-SW7600 world band receiver, l.w./s.w., etc., as new, boxed, £65.

Sony SW55 Radio with all accessories, boxed and as new, £175. Panasonic RFB65 radio, £60. Sanyo M999OL stereo radio cassette recorder, £65. Tel: Alan on Nottingham 0115-973 2608.

Start-up rig: Trio-520S 100W c.w., s.s.b., £225. 1960s Vibro keyer, £50. **DX edge??**, £5. Heathkit v.f.o. (valve), with h.b., £5. Tel: (01494) 530018.

STC module p.s.u. 5V, 10A, 50W, as new, still in original box and packing, £35. Tel: Gerry on Oswestry (01691) 623828.

Taking RAE this year? Benbow's *RAE Manual* plus *How To Pass RAE*. Petri's *Basic Radio Calculations* plus Casio FX1155 calculator, plus eight test papers with answers with one latest format, £25 including P&P. Tel: (01329) 315789 evenings.

Tear Drop microphone new, cost £45, will sell for £25. Tel: John (01283) 221870.

Ten-Tec century 22 c.w. transceiver, used as standby rig, v.g.c., complete with mains lead, instruction manual & boxed, £160 o.n.o. Tel: G0JZY QTHR (01275) 846343.

Ten-Tec Corsair with matching p.s.u., extra filters, boxes and manual, excellent condition, £400. Tel: Essex (01708) 250578, evenings and weekends.

Transistor radio sets, small collection from 1950/60s and 1970s, all working and in good condition, also the book: *Radio, Radio* lists all collectable radios with photos. Tel: (01450) 379217.

Tranzmatch h.f. a.t.u., £40. AVO 7 MkII leather case, £30. Trio DM-801 dipmeter, boxed, £20. Hansen RMS p.e.p./s.w.r. meter, £20. BT multimeter leather case, £15. Megger 500V leather case, £15. Balun (h.f.) weatherproof, new, £10. Yaesu YH-77 headphones, £5. *Amateur Radio Operating* manual (Fourth Edition), £5. Tel: John G4UBB 0181-868 7684.

Trio HF-930S transceiver 100W, all bands, built-in power supply, v.g.c., £425. Also Trio 9130 multi-mode, 2m (144MHz) f.m. transceiver, £220. Emotator antenna rotator, heavy duty, complete, new, £175. Tel: Harold G0EZW on Nottingham (01773) 781290, or write to him at 97 Nottingham Road, Selston, Nottingham.

Trio TS-530SP excellent condition, little used transmit, boxed, £400 o.n.o. MC50 microphone, boxed, £25. Kenwood TC-5 headphones, £20. Kenwood auto a.t.u. 250, not boxed, £175. Tel: Stan Littlewood GW7MQO on Llandudno (01492) 870768.

Trio TS-930 h.f. transceiver, good condition, boxed, £475 o.v.n.o. Tel: GW3WSU on Barry (01446) 738756.

TS-711 2m (144MHz) multi-mode base (240V), SP-430 speaker, MC-60 microphone, £475. Microwave modules, 6m (50MHz) transverter, 2m i.f., £115. AKD 4001 4m (70MHz) f.m., £115. 2/4m, 70cm (430MHz) h.f. antennas must also go. Tel: Bob G1WEX 0121-602 0663, answer machine, so leave message.

Two 1155 receivers one working, one rebuilt, needs p.s.u., £50. Also Lafayette HE30 receiver, g.w.o., £75. Also s.s.b. converter for

B40 or B41, g.w.o., £40. Buyer collects. Tel: (01203) 440637.

Valve amplifiers which include one valve power amplifier, also many valves. Tel: 0113-240 3496 for more details.

Vertical h.f. antenna Sandpiper, five bands: 80, 40, 20, 15 and 10m (3.5, 7, 14, 21 and 28MHz), never used, three months old, superb condition, cost £107 will sell for £70, no offers, prefer buyer to collect. Tel: Tom MM0BOJ on Ayrshire (01294) 214172, QTHR as MM1BIF (B callsign).

Wide carriage Dot Matrix printer, Star NX15, g.w.o., £25. Amstrad plug-in external 3" disk drive, unused, £10. Tel: Alan on Caernarvon (01286) 678584.

Yaesu FLDX and FRDX 400 twins, v.g.c., plus extension speaker, £325 o.n.o. Yaesu FRG 100 receiver, v.g.c., nearly new, £275 o.n.o. Realistic PRD-2006 scanner, £125 o.n.o. 400 twins, v.g.c., plus extension speaker, £325 o.n.o. Yaesu FRG 100 receiver, v.g.c., nearly new, £275 o.n.o. Realistic PRD-2006 scanner, £125 o.n.o. Tel: Mike M0AEQ on Milton Keynes (01908) 885986.

Yaesu FRG-7 communications receiver, mint condition, £95. Tel: Alan on North Wales (01286) 678584.

Yaesu FRG-7700 communications receiver with FRV-7700 v.h.f. converter plus manual, £195. Tel: Stevenage (01438) 722964.

Yaesu FRG-7700 with Joymatch a.t.u. plus earphones, £195. Yupiteru MVT 5000, 25-550 and 800-1300MHz, a.m./f.m., 100 channels plus magnetic mobile antenna, boxed, £95. Tel: (01484) 315396 or (01744) 892773.

Yaesu FRG-8800 receiver with FRV-8800 v.h.f. converter, FRA-7700 active antenna and FF5 lowpass filter, quick sale, £300. Tel: (01344) 459518.

Yaesu FT-101B, FV-101B, v.f.o., £180. Yaesu FT101ZD, FL-2100Z, FV-101M / v.f.o. SP-901 speaker, £800. Yaesu YVM1 video monitor, £30. All v.g.c. with manuals. Tel: Ian (01829) 760072, evenings only.

Yaesu FT-101Z WARC, f.m., fan extension, speaker, boxed, manuals, all cables, good order, £240. Timewave DSP59 plus filter, excellent, £100. Kent electronic keyer, a.m. side key, £40 pair. Tel: John G3LNK on Stoke-on-Trent (01782) 618410, or E-mail: g3lnk@aol.com

Yaesu FT-211 2m (144MHz) mobile, 5-45W, boxed, manual, good condition, £145. Tel: Adrian G7HSA (01584) 872618.

Yaesu FT-290R MkII 25W amplifier, NiCads, microphone, mobile mount, etc., all as new, worth £700, will sell (must sell) for £400 o.n.o, bargain. Tel: David (0468) 154998 or (01722) 328342.

Yaesu FT-690 MkI multi-mode, 6m (50MHz) transceiver, £250. Tel: (01606) 557476.

Yaesu FT-690 MkII, 50MHz, multi-mode, boxed, manual, CTCSS, v.g.c., repeater ready, £375, cash, cheque or credit card. Tel: Andy (01206) 396946, daytime or (01255) 880858, evenings.

Yaesu FT-736R transceiver, 144/430MHz with SP-767 speaker with filters, all boxed, mint condition, price to sell, £850 o.n.o. Tel: Craig G0WWD (01246) 252913 weekdays only.

Yaesu FT-747GX h.f. transceiver, 150kHz-30MHz, 100W output, f.m. and c.w. filter fitted, £270. MFJ-9420X, 20m (144MHz) s.s.b. radio, full band plus audio filter fitted, £150. Tel: Jim MM0AYD (01577) 864928.

Yaesu FT-747GX transceiver, 150kHz-30MHz continuous coverage, 100W, all bands, c.w. filter fitted, no f.m., v.g.c., £330. Tel: Russ on South London 0181-308 1704.

Yaesu FT-747GX with f.m. board fitted, v.g.c., £275 o.n.o. Tel: Paul on Isle of Wight (01983) 821808.

Yaesu FT-757GX radio with manual and microphone, still boxed, excellent working order, £430 o.n.o. Tel: Clive on Stoke (01782) 839714.

Yaesu FT-757GX11 with FP-707 speaker, p.s.u. and manual, g.w.o., £450. Tel: Edward G0WDT (01782) 717837.

Yaesu FT-767GX h.f., 6m/70cm (50/430MHz), modules fitted, excellent condition, £700 o.v.n.o. BNOS 6m linear amplifier, 10W input, 100W output, £80. Prefer buyer to collect or P&P extra. Tel: Allan on Edinburgh 0131-310 3142.

Yaesu FT-790 70cm (430MHz) multi-mode transceiver with Microwave Modules, 30W linear amplifier, radio immaculate - amplifier needs attention, £100 no offers. Tel: Geoff on West Midlands (01922) 478525 (evenings) or E-mail: geoff.w@virgin.net

Yaesu FT-900AT s.s.b. c.w. filters, mint condition, boxed with manual, power lead and microphone, £675 o.n.o. Tel: 0181-941 0535.

Yaesu FT-DX401 high power transceiver (300W of r.f.), excellent condition, spare valves including new PAs, driver and modulator, bench microphone and speaker. In regular use but I need more space for future projects, £175 o.n.o. Tel: Ken G4WAS on Walsall area (01922) 475057, 6-7pm is the best time.

Wanted

35 or 40ft tilt over standard mast and winch made by Tennamast. Write to Dave, 5 Alton Close, Bushbury, Wolverhampton WV10 8ES.

124 Spy set wanted by private collector, also all other SOE/OSS suitcase type radio sets required. Send full details with price required to Bill MacDonald, 40 Latchett Road, London E18 1DJ.

144MHz hand-held, must be cheap, i.e. old, ICZE or similar, looks not important. Tel: Ken 0181-761 6489.

Your Attention Please!

As the volume of adverts in 'Bargain Basement' increases we are receiving many more badly written, poorly prepared and confusingly worded entries that cause problems for everyone. **Because it is a free service** we are unable to verify whether or not each advert's details are correct and although all adverts are read by **Jo, Tex GITEX** and myself, we rely on your entry being prepared correctly so the best service can be offered. So, to help us to help you please type or write clearly **(in block capitals please)** the full information using the standard style adopted in 'Bargain Basement' adverts (which is easily done by reading a published advert!). Please use full wording or standard abbreviations - RX or rec. for receivers, etc., or terms (**please use frequencies** rather than bands ie: 1.8 to 30MHz, 144MHz and 430MHz rather than 160m to 10m, 2m and 70cm, etc.) and equipment references as used by the manufacturer (Kenwood TS-870, not TS 870 for example) to avoid confusion. **From this issue of 'Bargain Basement'** two ?? marks in bold within an advert will indicate that the Editorial staff were unable to determine the original wording/meaning and it has been published in good faith and with the best intentions. **Editor.**

All early wireless gear, crystal sets, valves, horn speakers, top prices paid for items made by Marconi, Burndept, Pye, BTH, Gecophone, Ericsson, serious collector, will pay well and collect any area. Jim Taylor G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH. Tel/FAX: (01202) 510400.

B2 receiver knobs, brass front panel, its transceiver case and L4/5/6, HRO loud speaker, MCR1 headphones, coils two, three and four. Tel: Andrew Humphriss (01926) 423120.

Book wanted: *Computerised Radio Monitoring* by Todd Daley. Tel: Graham (01903) 695764.

Cushcraft antenna AV3 14-28 vertical or equivalent antenna or Hustler 4BTV, 10-40m (7-28MHz). Tel: John (01283) 221870.

EHT transformer or any advice or help to enable me to repair my Tektronixs 'scope 585A. Tel: Tom 0181-533 6701.

Front panel for TS-430S in v.g.c., to replace old one getting tired, your price paid plus postage. Tel: Andy 0115-930 8096.

Government surplus R210 ex-army receiver, 2-16MHz, complete with converter for 12V, with manual. Tel: Donald (01349) 863952 after 6pm, 54 Bayne Drive, Dingwall, Rosshire, Scotland IV15 9UB.

Heathkit SB100 p.s.u. wanted by disabled SWL, will collect in Midland area, also circuit diagram or manual. The p.s.u. is HP23A or the mobile p.s.u. version, help! Tel: Jim 0116-232 2030.

Icom IC-706 MkI must be perfect. Tel: Camberley, Surrey (01276) 25191.

Icom ICR-70 receiver Service Handbook urgently required. Tel: David (0973) 382068; anytime.

Information wanted on the correct 'scope type CDU150, CT 531/3, 6625-99-223-1190. Tel: Douglas Byrne G3KPO on Isle of Wight (01983) 567665.

Instruction manual wanted for Yaesu FRG-7, will some kind person please photocopy a copy of these or FAX operating instructions, will pay for this plus all costs. Tel/FAX: (01253) 866046.

Kenwood HC10 world clock. Tel: Nigel M1CPZ (01202) 820554.

Lafayette HE-30, HE-80 (Trio 9R59D) as reviewed in *SWM* July 1998 or similar h.f. receiver, also Sony 2001, 7600 or Realistic DX-394 or similar, Fairmate HP-100E or any other scanner, possibly 8-1300kHz, wanted by 'Italia 2' operator settling in the UK. Tel: 0181-319 3553 extention 22, anytime.

Mains cable attachment, polarised pin, for an Eddystone receiver 840C model, will pay for cable and postage. Tel: 0181-595 0680.

Memory unit for Yaesu FRG-7700. Contact Mr Kennedy at 7 Wyatt Street, Kettering, Northants NN16 0DT.

Military radios wanted by collector, Racal man packs: 38 sets, 18 sets - all British, WWII radios: C42, C13, A14, C11, A11, Clansman radio PRC320, can collect, cash waiting. Tel: (07971) 382419.

Module for Yaesu FT-726R, 70cm (430MHz), good price paid for good working unit. Tel: Zane M1BFI (01582) 662183.

Operating / instruction manual wanted for Yaesu FT-209R/RH 2m (144MHz) hand-held, all expenses paid, etc. Tel: Martin on Leeds 0113-258 5806.

Power supply for WW2 transceiver TCS-12, 440V at 1A, 220V at 1A, home-brew, surplus, WHY?, no problem, will pay P&P. Tel: Peter (01287) 634197, 9-5pm - works QTH.

R1155 receiver in fair condition, p.s.u. not essential, would exchange for FRG-7 in good condition. Tel: Brighton (01273) 706141.

R1155 receiver must be g.w.o., cash or swap for FRG-7 in g.w.o. Tel: Mike on Sussex (01798) 342338.

Racal equipment wanted by collector, e.g. linear amps, a.t.u.s, exciters, p.s.u.s, 19 inch cabinets, spare parts, etc., anything considered. Tel: (01482) 887938.

Racal RA-1792 in mint condition, list price and carriage paid. Tel: Dublin 01-4536452 or write to 17 Thomas Davis Street, Inchicore, Dublin 8, Ireland.

***Radio Constructor* magazines**, January, February, March, May of 1969, January, December of 1970 and 1971 from March onwards. Tel: John (01634) 233058.

Reel-to Reel tape recorder, five inch reels. Tel: Jack Barnes (01229) 584466.

Telefunken mains radio model Cavotte 201, f.m./m.w./l.w./s.w. or model 1691 also Telefunken tuner/amplifier Operette Hi-fi 201, four wave bands, or model 2650MX and Grundig Satellite, s.w. radio model 1400. Tel: Londonderry (01265) 43793.

Tri-bander for 10, 15 and 20m (14, 21 and 28MHz), three element or two considered, must be cheap. Tel: Roger on Christchurch (01202) 470134.

User manual for Star printer LC-100 to purchase or borrow. Tel: Ian (01420) 85480.

WWII Marconi R1155 in g.w.o. but cheap, for pensioner SWL, would consider exchange ??? 707 Deluxe organ, cash adjustment. Tel: Ron (01245) 321251.

Yaesu FRV-8800 v.h.f. converter for the FRG-8800 receiver. Tel: Ron GW4JQC (01792) 850187.

Yaesu FT-757GX r.f. unit or scrap '757 for spares r.f. unit, must be working. Tel: Robin (01205) 290650, evenings.

Yaesu FT-790R MkI rubber antenna could swap/part exchange for dual band rubber antenna. Tel: Ian (01922) 630668 after 5pm.

Yaesu rotator G650, G600, G450 or G400 in g.w.o., also Icom IC-271. Tel: Mike G7NBE on Leicester (01530) 414473.

Exchange

Datong auto r.f. speech processor, select, Db?? steps model, wired for Icom transceiver/receiver, mint. Exchange for the same, but Yaesu wired version, must be in clean working order, 8 pin model. Tel: (01383) 721523.

Explorer Opti complete with leather case, just months old, will exchange for both AOR 8000 and Scout **MOD 40??** with manuals and boxes. Tel/FAX: (01473) 785203, anytime.

FT-726R 2m-70cm (144-430MHz), all modes, Sat. board installed, built-in power supply, fist microphone, manual, also workshop manual, original packing in very nice condition, will exchange for IC-706, IC-R7000, multi-media notebook. Tel: (01953) 884305.

FT-736R u.h.f./v.h.f., multi-base station, CTCSS module fitted, pristine condition, all boxed, with manual and microphone. Will exchange for h.f. radio in same condition, or possible other radio equipment. Tel: (0468) 756762.

Icom IC-735, all filters fitted and iambic keyer, all manuals, boxed, plus AH-2 auto a.t.u., controller, exchange for Trio TS-50, auto a.t.u., exchange PK232MDX for Icom AT500 auto a.t.u., might sell if price is right. Tel: G4XPP QTHR (01388) 747018 after 5pm.

Icom ICR-70 receiver for best scanner offered, prefer Yaesu but others considered, boxed, handbook, buyer to collect. Tel: West Midlands (01902) 326182.

Icom R-71E receiver for Drake B8A, difference (if any) settled in cash, will collect. Tel: Rogers (0118) 912476.

Yaesu FT-901DM, mint condition, microphone, service manual, will exchange for Lowe HF-225 or Yupiteru MVT-7100 or WHY? Tel: Neil on Ludlow, Salop (01584) 711304.

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RadioScene

VHF REPORT

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

DAVID BUTLER G4ASR,
YEW TREE COTTAGE,
LOWER MAESCOED,
HEREFORDSHIRE HR2 0HP

TEL: (01873) 860679

E-MAIL: butlerd2@boat.bt.com

PACKET RADIO @ GB7MAD

UK DX CLUSTER @ GB7DXC

THE REPORT THIS MONTH BY DAVID BUTLER G4ASR HAS VERY MUCH A SCOTTISH FLAVOUR WITH REPORTS OF DX CONTACTS MADE VIA TROPO AND AURORAL PROPAGATION.

The period between September 21-23 saw some of the best tropo conditions experienced for many years on the v.h.f., u.h.f. and microwave bands. The tropospheric enhancement commenced on September 21 with stations located in central, eastern and northern England working north-eastwards into Denmark, Norway and Sweden and to the east as far as the Czech Republic and Poland. Stations in Northern Ireland and Scotland were also able to work similar distances into Belgium, Germany and Holland.

Over the following days the enhancement intensified, especially for stations situated in northern England and Scotland. Both the 144 and 430MHz bands were particularly good with paths into Scandinavia, northern Poland and even as far away as Lithuania (LY). By the evening of September 23, the best of the propagation had disappeared from much of England and Wales but had shifted to central and northern Scotland with stations there working deep into Germany, the Czech Republic and Austria.

The autumnal tropo conditions didn't blanket the whole of the UK though. Stations only a few tens of kilometres apart but at different heights above sea level had varying fortunes. For example, my QTH (233m a.s.l. alongside the Black Mountains in west Herefordshire) was not quite in the right place to work some of the really long haul DX that was to be found on the 144MHz band.

During the evening of September 22 between 1830-1900UTC I was hearing the Lithuanian station LY2WR (KO24) peaking at best 41 on s.s.b. and 519 on c.w. over a path length of 1875 km. Approximately 45km to the north of me, the station of GW4FRX (IO82) located in a QTH considerably lower than mine, was hearing LY2WR peaking at 579.

Nothing was heard of LY2WR at the QTH of **Don Kirby GW0PLP** (IO72) however, but he did report working SM6KJX (JO67) for a new country on the 144MHz band. Don was particularly pleased with this s.s.b. contact as he is badly screened to the east with a 30m high rock face behind his house. He also heard OZ9ZX (JO65) but couldn't attract his attention. Don recommends that DX stations occasionally ask the pile-up to stand by and listen for weaker stations, perhaps by prefix or locator square. His locator, IO72, is relatively rare on the v.h.f. bands and it would have benefited both stations if this practice had been adopted.

The 144, 430MHz and 1.3GHz antennas at the QTH of DK5KK.

YOUR REPORTS

Now I'll turn to your reports and it's very pleasing to get a full post-bag from north of the border. First up is **David Dodds GM4WLL** who informs me that the enhanced tropo conditions were detected when he heard co-channel interference on a BBC Radio 4 Band II f.m. transmission whilst driving home from work. A quick listen on the 144MHz band at his home QTH revealed the station of GM4CXM working many stations in Sweden. David immediately put his portable 144MHz system into the car and headed off to a local high-spot south of Edinburgh.

David's portable kit consists of a Trio TR9130 transceiver, 100W solid-state amplifier, a Morse keyer and digital voice recorder along with an 8-element Yagi and a 6m mast. David says that this is nothing special but it is very easy to set up quickly and possesses enough power and sensitivity to work most of what is available when conditions are up. The rig and ancillaries are built into a portable rack to allow for instant set-up without having to mess about with patch leads and power cables.

Coming on the air at 1630UTC the first QSO made by GM4WLL/P was a 15 minute rag-chew with the Danish station OZ6ABA (JO57). After David had finished the contact he indicated that he would be listening 10kHz up in frequency. On moving to that frequency he heard a tremendous pile-up and then realised that half of Europe was calling him. For the next three hours David worked strings of stations located in DL, PA, OK, OZ, SM and SP. Nearly 50 stations were contacted with the best DX being SP2NJE 1413km away.

At the beginning of the opening the signals from Polish stations were extremely strong, indeed stronger than the multitude of German stations calling. The opening was still going when he had to leave the portable location three hours later. Back at the home QTH (IO85) David could still hear OZ and SM stations peaking S9. On the following evening GM4WLL heard OK1AGE/P (IO70) on the 430MHz band but couldn't raise him. However many Scandinavian stations continued to be worked on the 144MHz band for the following two evenings. David gleefully reports that this was one of those really good events that still brought a smile to his face a week after it was all over!

Colin Smith GM0CLN also decided to head for the hills during the evening of September 22, accompanied by his friend GM7TKA. Colin's portable set-up consists of a Trio TR9130 transceiver, 80W and a 14-element MET Yagi attached to the car roof-rack. He reports that he made dozens and dozens of contacts with stations situated in DL, OZ, SM and SP. The longest distance QSOs made on the 144MHz band were with SP3UCU (JO92 at 1418km), SP3SFN (JO82 at 1363km) and SP2FAX (JO83) at 1352km.

During the same period GM7TKA also aired his call sign making very similar contacts. Both stations heard SP2OFW (JO93) which would have been their furthest distance contact (1437km) but the Polish station was very busy trying to work into the Isle of Man (GD). On the following evening, September 23, Colin operated from his home QTH (IO85) with an Icom IC-275E, 25W and a 14-element Yagi. Contacts on the 144MHz band included DD0VF/P (JO60), OK1AGE/P (JO70) and OK2UAF (JN89).

Allan Duncan GM4ZUK was yet another Scottish station who decided it would be more productive to operate from a portable location. He used his contest site in locator IO86 which at 450m a.s.l. has an excellent take-off in all directions. Allan uses a Kenwood TS790E transceiver which conveniently runs 40W on the 144MHz band and 30W on the 430MHz band. It also has the 1.3GHz module fitted which produces 40W output. Operating as GM4ZUK/P he used a 13-element Cushcraft Yagi on 144MHz, a 17-element NBS Yagi on 430MHz and a 23-element F9FT Yagi on 1.3GHz.

DAVID G4ASR'S COLUMN SHOWS THAT THERE'S PLENTY OF ACTIVITY ON THE VHF BANDS

RadioScene

During his first evening of operation on September 22 he made a total of 103 contacts on the three bands. Conditions were excellent. Highlights on the 1.3GHz band included OK1VMS (JO70), four OZ stations, three SM stations as well as a number of DL and PA stations. On the 430MHz band it was a similar situation, contacts including OK1AGE, OK1VMS, SP1EOI, SP2FAX and many other stations in mainland Europe.

Allan was also active from the same site on the following evening, September 23, with even better results. Strangely, he also made the same number of QSOs as in the previous evening, a total of 103 spread across the three bands. Conditions were tremendous to eastern Europe with 29 contacts being made into the Czech Republic on the 144MHz, 430MHz and 1.3GHz bands, some over 1600km away. On the 144MHz band the best DX of the evening was OE3LFA (JN88) at 1581km. Another foray was made on September 24 and although only 11 contacts were made it did include two with LY2WR (KO24) on the 144MHz and 430MHz band over a path of 1742km. Truly an excellent opening.

In a packet radio report **Ray James GM4CXM** (IO75) mentions that although he missed the start of the opening on September 21, he was very pleased to see good conditions in western Scotland on September 22-23. Ray runs 400W from a 3CX800A7 amplifier into a pair of 16-element Yagis and as a consequence he was able to work much DX on the 144MHz band. It was obvious that propagation was best into Germany with 42 QSOs being made with that country but only 11 into Holland and three with Belgium. Contacts were also made with SP4MPB (KO03) for his best DX at 1609km, OK2UAF (JN89) at 1532km and OK1FID (JO80) at 1506km. Other contacts on s.s.b. included OK1XH/P (JN79), OK1AGE/P and OK1VMS (both in JO70), SP1EOI (JO73), SP1MHY (JO84), SP2FAX (JO83) and SP3SFN (JO82). Contacts were also made into Scandinavia, ten with Sweden, nine in Denmark and two with Norway.

Nigel Booth M1DKN (who last time I recall wrote in as an s.w.l. - congratulations on the new callsign Nigel) reports that v.h.f. conditions were also good for inter-UK working just prior to the big event. Over the weekend of September 19-20 he noticed that the GB3VHF beacon was pounding in at 599 instead of the normal signal he receives at the S1 level. Nigel lives in Norwich (JO02) and uses an Icom IC-290E transceiver running 25W into a 5-element Yagi. He reports initial QSOs on the 144MHz band with stations in locator squares IO82, IO91, IO92, JO01 and JO02. Nigel wishes it mentioned that he is trying to gain points for the RSGB 144MHz Squares Award and the RSGB Countries and Counties Award. So if you hear him on please give him a call.

BACK SCATTER

Reports have still been received regards the large-scale auroral opening on August 27. As reported last time, back-scatter signals were heard in Scotland around 0800UTC with the main event in the UK taking place between 1300-1800UTC with a much smaller phase between 2015-2130UTC. Beam-heading from central England on the 144MHz band ranged between 40-70 degrees (signifying a good aurora) with contacts being made with stations located in DL, F, HA, HB9, I, LA, LY, OK, OZ, PA, SM, SP, YL, YU and 9A.

David Johnson G4DHF (IO92) has sent an update to his report given last month mentioning that, in total, he made some 80 c.w. QSOs on the 144MHz band during the aurora. In addition to contacts previously mentioned he also worked into Switzerland contacting the stations of HB9BQU (JN37), HB9DFG (JN37) and HB9QQ and into Italy with I1JTQ (JN35), I2FHW (JN45). Stations in southern France including F8CS (JN27), F8OP (JN26) and F/G8MBI (JN04) were also contacted. These contacts are relatively rare during an aurora as many of these stations are located towards the southern limit of what is normally expected for this type of propagation.

In simplistic terms the maximum distances that can be worked are approximately 1000km to the south and north and 2000km to the east and west. These distances are actually contained within an imaginary oval boundary situated around your specific QTH. Sometimes you may hear references to the boundary fence which indicates the theoretical maximum distance achievable from your location. All this goes some way to explain why you are more likely to make contacts into Hungary, Poland and the ex-Russian republics and hardly ever into the south coast of France and northern Spain.

As proof of this, the vast majority of contacts made by G4DHF were located in eastern Europe. Around 20 QSOs were made with stations in Croatia, Czech Republic, Hungary , Poland and Yugoslavia. A little further afield were contacts made with the Lithuanian stations of LY2SA (KO13), LY2WR (KO24) and LY3ED (KO14) and YL3AG (KO26) in Latvia.

David Dodds GM4WLL was testing out a newly acquired Yaesu FT-290R MkII transceiver (for use in the car) when he heard a German station on the s.s.b. calling frequency. His signal was 'tone-A' and a quick listen around the 144MHz band showed several other strong auroral signals. Grabbing his "portable emergency opening kit" David immediately drove to an elevated location near his home QTH on the Pentland Hills (IO85). Fortunately the band was still well open to DL, F, ON and PA by the time he had assembled the station. From 1530UTC he then worked a number of countries using c.w. before switching to s.s.b. This resulted in a mini pile-up which sounded like a wall of white noise. By 1800UTC the event was fading out but by that time GM4WLL/P had made 31 QSOs with stations in six countries.

AMAZING AURORA

Carsten DG1ELE (JO31) reports that the aurora on August 27 was the biggest he had ever experienced at his QTH. He uses a Trio TS-700G transceiver with Mutek replacement front-end, a 300W amplifier and a 12-element Yagi. Operating exclusively on s.s.b. he made contacts with stations in G, GD, GM, GW, DL, LA, OZ and SM. His UK contacts included G4DIE (IO81), G8IYG (IO82), G1SMI, G4ZVA, G8HDS, G8XVJ, M1AIX, (all in IO83), G4NKV (IO93), MD1BYG (IO74), GM4WLL/P (IO85), GM7OIN (IO75) and GW8ELR (IO71).

Another German station known to have been active during the aurora was DJ4UF (JO30) who made c.w. contacts with G0EVT (IO93), G0MJW (IO91), G3PJW (IO83), G4DHF (IO92), G4HGI (IO83), G4SWX (JO02), GM1XOI (IO85), GM4CXM (IO75) and GM4WLL/P.

Chris HB9DFG (JN37) mentioned that despite using a group of four 7-element Yagis he doesn't hear many auroras in his part of Switzerland. However on August 27, between 1330-1600UTC, he made c.w. contacts with eight Dutch, 17 German and the stations of G3IMV (IO91), G3PHO (the editor of the RSGB's *Microwave Newsletter*), G4DHF, G4SWX and GM1XOI.

Even more pleased was **Mario I1JTQ** who reports that this was only the fourth aurora he has heard at his QTH (JN35) since 1979. Mario uses a Kenwood TS-850 h.f. transceiver, an SSB Electronics LT2S transverter driving an amplifier running a Two-4CX250B amplifier and two 18-element Yagis. Between 1530-1645UTC he contacted G3IMV, G4DHF, G4SWX and a number of DL stations.

Finally a report from **Vidas LY2SA** (KO14). He uses an Icom IC-821H transceiver, a 300W amplifier and a 16-element KLM Yagi at 15m above ground. A total of 84 contacts were made with stations in 17 countries with his best DX being GM0NAI (IO75) at 1742 km. He thought that the aurora was really fantastic and he looks forward to the next big event.

Interestingly, the aurora on August 27 coincided with an event when the Earth's upper atmosphere was bathed briefly by an invisible burst of gamma and X-ray radiation. According to researchers at Stanford University the pulse, the most powerful to strike Earth from beyond the solar system, had a significant effect on Earth's upper atmosphere. This was the first time that a change in the

Earth's environment has been traced to energy from a distant star.

Umran Inan, professor of electrical engineering at Stanford and head of the research group that observed the atmospheric disturbance, reports that it was as if night was briefly turned into day in the ionosphere. (The ionosphere is the portion of the atmosphere between 60 to 80km in altitude that plays an important role in radio communications and of course in auroral back-scatter propagation).

According to space agency scientists, the radiation reaching Earth had an intensity slightly less than that of a dental X-ray. Both gamma rays and X-rays cause ionisation directly by stripping electrons from atoms and leaving them electrically charged. Nevertheless the burst had a remarkable impact on the ionosphere. Umran Inan said that it was amazing that such a burst could produce ionisation levels similar to those produced by all the radiation coming from the sun.

The wave of radiation emanated from a newly discovered type of star called a magnetar. A magnetar is a special kind of neutron star, which is the collapsed core that is left behind when a massive star explodes. It is extremely dense, weighing more than the sun but squeezed into a ball less than 19km in diameter. A magnetar differs from an ordinary neutron star by possessing a magnetic field far greater than any other object known. Its field would be so intense that a steady X-ray glow would emanate from its surface and periodic starquakes would produce bursts of gamma rays and occasional cataclysmic flares like the one observed on August 27.

Although coincidental, it is not suggested that the magnetar event caused the ionisation that produced the auroral opening on August 27. However there was a severe geomagnetic storm that occurred shortly after the gamma ray burst and investigations are being made to see if it may have been triggered by the event.

Further auroral openings in the UK also occurred on August 29, September 24, 25, 26 and October 1. The best of these was that on September 25 when the geomagnetic activity increased to 'major-storm' levels. This storm was due to a coronal hole in the Sun's northern hemisphere and was a repeat of the geomagnetic storm that took place on August 27. The event on September 25 did show some initial promise with reports of DX activity on the 144MHz band as early as 1025UTC between stations in Finland (OH) and DL, PA, SM and UA3.

Another opening between 1230-1330UTC saw contacts being made from DL to OK, SP and SM and was a warning for UK operators to closely monitor the v.h.f. bands. The event was relatively weak at my QTH (IO81) and was mainly restricted to contacts with stations in Scotland. Between 1420-1600UTC I heard the stations of GM0CLN, GM4OGI, MM0BQI (all in IO85) and GM4ZUK/P (IO86). At 1445UTC I made a solitary c.w. contact with SM5BSZ (JO89) some 1477km away.

Collin Smith GM0CLN noticed that the event waxed and waned somewhat with signals coming and going. Between 1427-1548UTC he made c.w. contacts with the stations of DJ2FQ (JO31), DJ2QV (JO31), DL5ME (JO52), DJ9YE (JO43), GM4ZUK/P, ON4AMX (JO20), ON4CDF (JO21) and PA3BIY (JO22).

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 a simple telephone call is all it takes, even if it is only to inform me that the bands are open!

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

73 David G4ASR.

HF FAR & WIDE

LEIGHTON SMART GW0LBI
33 NANT GWYN
TRELEWIS
MID GLAMORGAN
CF46 6DB
WALES
TEL: (01443) 411459

I think it's safe to say that propagation conditions on the high frequency bands are **most definitely** 'on the up' compared to this time last year. The reports from our regular HF Far & Wide reporters show quite clearly that at this time in the approach to the next sunspot peak, conditions are well and truly going in the right direction at last.

So perhaps now is the time for those of you who have given Amateur Radio a rest for a while to dust off the key and microphone and get back into the swing of things. And for those of you studying your 'ticket' the present conditions should be a real incentive to join us on the bands eh?

However, having said that, the situation here at GW0LBI is looking slightly bleaker, as a recent storm brought down the main station antenna once again. So I've been reduced to listening mode this past couple of weeks, using my long wire antenna for receiving only.

Despite the fact that it's been wrapped and tangled around a few neighbours garden sheds, trees and fences by the wind, the antenna still works reasonably for reception, although I must admit that it doesn't radiate all that well when I put a few watts into it! Back to the catapult and fishing line trick again I guess, although there's always my 'ropey' 18MHz dipole to fall back on if all else fails! The joys of Amateur Radio I say!

YOUR REPORTS

On to your reports now. Space is limited this month and as all of our reporters have been concentrating on the higher bands, I'll start with 14MHz this time around.

First comes **Don McLean G3NOF** in Yeovil, who reckons that "the 14MHz band did not seem to close at all this month"! His log includes s.s.b. contacts with AP2GH (Pakistan), OH0AA (Aaland Island), 3W6DXI (Vietnam) QSL via DL4DBR, as well as 7Z1IS (Saudi Arabia).

Also on 14MHz **Dave Collins GW0WVF** in Penpedyrheol, Mid Glamorgan used his s.s.b. to good effect, hooking up with TI2CDA (Costa Rica) at 2300, VU2EGX (India) at 1700, 3W6EZD (Vietnam) at 1918, VK7CK (Tasmania) at 0800, and 7M4BEN (Japan) at 2028UTC.

The log from **Sean Gilbert G4UCJ** of Milton Keynes shows that his c.w. has been winging its way to all parts of the globe, judging by his low power 14MHz contacts with TG9AQ (Guatemala) at 2341, VK3AJJ (Australia) at 0835, FM5FJ (Martinique Island) at 2123, CO2SX (Cuba) at 2106, and finally KF4SEV/HP1 (Panama) at 2222UTC.

Also from Milton Keynes comes active 'mobileer' and portable station buff **Charlie Blake M0AIJ** who has been DXing out of Dorset from a portable set-up. Charlie's lists show s.s.b. contacts with CU2EJ/98 (Azores Islands special event) at 0058, SV1TP/P (Poros Island) at 1302, 4J80ADR special event celebrating the 80th anniversary of the Azerbaijan Democratic Republic, and 5X1T (Uganda) at 0506. The last contact was "a bit of a pile-up" says Charlie.

A warm HF Far & Wide welcome now to new reporter **Brian James GW0WGW** of

Fig. 1: A listener's report - such as the card from Les Poyner G-14237 to Leighton Smart GW0LBI- can prove very helpful...especially when nobody replies to a CQ call! The example shown was sent after Les heard GW0LBI in QSO on 1.8MHz and provides much useful reception information and comment.

RadioScene

Aberbargoed in Gwent, who has been busy on 14MHz s.s.b. this month. Among Brian's contacts are included 8Q7JD (Maldive Islands) at 1825, VU2PAI (India) at 2000, FP/N9PD (St. Pierre & Miquelon Islands) at 1700, JA6ZPR (Japan) at 1727, as well as YI1HK (Iraq) at 0500, and CO8DC (Cuba) at 2038UTC.

THE 18MHZ & 21MHZ BANDS

Also located in Gwent is **Bev West GW0OSQ**, a well known local low power enthusiast. Operating solely on the 18MHz band using s.s.b., Bev racked up contacts with 9K7POW (Kuwait City), JJ3LLT (Japan) DU1KT (Philippines) at 1500, plus CA2GU (Chile), KP4ZQ (Puerto Rico) at 0600UTC, HL2DNN (South Korea) and finally BD4RE (China). Not bad for a few watts and a home-brewed cubical-quad antenna Bev! I am literally green with envy!

Dave GW0WVF had a peep at the 21MHz band and hooked up with ZD8T (Ascension Island) at 1920 with HL0Y (South Korea) the following morning at 1145UTC.

Carl Mason GW0VSW of Skewen in West Glamorgan used 70W of c.w. to work UA0FDX (Asiatic Russia) at 0813, HL1CG (South Korea) at 0828, and SV8/SM0TXM (Parlos Island) at 1018UTC.

Don G3NOF lists 21MHz s.s.b. contacts with A41LZ (Oman), BD4DW (China) QSL via PO Box 040-088, Shanghai, People's Republic of China), HS0/G3NOM (Thailand), and 9M2TW (Western Malaysia).

A single 21MHz contact comes from our all-c.w. man **Ted Trowell G2HKU** on the Isle of Sheppey in Kent who lists a QRP 5W contact with special event station ZG2FX (Gibraltar) at 2000UTC (QSL via G3RFX).

THE 24 & 28MHZ BANDS

On the other hand Ted G2HKU has certainly been active on the 24 and 28MHz bands of late. He lists 24MHz contacts with 4Z5LF (Israel), HF0POL (South Shetland Islands), EA8CN (Canary Islands), ZP5KO (Paraguay), K6HWT (west coast USA), 9M2TO (Western Malaysia) and PY2OW (Brazil) all at around 1500, while the 28MHz band provided Ted with two contacts in the shape of TL5A (Central African Republic) at 1600, and OY3QN (Faroe Islands) at 1900UTC.

Carl GW0VSW had a go at the 24MHz band this month too and hooked up with 9K2RR (Kuwait) at 1312. Also logged were HF0POL (South Shetland Islands) at 1330 QSL via SP3BGD, TL5A (Central African Republic) at 0916 QSL via PA3DMH, and EA8TB (Canary Islands) at 1000UTC.

The c.w. mode was the way for Sean Gilbert on the 28MHz band this time around, gaining his contacts with KP4TF (Puerto Rico) at 1116, K1RM (USA) at 1400, PW5LB (Brazil) at 1509, HF0POL (South Shetland Islands) at 1523, and OH0/SM5TXT (Aaland Island) at 2247UTC.

Finally for this month, Don G3NOF lists 24MHz s.s.b. contacts with AP2WAP (Pakistan) QSL via IN3VZE, DU1KT (Philippines), ZF2WP/ZF9 (Cayman Islands), 6W1QV (Senegal) and 9Y4GR (Trinidad & Tobago), while 28MHz provided him with TU2XZ (Ivory Coast), CX6ABZ (Uruguay), CE3/NE4Z (Chile), and FS5PL (St. Martin Island).

SIGNING OFF

Well, judging by your reports it must surely be official! The long awaited upturn in sunspot activity and the corresponding improved propagation conditions have surely arrived - so make the best use of your new 'Lo-Bands Data Card -and listen out for the various beacons. They're a good guide to propagation conditions.

I'm sure that amateurs who are new and relatively new to the hobby will be enjoying themselves immensely over the coming months and years, particularly on the higher frequency bands. It's all happening -conditions are on the 'up'!

THANKS FOR ALL YOUR REPORTS, COMMENTS AND INFORMATION WHICH HELP ME TO MAKE YOUR COLUMN WHAT IT IS. AS USUAL, REPORTS AND INFORMATION (AND PHOTOGRAPHS - PLEASE!) BY THE 15TH OF EACH MONTH. CHEERIO FOR NOW, AND GOOD DX!

Leighton GW0LBI

DATA SCAPE

ROGER J. COOKE G3LDI

TEL: (01508) 570278

E-MAIL:
rjcooke@FreeNet.co.uk

PACKET:
G3LDI @ GB7LDI.#35.GBR.EU

THIS MONTH SEES THE BEGINNING OF OUR NEW COLUMN WRITTEN BY ROGER COOKE G3LDI, WHO HAS TAKEN OVER FROM MIKE RICHARDS G4WNC. ROGER G3LDI WILL BE TAKING YOU THROUGH THE INTERNET FROM BEGINNING TO END. AS HE IS A ALSO A BEGINNER, THE COLUMN SHOULD HELP THOSE OF YOU WHO ARE A LITTLE 'INTERNET SHY'.

Well, it's great to be back! I shall hopefully be inundated with E-mails, packet messages and telephone calls with all sorts of information and pictures to fill this column! The format is new to me, possibly new to you (at least some of it might be) and the learning curves can be steep.

I am new to the Internet scene myself, so shall be taking a look at how to get started, what to do, the cost and so on. In this way, it might help some of you to take that step to "surf the WEB", or merely to send and receive E-mails.

I shall also be covering the amateur side of data which, in my opinion, is the most important out of the lot. So, please keep me updated on what YOU are doing. Your columnist needs YOU! My output is directly proportional to YOUR input!!

UPDATE

I have been busy updating the BBS here. I decided to upgrade from FBB 5.15c to 7.00g and this presented me with a few problems. However, I have now cured most of them, but one still remains and it looks as though it will have to stay that way.

My users who have *Winpack* as their terminal program reported that they were unable to upload mail and download mail, in compressed format, in the same session. This problem cannot be overcome and the only solution is for all *Winpack* users to click on their **Mail/Mail Options box** and tick the **"Use Split Sessions"** box. Users should also ask their sysop to set the F flag in their user file and they should also set the expert status to prevent a multiple line log-in.

In practice, FBB 7.00g looks completely different to previous versions and takes a while to get used to. Another small problem is that the *NEWDOC* server locks up occasionally. I have opened two separate windows to provide me with permanent monitoring. **Fig. 1** shows the new version up and running.

Fig. 1: FBB 7.00g.

E-MAIL

I have resisted joining the Internet until recently, mainly because I did not have a "real" need for it and because I was

so busy answering mail on the packet network. I did not want to add to the already quite heavy mail-load each day! However, a free system appeared and I was tempted!

My Internet Service Provider (ISP) is **FreeNet**. This allows me to use the E-mail service and also access to Internet, completely free - with the exception, of course, of the telephone bill! I can also have 5Mb of Web pages, so that is another challenge. As soon as I get some spare time, I shall design my own Web page.

The modem I am using is an external type, a **US Robotics Sportster Flash**. There is a whole range of modems and it really boils down to how much you are willing to spend. Once connected to the telephone line, a range of possibilities present themselves. I also use the software that came with this particular modem, called *SUPERVOICE*. This allows me to set up a voice-mail system as well as a landline type BBS for large file transfer. It also allows the user to set up various individual directories and BBS, with DATA, FAX, and VOICE capabilities.

For E-mails and accessing the server, or ISP, I use **Pegasus Mail**, which allows me to compose my mail off-line, queue it and send it all in one session. Once connected to FreeNet, and having had my password verified, I invoke Pegasus Mail and click on the appropriate Icon, which then uploads and downloads all in one session. Normally this takes no longer than two minutes, depending on the size and amount of mail of course.

The Pegasus Window is shown in **Fig. 2**. There are various options within the program, such as distribution lists, address books, signature files, and these can evolve with experience of using the program.

I use Netscape for Internet access, shown in **Fig. 3** and, providing you are very aware of the amount of time that can slip by, using the Net can be very interesting. Prior knowledge of just what you are after can help keep the costs down, as can arranging to use Internet at the right time. Weekends are best, just 1p per minute on BT, followed by evenings at 1.5p per minute and lastly – to be avoided – daytime at 4p per minute.

Competition is becoming fierce with Internet Providers.

Fig. 2: The Pegasus Window.

Fig. 3: An example of a Netscape window.

Dixons Store Group, the high street retailer, has launched a free Internet access called Freeserve, in conjunction with the backbone provider Energis. One of the pioneers in free Internet access, **X-Stream**, already claims over 95,000 members after only seven months of operation.

There are no catches to these free services, but the technical support lines can be expensive. For example, Dixons charge £1 per minute on the help-line! Freeserve have really up-staged BT-Click+, the newly-launched non-subscription service from BT. Here again, hidden charges come into play. The BT service charges an extra 1p a minute for every minute on-line, plus 50p per minute for their help-line.

Other retailers are trying to jump on the bandwagon. **Tesco** have just introduced their Internet service, but charge £8.50 per month for the pleasure. **Gateway** is considering offering a similar service although the proposed charge, if any, is not known. Obviously this is a very lucrative market to enter, building a potential marketing database that could be sold off at a later date. Retailers see it as a very worthwhile advertising medium, and I feel that better offers will be in the pipeline as competition hots up.

Let's assume you sign up with Freeserve, the Dixons service. They make profit from the telephone charges. On a 4p per minute standard rate call, BT takes 0.641p. The rest is divided between BT and the Freeserve consortium. The support line will also yield a large profit. Pity we do not have a similar telephone charging system to the USA where all local calls are free! Then it really would be a free service. One telephone company is offering a whole weekend

Fig. 4: The Evertech logo.

connected to the Internet for 1p. (If you know who that is, please let me know!). So, you 'pays your money and you takes your choice'

MATRIX SWITCH

I've heard that **RSD Communications Ltd** are looking at producing a very nice Intelligent Audio/Video Matrix switching box (remote control operated as well as partially automatic), with some goodies such as ZCD to get rid of audio switch clicks, own volume control and adjustable video level control, onscreen display, etc. Other audio effects (sim surround, spacial, 3D etc) could also be added.

The unit would look after all the gear that some people have these days, Nicam Stereo TV, VCR, satellite receiver etc. If you are interested in such a device then give **John A. Ross** a ring on **(01786) 450572**.

COMPUTER INTERFACE

The computer interface problem has been with us since the use of the old BBC B machine and possibly earlier. In those days it really was bad, the CPU clock speed was low and it produced 'birdies' all over the place. Harmonics were rife and, of course, the BBC B was produced in a plastic box - just about the worst thing that could have been used! However, Amateur Radio operators were not considered when this machine was produced.

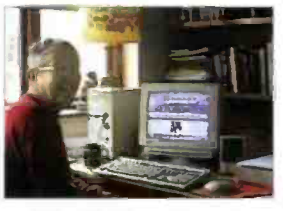

Fig. 5: Your 'new' author, Roger Cooke G3LDI at work!

Obviously with digital signals, harmonic content will be high and the interference will vary/change in frequency according to the various data rates as software is executed. But, at least the modern PC is now usually built into a metal cased box. If your PC is a proprietary brand name, it should meet certain specifications regarding interference. However, most amateurs build their own machines these days and certain precautions should be taken.

The usual thing to do in an amateur installation is to physically separate the radio gear from the computer gear as much as you can. It's also preferable to have two earth systems, one for the radio and one for the computers. Make sure all the interconnection cables are screened and a liberal sprinkling of ferrite rings on all peripheral equipment should be used.

The radio gear should be fed with coaxial if possible and the antenna should be as high as possible. (This would apply anyway!) I use two earth systems, both are six foot copper pipes, one for the radio gear and the other for the PC equipment. So far, I have not needed anything else at all.

At my QTH, h.f. is practically clean, just the odd birdie, although I do get more on v.h.f. However, none seem to cause problems with the Satgate, or BBS system and are, in general, not strong enough to worry about. Providing these normal precautions are taken,

CHRIS EDMONDSON VK3CE LOOKS AHEAD TO THE OLYMPIC GAMES IN SYDNEY

RadioScene

interference problems should be negligible with modern computers.

NEW LIFE FOR OLD

Upgrading the central processing unit (CPU) can be a less traumatic way of obtaining a fast machine than splashing out on a new motherboard etc. Evergreen Technologies have an MXPro upgrade 200MHz CPU for £89, excluding VAT. Upgrading a four or five year old machine can give it new life for a few more years.

Installation is reasonably straightforward, (if you can afford the down-time!). I must admit that I am always very nervous about upgrading my BBS or Satgate machines. Because they are running 24 hours a day, Mr. Murphy usually pays a visit!

To upgrade, put the install disk into the floppy drive, start the machine and this then runs the install program, which in turn determines if a BIOS upgrade is required. The BIOS information is saved to a file so that you can return to the original chip if you want to. The computer's performance is then measured. This gives a measure of integer arithmetic performance that's proportional to the clock speed, measured in Drystones.

Assuming that the PC can be upgraded, all that remains then, is to replace the chip and adjust the clock-speed of the bus that the motherboard uses. Switch on and check the performance. You should find that the performance has increased considerably, depending on the CPU replaced of course!

If you are interested in finding the list of UK distributors, try **www.evertech.com/** (See **Fig. 4**).

DIGITAL CAMERAS

Digital camera devices seem to be catching on now with the latest from Nikon - the **Coolpix 900**. It has an impressive 1.3 million pixels, allowing it to take images at 1,280 x 960 resolution. However, some of the earlier ones are quite presentable and **Peter Hunter G0GSZ** called here one day and took a few pictures in and around G3LDI. I don't know what model he has, but the picture in **Fig. 5** is pretty clean and shows your author sitting at the Library machine, typing this article!

THAT'S ALL FOR THIS MONTH. ANY INFORMATION TO ROGER COOKE. SEE DETAILS AT THE TOP OF THE COLUMN.

There was an error on one of the Web Site addresses in last month's 'Radio Scape'. The address for the **Weather Underground** should have been: **http://www.wunderground.com**

AUSSIE ORACLE

LETTERS AND REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE.

CHRIS EDMONDSON VK3CE, BOX 1 YARRA ROAD, WONGA PARK, VICTORIA 3115, AUSTRALIA

E-MAIL: vk3ce@tbsa.com.au

THIS MONTH, CHRIS EDMONDSON VK3CE EXPLAINS THE REASONING BEHIND THE DECISION OF THE AUSTRALIAN AUTHORITY TO USE SOME OF THE 430MHZ AMATEUR BAND TO HOUSE ALL OLYMPIC GAMES RADIO TRAFFIC IN THE SYDNEY OLYMPICS IN THE YEAR 2000.

G'Day from Downunder! Gee whiz, I really do feel sorry for you lot! We've had a dreadfully bitter winter here way South in Melbourne. It actually got down to 1.8°C one night. Brrr! And now you race headlong toward another chilly winter. For your sake, I hope you get the sunny 24°C we had one astonishing mid-Winter's day!

Oh well, we're only 24 hours away and there's lots of room for one or two more. We always leave the porch lights on, you know and keep a cold tinny or stubby in the 'fridge.

Last time around, I told you about some of the truly generous band allocations we are lucky to have in Australia. This time I have some rather surprising news in regard to one of them, but I suspect the effects of it will be with us for quite some time to come.

THE SYDNEY OLYMPICS, 2000

As you know, the Olympic Games are to come to Australia's most populous city, Sydney, in the year 2000. Organising an event of this size and stature must be a logistical nightmare and its demands on resources of all kinds will be very high. One resource which obviously plays a most important - vital - part is communications and providing enough spectrum to house something as big as an Olympic Games effort poses a unique problem: **where to put it?**

Where spectrum for commercial services is concerned, Australia sees some very limited activity in the low v.h.f. areas and lots of activity around 148-174, 400-420 and 450-510MHz. Basically, that's it. Now, from a commercial point of view, Sydney is easily the r.f. 'sewer' of Australia. Where r.f. is concerned, it's a topographical disaster area. No nearby mountains, but major undulations from one side to the other. So, where Melbourne may need three hilltop sites to cover the entire city and metropolitan area, Sydney needs more like 20 sites of the same or higher power.

Where all this is leading to is that the Olympics posed a unique problem: a need for several hundred available channels, but no suitable spectrum to place them. The answer, I'm afraid to say, is that **part of the 430MHz amateur band will be used to house all Olympic Games radio traffic**. Effective March 31 1999 to December 31 2000, amateurs within 250km of Sydney will have no access to the bottom of 430MHz, from 420 to 433MHz.

While the statement looks pretty draconian, you should understand that our 430MHz band is actually 30MHz wide, so the portion from 433 to 450MHz will be unaffected.

In Australia, we use a 5MHz duplex repeater split, with all outputs between 438 and 440MHz, meaning the repeater input frequencies are above the forthcoming 'no fly zone'. What's more, the satellite service isn't affected, no simplex channels are taken up... in fact, the effect is pretty minimal.

What we do have there, is a lot of repeater links and one of the two 430MHz fast-scan ATV repeater input channels (one is 444.250MHz; the one on 426.250MHz will be 'off limits').

After giving the matter a good deal of thought (in my Editorial Comments column for the November issue) I have given the cautious nod to the proposed use of the band (not that I have any say in it at all, of course!) because of a few things. Firstly, the spectrum people **guarantee** the band's return to us on January 1st 2001 - which effectively quashes our very real concerns for the band's immediate future. Second, I reckon a bit of co-operation with the 'Powers That Be' is a good thing and reflects well on us as a group. Third, if we don't smile and act graciously, they'll simply take it from us anyway, but with no suggestion of future co-operation.

The Olympic radio system sounds quite intriguing. What a shame we won't be able to listen to any of the traffic, though - it's all digital!

I ran the full message from the Australian Communications Authority (ACC) verbatim in the November issue of my magazine *Radio and Communications*. However, for *PW* readers my colleagues in the Broadstone office in Dorset have abstracted the main features of interest for you. (*Sorry we didn't have room for it in full Chris.* ***Editor***).

So here it comes: "A message to Amateur Radio Operators from the Australian Communications Authority regarding the 2000 Olympic and Paralympic Games and the operation of the Olympic Radio Network (ORN)".

The principle focus of the meetings between the ACC, has been to develop radio frequency arrangements that will enable a high quality ORN with minimum negative impact. An important focus has been to ensure that any inconvenience caused to Amateurs due to the operation of the ORN within the range 421-432MHz is minimised. Both the Department of Defence and the ACA have confirmed that the ORN will cease operation on 31st December 2000.

The ORN will be a distinct trunked radio network especially created to support the staging of the Games. Telstra has been contracted to implement the ORN and is now planning the installation and support of the network on behalf of the Sydney Organising Committee for the Olympic Games (SOCOG).

The SOCOG committee has selected a trunked land mobile system using Motorola's 'Astro' as the basis of the network. Astro is a four level f.m. QPSK digital trunked land mobile technology closely related to Motorola's SmartZone trunking system. SmartZone is a proven technology already providing the basis of the NSW Government Radio Network (GRN).

In order to adequately service the administrative, command, control and other functions central to the staging of the Games, the ORN will require a capacity of at least 200 channels.

Provisional planning and modelling is still being performed to determine exact channel limits, however the following arrangements are likely to be close to the final operating arrangements for the ORN. It will be in operation for the period 31st March 1999 to 31st December 2000 to accommodate the period of the Games and the extensive SOCOG lead up test event schedule, location of the ORN is expected to be confined to the Sydney basin, the spectrum to be used is bounded within the following frequency limits derived from 6.25kHz from the lower and upper channels planned:

Base receive 421.00625-421.98125MHz, paired with base transmit 428.0687-429.04375MHz, with a transmit/receive split of 7.0625MHz

Base receive 424.00625MHz to 426.81875MHz, paired with base transmit 429.08125MHz to 431.89375MHz, with a transmit/receive split of 5.075MHz.

Three blocks of frequencies will be used within the ORN. On any particular radio site, only channels from within the same block will be in use. This arrangement ensures that intermodulation products up to the seventh order are avoided in all blocks. However in one of the blocks, up to 15th order intermodulation products will be avoided. Channel width will be 12.5kHz.

The Motorola Astro equipment to be used for the ORN is fully programmable over the range 403-433MHz and the hand-held and base transceivers can all transmit and receive on any channel in that range. The transmit/receive sense of the ORN has also been chosen to further minimise the potential for interference. Motorola's Astro equipment is available in three frequency ranges, namely: 403-433MHz; 439-470MHz and 450-489MHz.

Of these three ranges, the range 403-433MHz is considered most suitable for operation of the ORN because the equipment can be retuned for GRN use after the Games are over. Within this range the segments below 420MHz are already substantially occupied in Sydney by the GRN and other services. Therefore the only viable spectrum that will support the 200 channels or more required for the ORN is the upper range from 420-433MHz.

WIRELESS INSTITUTE OF AUSTRLIA

The ACA release mentioned that the Wireless Institute of Australia's (WIA) President, **Peter Naish VK2VPN**, had been involved in the discussions. So, I rang Peter at his home in Sydney and asked him to write a piece by way of introduction to the ACA story. Here's what he wrote:

The Olympic Radio Network and the WIA: The Olympic Games to be held in Sydney in 2000 will be a most spectacular event and the eyes of the world will be focused on it. The Sydney Organising Committee for the Olympic Games (SOCOG) and its many associated bodies have an awesome task in preparing for the Games. The special requirements for this major event cover every aspect of human resources and modern technology.

With such a complex of people and facilities to manage, the SOCOG and other Olympic committees need a communications network which is totally reliable with 100% availability throughout the area covered by the many Games events. Such a network is being established and one of the key components is the ORN.

In conjunction with Telstra - an Australian Telecommunications organisation - SOCOG have selected the Motorola 'Astro' trunked land mobile system for the ORN. This equipment operates over a range of frequencies which includes the (*Australian*) Amateur Radio 70cm band. (*In Australia*) The 420 to 450MHz band is allocated to Radio Amateurs on a secondary basis with the agreement of the Department of Defence who have primary use of this part of the radio spectrum.

When the WIA heard of the plan to use frequencies in the 70cm band for the ORN, we contacted the Australian Communications Authority, ACA, to express our concern at the possible loss of this popular band. Reacting to the WIA's concern, the ACA arranged a series of meetings attended by the various parties to determine an arrangement whereby the needs of the ORN could be fully met with a minimum of disruption to the traditional use of the 70cm by Radio Amateurs. I am pleased to say that this objective will be achieved although there will be some restrictions placed on the Radio Amateur's use of the lower portion of our band during the period of the Games and the year proceeding them.

As Radio Amateurs we should feel proud that we can contribute to the success of the Olympic Games in 2000. The temporary loss of some of our privileges is a small price to pay for being seen to be part of the team. We have been recognised by SOCOG as a totally responsible body of citizens which enhances our reputation in Australian Society. The WIA in taking this initiative has once again shown the benefit of a national body capable of representing the needs of all Radio Amateurs at the highest levels.

Peter Naish, VK2BPN
Federal President, Wireless Institute of Australia.

THE GOOD NEWS

The good news is that none of the arrangement will impact on European amateurs in any way of course - unless they're coming to VK to visit the games and plan to use low 430MHz frequencies! But I thought I'd tell you all about it this time to show how co-operation with government authorities can sometimes help us to resolve unanswered questions.

The 430MHz band in Australia has been under a very real cloud for years. Here we are, sitting smack dab on a 30MHz slab of the most desirable commercial spectrum there is, with just 13 000 or so active amateurs nationally to occupy it! Were we worried, with thousands of spectrum-hungry commercial users lining up to pounce on the band? You bet we were!!

I need hardly remind you of what happened last year to the hapless amateurs in Guatemala, who lost any access whatever to the entire 430MHz band, quite literally overnight. They didn't even get a chance to say goodbye to the spectrum...!

Our amateur resources should be guarded and jealously protected from greedy commercial interests... but there are times when a little careful co-operation can reap handsome dividends!

I look forward to meeting up with you again next quarter. Until then, I wish you and yours the very best for a happy and safe Christmas and look forward to chatting again in 1999.

Please feel free to write or E-mail me, but please understand that I put *Radio and Communications* together on my own and sometimes simply don't have the chance to respond to mail as quickly as I might like to.

73 Chris VK3CE

GRAHAM G8EMX ROUNDS UP THE LATEST ATV NEWS

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THIS MONTH GRAHAM G8EMX BRINGS YOU ALL THE UP-TO-DATE ATV NEWS ALONG WITH AN UPDATE OF THE 'INTERNATIONAL' ATV CONTEST WHICH TOOK PLACE ON 12 & 13 SEPTEMBER 1998 HIGH UP ON THE MENDIP HILLS.

With the loss of the, now-closed, Granby Halls as a venue, the **Leicester Amateur Radio Show** in September was held at a fresh site - Castle Donington International Exhibition Centre. Among the regular exhibitors was the **Leicester Repeater Group (LRG)** so, before a major power failure plunged the place into near-darkness, I managed to pick up the LRG's latest newsletter, *LENS* and an update on the group's 1.3GHz Amateur TV repeater **GB3GV**.

ATV repeater GB3GV is very much the work of keeper, **David Payne G8OBP.** Repeater transmit, receive and basic logic functions adopt fairly standard circuitry, but this repeater also transmits a cycling display of currently 16 colour pictures while in beacon mode. These have been scanned in from photos onto the hard disc and then loaded onto a 7Mb RAM disc for transmission.

The Leicester Repeater Group would like to see a lot more ATV activity through GB3GV. Keeper Dave has many ideas for future additions. For example, a site camera, a v.c.r. facility, maybe a 10GHz input channel too. But all this takes time and money, so an increase in repeater use by local ATV operators would make such an expansion easier to justify.

'INTERNATIONAL' ATV CONTEST

Boosting on-air activity is one of the objectives of an ATV contest and the most recent, the 'International', took place over the weekend September 12/13. Like all Amateur Radio contests, the objectives were to encourage activity on the ATV bands and see how antennas, transmitters and receivers performed.

After a two-year break, the **Severnside ATV Group** had decided to resurrect its portable station **G7ATV/P** and provide a competing entry for the International contest. The Group had permission to occupy farm land high on the Mendip Hills, so during the few days before the contest, equipment was being checked and taken up to the site.

Fig.1: The huge array of antennas ready for contest action at ATV station G7ATV/P.

The Severnside Group was to operate on all ATV bands up to 10GHz, so an 'antenna farm' of 2m, 70cm , 24cm, 13cm beams and a 3cm dish became held aloft with a 'Versatower' mobile mast. Two caravans and a petrol generator provided ground support for the transmitters, receivers, and reasonable 'creature comforts' for contest operators **Viv and Ivor Green (G1IXE and G1IXF), Ross Wilkinson G0WJR and Ian Bennett G6TVJ.**

By mid-day Saturday, antennas were being fitted and mast-head transmitters and pre-amps clamped into place. G7ATV/P would be using quad-loop 21 element beams for 70cm, fed with maximum legal power giving 35kW of effective radiated power (e.r.p) with some sideband filtering; quad-loop 48 element loop antennas for 24cm, fed by a 75W PA giving 8kW e.r.p; 25-element yagis on 13cm, fed with 800mW giving up to 60W e.r.p; and a single 60cm dish for 3cm, fed with 1W giving almost 2kW e.r.p. To any passer-by, the operation had all the appearance of a major professional broadcaster or communications giant carrying out tests for a new transmission site!

IN THE BEGINNING

The International ATV Contest began at 1900 hours UTC. After only a few minutes a local station called in and the Severnside ATV Group Contest station G7ATV/P was in business. Viv was on the 144MHz 'talk-back' microphone while Ivor, Ian and Ross looked after the multitude of switching.

Lots of switching is involved. A contest vision transmission consists of a numerical group of four non-consecutive digits which the receiving station has to resolve, then add together and reply with the sum (there is a tendency here to see 10 as 'ten' instead of '1'). A different set of four digits is necessary for each band used. If the sum is correct, a valid exchange is logged. Scoring also involves signal strength (picture quality P1 to P5) and distance.

So, operators at contest station G7ATV/P had to establish initial contact on 144MHz, note callsign and location, time of establishing contact, establish first band (or only band) for a vision exchange and then note all this in the contest log sheet for the band, select correct four digits for the band to be used, rotate antennas and select appropriate transceive and receive, select transmit or receive function according to whatever had meanwhile been agreed as a first direction via the 144MHz link, then attempt an exchange in vision, send or accept a exchange report, make a note of that report and contest serial number on the log sheet. Then do everything the other way round!

As the ATV contest progressed into the evening, the 'elevation' adjustment on the 3cm dish proved its worth whenever G7ATV/P was attempting an exchange on 10GHz. Some stations that were unresolveable, even when the rotated direction was spot-on, became P5 (top quality) after just a couple of degrees of elevation or depression adjustment. Even though most of the equipment was 'homebrew', the only failure was a commercial 144MHz linear amplifier.

THE END IS NIGH

On Sunday, as the time approached the end of the contest, I counted that G7ATV/P had achieved eleven contacts on 10GHz, five on 2.3GHz, 18 on 1.3GHz and eight on 70cm. The contest was called the 'International' and, in previous years, G7ATV/P had 'worked' continental ATV stations in the early hours of the Sunday morning. But, none were apparent to the team this time.

The International ATV contest closed at 1300 UTC. The Group considered that their substantial efforts had been worthwhile because, apart from the G7ATV/P score, the station had provided pictures to parts of Wales and to home-based stations that never normally received an ATV signal. The team is now eagerly waiting to see the contest results.

WELL, THAT'S ALL FROM ME THIS TIME - AND FOR THIS YEAR! KEEP SENDING YOUR ATV NEWS AND REPORTS TO ME PLEASE, DETAILS AT THE TOP OF THE COLUMN. A HAPPY CHRISTMAS AND NEW YEAR TO EVERYONE, 73S AND, OF COURSE, P5!

Graham G8EMX

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 SHORE BRINGS YOU MORE NEWS ON THE BROADCAST BAND, THIS TIME INCLUDING SOME INTERESTING INFORMATION ON THE PEOPLE BEHIND WHAT YOU HEAR.

All change please! The BBC went through one of its periodic personnel upheavals in September, this time involving the international radio arm, the World Service. **Sam Younger**, the Managing Director, was replaced at a couple of hours notice by **Mark Byford**, the Director of Regional Broadcasting and, according to press reports, a 'Birt apparatchik'. Younger, who had been head of World Service for the past three years, was reported as leaving 'to pursue other interests', a standard wordsmith-ed phrase that most people have interpreted as 'I was pushed'!

Whether the new incumbent will set about changing a whole lot at Bush House remains to be seen. As this edition of *PW* goes to press, there is still no news on the fate of the German Service which has been threatened with closure despite its 2.5 million regular listeners in Europe. Detailed press coverage in the UK and Germany at the time of the German Service's 60th anniversary on 27th September has started some people thinking about a crusade to save this last remaining western European language service from the BBC.

As the world slides further towards economic recession, it is worth keeping an ear to the international services of countries which are particularly caught up such as Russia and Japan. It is an interesting exercise to compare coverage of the financial situation on these services with the domestic media in the UK - maybe there's even a secondary school project or a university thesis in there if you're of that age!

TROUBLED TIMES

As I write this article it looks as though the situation in the Former Yugoslavia is about to erupt, with the threat of Nato air strikes against the Serbian military. There seems to have been appalling atrocities committed, and it's not easy to work out exactly what's going on in that troubled part of the world. However, you can still hear **Radio Yugoslavia** from Belgrade, daily in English at 0430-0500 on 9.58 and 11.87MHz, 1830-1900 on 6.10 and 9.72MHz and at 2100-2130 on 6.10 and 6.185MHz.

Voice of Russia in English to Europe:

TIME (UTC)	FREQUENCY (MHz)
1700-1800	9.765, 9.740
1800-1900	9.820, 9.775, 9.765, 9.740, 7.350, 7.290, 1494mw, 1143mw
1900-2000	9.865, 9.820, 9.775, 9.765, 9.740, 7.440, 7.350, 7.290, 1494mw
2000-2100	11.980, 11.930, 9.820, 9.775, 9.765, 9.710, 7.350, 1494mw, 1323mw

NHK Radio Japan in English to Europe:

TIME (UTC)	FREQUENCY (MHz)
0000-0100	6.180, 6.155
0500-0600	7.230
0600-0700	5.975, 7.230
1700-1800	7.110
2100-2200	9.725

Keep an ear on the **BBC World Service** frequency of 1296kHz. The transmitter is located at Orfordness on the East Coast and the antenna is tightly focused on Eastern Europe, particularly Poland, the Czech Republic and so on. However, there are rumours that Merlin Communications, the company formed by the management buy-out of World Service transmission, is about to hire the transmitter out to foreign stations. A Belgian station, VT4, has been noted on 1296kHz with test transmissions, and these can only possibly have originated from the Orfordness sender.

It is unclear whether British law permits a foreign station to beam its programmes from the UK to an overseas target on the medium wave band (clearly it is possible on short wave - look at the relays for NHK Radio Japan, the **Voice of America** and so on from former BBC World Service sites), so an interesting situation could develop.

There is now quite a lot of down time on the 1296kHz transmitter following the cutbacks in direct transmission of most BBC World Service language services to central and eastern Europe, so anything could happen!

Radio Iraq International is on the air with English to Europe at around 2100 on variable 11.785MHz for an hour. There is a repeat of the broadcast at 0300 for the Americas on the same frequency which seems to carry all Iraq's international radio services including French at 2030 and German at 2000.

Another station with variable frequency usage is the **Voice of Azerbaijan**. The station has English at 1700 on variable 9.165MHz, followed by Russian on the same channel.

Radio Taipei International - formerly known as the Voice of Free China - is on the air with English (with some relays continuing via WYFR in Florida, USA) at: 0200-0300 on 5.95, 9.68, 11.74, 11.825 and 15.345MHz; 0700-0800 on 5.95MHz; 1100-1200 on 7.445MHz; 1200-1300 on 9.61 and 7.13MHz; 2200-2300 on 17.75 and 15.6MHz.

HAPPY ANNIVERSARIES!

It's been a year of anniversaries for international broadcasters. **Radio Norway International** celebrated its 50th birthday by closing down its English-language service - all 30 minutes a week of it - at the beginning of October **Radio Sweden** had its 60th birthday party at an event in Stockholm on 26th October, and **Radio New Zealand International** reached its 50 year mark in September.

It's good to see that most of the elder statesmen of international radio are still in reasonable health, but I do wonder how many of them will be on the air in another 50 years. By then, the ionosphere on which short wave transmission relies may well be completely taken over by a US military project called HAARP. This aims to convert the ionosphere into a 'virtual' military weapon by charging it with electromagnetic impulses which will allow signals to be bounced off the ionosphere at extra low frequencies to reach submarines deep in the oceans of the world. At the same time, there are over-the-horizon radar applications (remember the 'woodpecker' radar transmission pulses that affected the h.f. bands in the 1970s and 1980s?) to allow low flying missiles to be tracked.

Recent articles in the specialist US ecological press reveal that HAARP went operational in the autumn, and the huge facility in Alaska is now developing applications to help the USA's Department of Defense. If you hear some strange noises, you'll know what they might be.

THAT'S ALL FOR THIS MONTH. KEEP ME UP TO DATE WITH WHAT YOU HEAR. GOOD LISTENING.

73! Peter.

PRACTICAL WIRELESS INDEX VOLUME 74 JANUARY TO DECEMBER 1998

PRACTICAL WIRELESS INDEX VOLUME 74 JANUARY TO DECEMBER 1998

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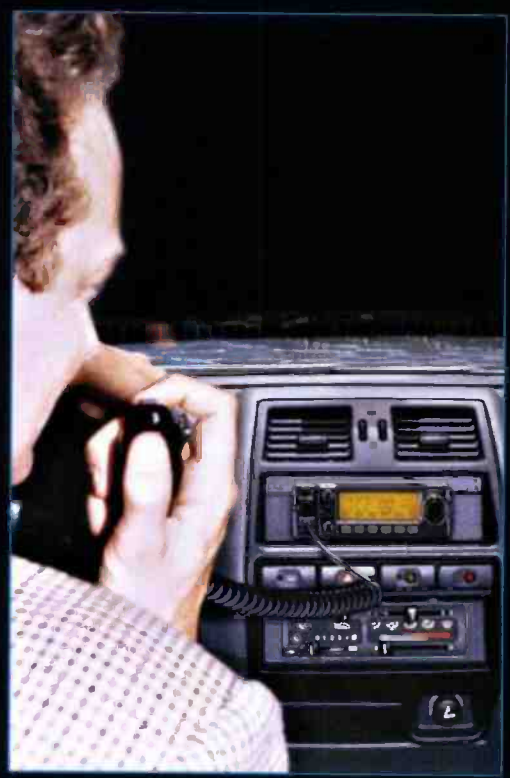

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