H.A.R.S. Journal

Journal of the Hereford Amateur Radio Society

Issue No 5 • December 2016

Editorial

Thanks Nigel for your seasonal greetings below. The Committee and Members wholeheartedly wish the same to you and your family too. Nigel is right to highlight the need for younger members to join the club. It is likely that very few enthusiasts will want to learn to operate using CW nowadays and the off-the-shelf black-box transceiver has all but destroyed the thrill of home construction. A great deal of imagination is needed…… but it is an interesting challenge nevertheless.

On another note, we could ponder upon the possibility of raising the cash to send G1YBB on a DXpedition to Christmas Island (VP9); so that Steve can have the pleasure of seeing-off the rest the world – surely the ultimate contest!

Ed

Christmas Message from Nigel G4XTF, our Chairman

The last few months have shown that HARS can be an active and successful society. Steve Clements G1YBB and Paul Neades G1YFC are to be congratulated on their individual results, being overall winners, in the Practical wireless 2m QRP contest. Whilst the club can bask in the reflected glory of their considerable efforts it was also recorded that HARS was the top fixed station and we are now awaiting the results of the 4m contest. It would be good to see us all becoming more involved in the monthly contests and ensure we submit our individual logs so that the club benefits from the accumulated points.

However, there is one major point of concern that has puzzled the committee for a while and it the loss of those people that we have trained and who have passed the Foundation Level and Intermediate Level exams. What are we doing (or not doing), which is putting these young folk off? What can we do as a Society to encourage them to remain interested in this fascinating hobby? This problem needs to be addressed pretty quickly or the club will die out literally in a few years time, something for creative consideration.

Christmas festivities begin in a few weeks so I would like to take this opportunity to wish you all a blessed and happy Christmas and a healthy and successful New Year. May your antennas stay high and your SWR remain low.

73 Nigel G4XTF

Contesting

On the night of October the 7th we were treated to a "Contest" master-class by Steve Clements, G1YBB. Steve, well known to all by now, is a perennial high-scorer and has demonstrated exceptional prowess in winning the 144MHz 2016 Back-Packers challenge.

This is essentially a two-man operation and due recognition was given to Paul G1YFC.

The favourite QTH for this is 800m ASL (Pen-y-Gadair) in the Black Mountains range.

Steve outlined some of the extremes involved in preparation, skill and commitment. For example, the weekend contesting covers the period from May to September each year, suffice to say that contesters have to be resilient and take on the weather whatever it turns out to be.

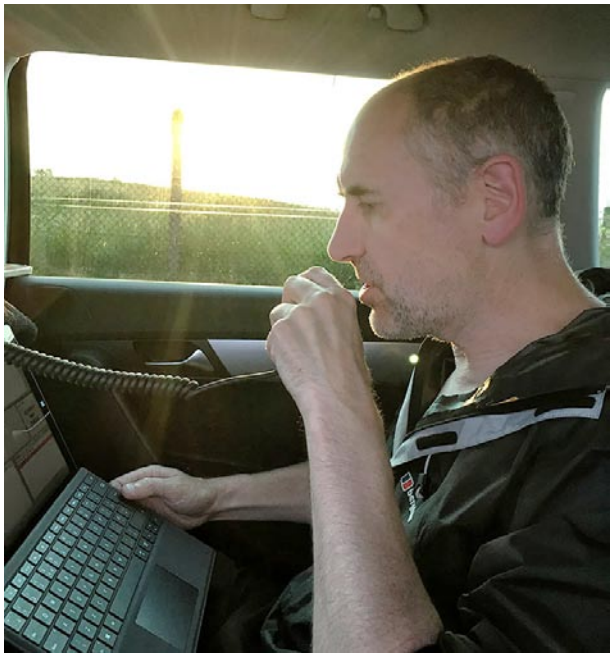
Everything has to be carried to the mountain top so a great deal of design detail goes into the "weight-to-signal-quality" equation with the accent on S9 results. Take, for instance, Steve's special yagi designed for results! If you would like to see the professional, and workman-like detail which has gone into building the antenna, you must, if you can, visit http://g1ybb.uk/portable-9-element-144mhz-dk7zb-long-yagi/

Stop Press!!

The PW Low-Power 2016 contest winner has been announced…….yes!.....you have guessed it! G1YBB. Our Steve has done it yet again using 2.5W from his FT-817 from the top of Pen-Y-Gadair. And….to boot, Steve won the UKAC 144MHz Low-Power October contest operating from Dorstone using 10W out of an FT-225RD. Note that this UKAC is held during the first Tuesday night in the month and is an all-year-round competition. To add to the score, Bob G3IXZ, operated on 70cms SSB at the same time.

Steve's hope is that more club members will assist and go for contesting in a big way and put Hereford and the Club in an increasingly unassailable top-of-the-table winners position.

(Congratulations Steve & Paul….Ed)



Steve in operating mode

Museums of Particular Interest in Wales

Bob, G3IXZ, brings to our notice news about the excellent **Welsh Radio Museum** based in Denbigh North Wales. This museum houses the personal collection of David Evan Jones who died in 2008. Mr Jones had collected broadcast radios which were manufactured from 1922 to the mid-1950s.

All of the radios have been beautifully restored including an exquisite 1922 Marconi crystal set in a small but smart wooden case.

The telephone number is 01745 812287 and there are various connecting websites but the main site is www.gwefrhebwifrau.org ; well worth a visit.

Whilst in Wales try and get to see the **Museum of Fire and Power**. This museum is 8 miles north of Cardigan (on the A487) and has 20th century working engines of all types and sizes beautifully displayed and mostly working. Individual exhibits are fired up at different times.

There is a super working amateur radio installation GB2MOP from which you can operate.

The website address is www.internalfire.com and the post code is SA43 2JS

Thanks, Bob... Ed.

HARS members at GB0LSG - JOTA '16

HARS Club members Matt G8XYJ and Dave G4OYX were heavily involved in the set-up, operation and de-rig of the two radio stations for **GB0L**udlow**S**cout**G**roup at the Jamboree-on-the-Air camp at Doddington Village Hall on the SE-facing slopes of Clee Hill at a wonderful 300m, 1000' ASL.

The Scout Leader Gillian and her husband Philip G4HQB were the main movers assisted by other Scout Leaders including Jeff Williams from the local area.

Some 30+ Scouts (girls and boys!) from Ludlow and Cleobury Mortimer made up the contingent over the weekend of 15 and 16th October. They camped in the grounds of the Hall and the scheduled activities were orienteering, amateur radio and electronic kit construction to name but a few.

The stations

G8XYJ, G4OYX and G4HQB set up the two stations on the Friday afternoon, the VHF/UHF one comprised an Icom 2820 for FM and D Star operation into a Diamond X50N collinear and a FT857 for 2m SSB into a 10 element Diamond Yagi.

These two antennas were mounted on four sections of ex-East German Army composite swaged poles and directionality for the Yagi was by the Armstrong method. It took us a while to ascertain that the hall was NE/SW and what we thought was south was really east-south-east!

The HF antenna was a M0CVO HW-40HF off centre-fed dipole for 40-10m and was mounted on seven of these composite swaged poles in an inverted Vee configuration NE/SW. Phil's Icom IC-518 was the HF transceiver and KW Ezi-match ATU.

On both mounts verticals on the building were used as supports assisted by cable ties. The HF support pole needed guying and two guys were easy to achieve but a little ingenuity was required to place the third guy over the roof of the single storey building. What was required was something weighty on the end of a rope thrown over the roof. We settled on a small 300 cc plastic drinks bottle suitably filled with an amount of water. This worked well and the windows on the far side of the building were avoided!

12 element Yagi and Co-linear antennas

On air test

RF tests showed the VHF and UHF antennas, as expected, were OK and Matt was able to hear the 2m beacons at Kent GB3VHF 144.430 MHz and Hellenthal-Miescheid DB0JW 144.414 MHz

The HF antenna was also very good, there being a low noise level on site and G4HQB found that the combination of good antenna height, it being in the clear and being supported by RF transparent swaged poles meant that an ATU was not required with a good SWR on all bands.

Matt soon discovered that GB7WF Bewdley, was S9+ and that D Star was FB through it including the option to operate within cells abroad. HARS GB7VO was S3.

Come the Saturday

On the Saturday we were pleased to see all the antennas rigged the day before were still in place!

Matt G8XYJ with Scouts on the VHF/UHF transceivers

Matt kicked off the VHF/UHF operating and over the day had simplex SSB contacts with the following JOTA stations:

GB0SBG Banbury and GB2GMN Manchester, then on D Star Milton Keynes and GB2GCS Cleethorpes.

In addition on SSB they worked Steve, G4FOH in Royston Herts, M6ZUF near Junction 18 on the M1, M0AFJ Tim in Milton Keynes, Giles M0NXA our RSGB Regional Manager in Cheltenham. On FM they worked M0STN in Banbury.

On D Star they worked MW0GUK, George in Abergavenny, Paul G0RLJ in Kilburn, Derby via GB7WF and KS5V, Dan in Houston Texas.

There were many more local stations but regrettably none identified as being HARS members.

On the HF Phil and Dave worked the following JOTA stations on SSB on 40m

GB0SPS South Pembroke Scouts, Manobier South Pembrokeshire.

GB2SPX Norwich, Norfolk. The Ludlow and Cleobury scouts exchanged messages with the scouts on the above stations.

And another special event station GB0ELR East Lancs Railway on 40m.

40m was very busy on Saturday and it was difficult to find clear channels. We did try 20m but propagation was unreliable and there were few JOTA stations with good clear signals. We have found that solid copy is a requirement for the inexperienced youngsters as they really need to hear all the QSO to stay in touch. Hence VHF/UHF and particularly on the digital modes is preferred for best copy particularly if there is a lot of background noise in the room.

The kit-building

Scout Leader Jeff Williams was the main mover with the electronic kits. It was found that a popular one was the Dutch Windmill comprising a small pcb with the four windmill blades having red and green LEDs. It can be seen on the following website www.kitbuilding.org under the heading Light-Mill and it is aimed at the Scout market.

Jeff provided four Antex 15W soldering irons though it must be said that the bits were in various stages of repair and some joints could be a bit tricky to achieve though Jeff was wise to have a supply of 60-40 tin-lead solder rather than the newer lead-free type. With G8XYJ busy on the VHF/UHF and G4HQB on the HF, G4OYX was assisting on the builds and noticed that the girls were on the whole much more careful in component selection and assembly compared to the boys. Most of the kits worked first time. There may well be some fault-finding going on this week at the QTH of G4HQB!

More HF

Phil did try for more HF QSO's over the Saturday evening but RF propagation conditions were not favourable and with 30+ scouts in the main hall there was a lot of background noise!

Sunday de-rig and conclusion

By Sunday morning it was the end of the camp and we returned to site for the de-rig which went well. All the /A equipment is packed up and ready for the next time. It was enjoyable to see the youngsters getting stuck in to the comms and the kit building.

As in the past at these events Matt and I were made very welcome and the food provided was excellent! It is a good couple of days and well worth attending if you want to have a go at operating and also demonstrating the hobby to the youngsters. We have one scout who would like to attend a FL Course!

(Thanks Dave and Matt.....Ed)

Stop Press... Congratulations Abound

Congratulations to these guys who recently took the Radio Ham Intermediate Level Exam. Everyone passed and we hope to hear their callsigns on the air soon. Will all of you please keep in touch with the Journal (Ed: Mike Bush G3LZM) as we would all like to hear about your first steps into this great hobby of ours.

... *Ed.*

Left to Right: Graham Jacks, Andy Gray, Neil Collins, Geoff Marfell, Richard Webb

A Nifty Component Checker for next-to-nothing!

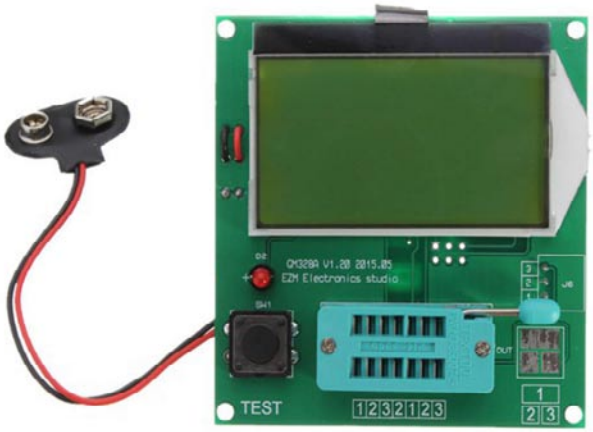
by Duncan, M0OTG

As many Club members will know, I like old stuff. The glow of ancient valves, forgotten transistors in little aluminium cans, the green glow of cathode ray tubes and the heft of brick-sized, hernia inducing transformers; all of these get my juices flowing. If the equipment is not working, I enjoy trying to get it going again. But if the electronics are well and truly shot, then there is still some educational fun to be had in dismantling things and extracting all the useable parts. This leads to the accumulation of large quantities of components of uncertain quality and often, unknown value in terms of resistance, capacitance or inductance. Inductors are seldom marked, capacitors often have cryptic coding and resistors, if they are any age at all, seldom seem to agree with the coloured rings on the body. Then there are transistors - are they duds or is there the spark of life left in them?

The all-important device-under-test ZIF connector.

So, if you lurk in this world of electronic recycling, you need a way of checking components and getting some idea about whether this or that transistor is going to do the job. You might also be assembling a kit and it is always good policy to check the ingredients before wielding the soldering iron.

This is where China can help. There is a little gadget called a GM328 which costs about



£10 and will measure just about anything, presenting the data on a little LCD screen. An ebay search will throw up a number of variations on the basic design, some even available as kits. The version that I have seems to be reasonably accurate although I have not attempted a systematic check. Powered from a 9v battery, it comes as a small printed circuit board fully assembled and with the LCD screen in place. I have installed mine in a small plastic enclosure although I had to fit a different design of push-switch in order to do this. There is a simple wire-clamping device on the front making components easy to measure. Transistors and diodes can be inserted any way round because the unit detects the orientation automatically.

Example display for a semiconductor device.

This is a sophisticated little device at a bargain price, check it out at www.banggood.com and look for item GM328A.

Duncan James (M0OTG)

The G-QRP Mini Convention 2016

by G4XTF

Early on the morning of the 22nd October Bob G4IXZ and Richard G4FAD and myself set off for Rishworth School, Ripponden. It was not a bad morning WX wise and the journey was a pleasant one. The parking was the usual abandoning of cars along the road outside the school. As we had items for the "bring and buy" sale we managed to park close to the school to save carrying heavy equipment a long way.

As usual, the clientèle were all past their sell by date, including yours truly. However it was good to meet old contacts and make new friends whilst having coffee or consuming the famous "Pie and Peas" followed by Apple Tart and Cream. The beauty of this convention was that the lectures drew people away from the main hall which made looking at the stalls very pleasant indeed. We did attend the last two lectures however.

Lecture 2 by Rex Harper W1REX

"Building QRP kits on the kitchen table"

Rex is the owner of QRPme and Tuna tin kits. He talked about building these in the domestic and out-in-the-field environments. After his talk he hosted the UK's BIGGEST Buildathon where everybody received an RF Probe Kit that we built there and then, whilst sitting or standing, in the crowded lecture hall. Apparently 110 kits were constructed!!

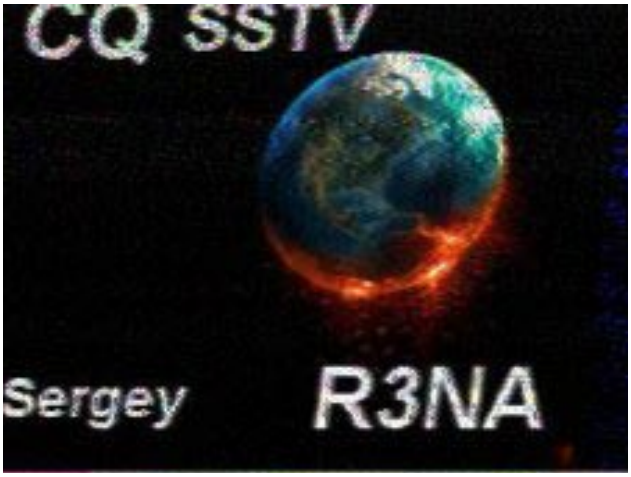
Lecture 3 by George Dobbs G3RJV

"Speaking of QRP ….. club and personal"

George reminisced about 40 years of the G-QRP Club and also took time to look forward at the life of the club.

Unfortunately, this was the last QRP Convention as its committee members are now feeling unable to continue. We observed that the several hundred visitors were mostly over sixty years of age and a high percentage of which we thought were "north" of seventy. Sadly, it seems that QRP does not appeal to the younger radio amateurs, which is a great pity.

Nigel G4XTF



Pics A and B: Typical Received Pictures (about 1 min) (14.230MHz)

Amateur Television Update and SSTV

In the last issue it was shown how there seemed to be little or no activity in our area. Bristol being the nearest repeater. There is the now the possibility, however, that a TV Beacon and test card may come to fruition as a beginning.

Of course the argument prevails as to the relevance of ham TV now that even home made films can easily be shown on the Internet for world-wide consumption. But, surely the point is that communication over radio by whatever means, is the holy grail of amateur enthusiasts wishing purely to construct and implement equipment to bring this about; and the exciting technical achievement which ensues.

So here is another medium to ponder upon…… **SSTV**

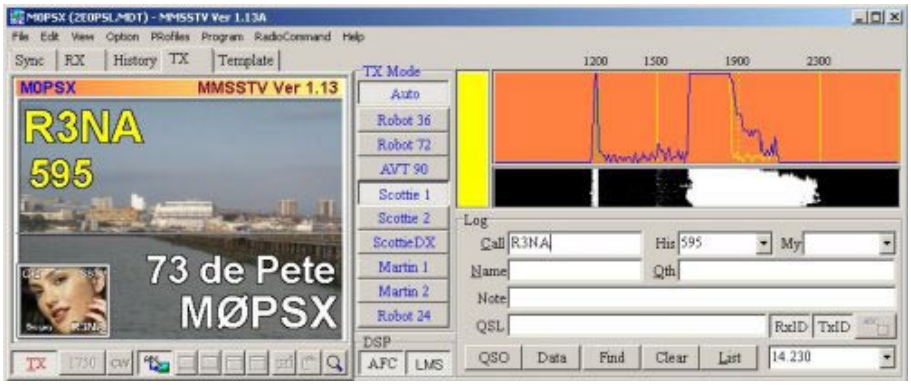
As just about everyone knows, SSTV stands for "Slow Scan TeleVision" which is a mode whereby digital-data pictures can be sent across the world using the HF bands.

To do this it is necessary to connect your radio rig to a computer with software installed to send and receive images. One of the popular applications is MMSSTV, written by JE3HHT which is a free download.

Connecting your computer to your radio can be tricky. You need to connect output of your radio to the input of your computer's sound card using a TNC (terminal node controller) as shown in the picture below.

Pic C: Digimaster Pro CAT interface box

Using the MMSSTV software application, an outgoing image would look like this…..



Pic d: Sending an SSTV image using the MMSSTV application.

If you think SSTV might be for you, give it a go. Please do let me know how you get on. Ed.

Some of the content of this article is by kind permission of Pete G0PSX and the Essex Ham website www.essexham.co.uk

Weather Balloon Data Analysis

by Ryan Ing

In the last issue of our Club Journal we introduced Ryan Ing, a head pupil at the John Masefield School Ledbury, who designed and launched a weather balloon as a study project.

We reported that it was an almost perfect flight and Ryan has now kindly sent the following collected data presented most professionally; to share with us.

Here is an analysis of the data collected by the weather balloon at 10:30am on Thursday 15th September.

Highest altitude (ft)	81,500ft
Lowest recorded temperature	-50.9
Lowest recorded pressure (hPa)	32
Maximum horizontal speed (mph)	122.8

(The sounding below shows a comparison of the different readings against altitude. The atmospheric pressure reading has been converted from hPa to kPa for better scaling.)

From this graph (Fig. 1) we can determine a number of different characteristics of the atmosphere and conditions on the day of the launch.

Height of the tropopause:

The slope of the temperature curve is known as the lapse rate. One of the main details you can see on the graph is the negative lapse rate, known as an inversion, after 12,000m. The point at which the temperature stops decreasing is known as the tropopause and marks the transition between the troposphere (where all our weather systems are) and the stratosphere. On the day of the launch the tropopause was at roughly 12,500m.

The reason for the inversion in the stratosphere is due to the major part the ozone layer plays in warming of the air at this altitude. The ozone layer absorbs energetic ultraviolet radiation and some of this absorbed energy heats the stratosphere.

Cloud Layer:

Temperature inversions can also be found in the troposphere and can happen for a number of reasons.

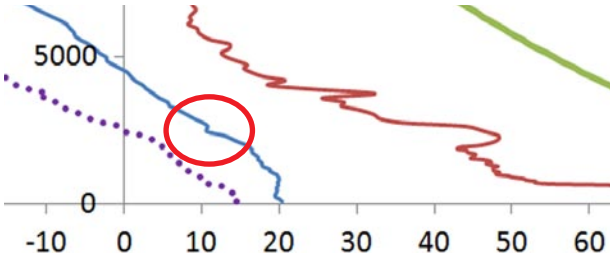


Figure 2) Temperature detail

On the above graph (Fig. 2), you can see a small temperature decrease at 2000m. A number of different events are also happening

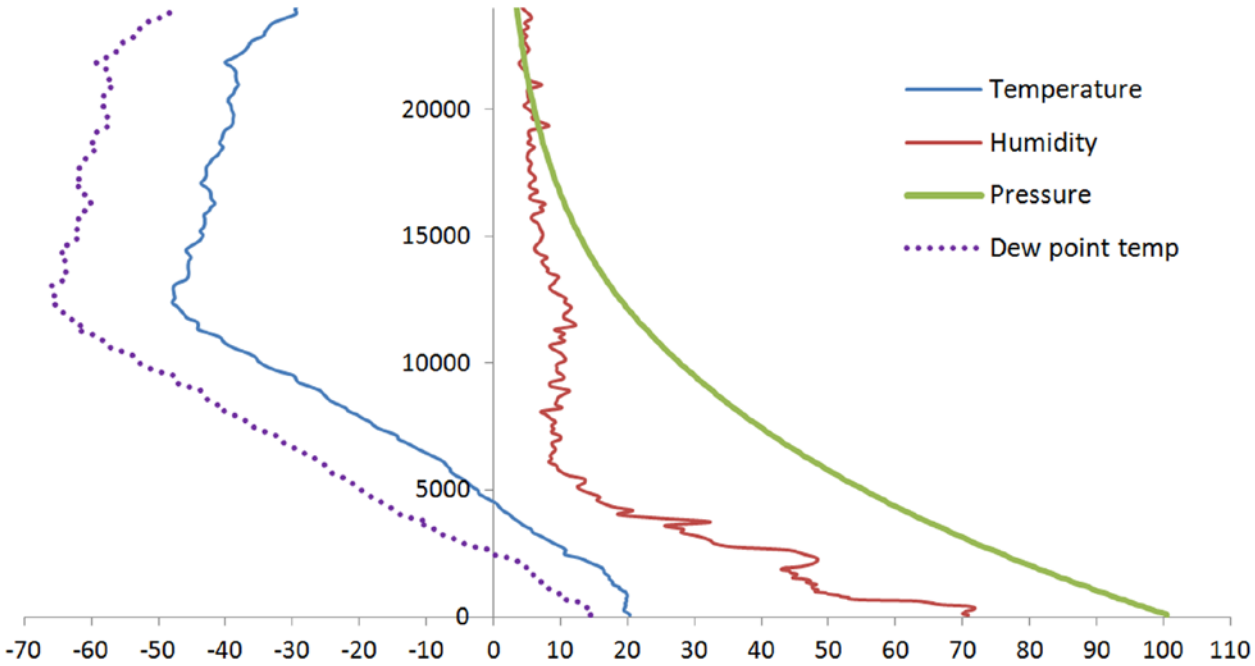


Figure 1) Comparison showing Temperature, humidity and pressure against altitude.

at this point. There is a rapid increase then decrease in humidity, and the dew point temperature is at its closest to the ambient temperature. From this we can determine that the payload most likely went through a small layer of cloud at 2000m. The small decrease in temperature is due to moisture on the instrument which evaporates, causing some latent heating.

Boundary Layer:

The lapse rate varies up until a point at around 2600m, the area below this altitude is known as the boundary layer. It is the part of the atmosphere which reacts with the earth's surface, which can cause turbulence from buildings and heating through convection. These processes cause the temperature to vary a lot until it is above this layer, which can clearly be seen on the graph.

Pressure:

The atmospheric pressure decreases with an exponential trend to 32hPa, which means that the balloon ascended to above 96.81% of the atmosphere. From this point the atmosphere continues for another 76km with decreasing pressure until the Karman line at 100km, which is the internationally accepted boundary where space starts. There is no definitive line of the edge of our atmosphere; the pressure just decreases more and more until it is a near vacuum.

Adiabatic lapse rate:

Meteorologists use the lapse rate as a way of measuring the balance of air parcels in the atmosphere, from this they can tell whether the atmosphere is unstable or is in equilibrium. There are 4 forms of adiabatic lapse rate. The data from my launch suggests there was a normal or moist adiabatic lapse rate of 6.21°C per 1000m:

- Isothermal (lapse rate is zero, temperature doesn't change with height)
- Normal (Normal decrease in temperature with height)
- Dry Adiabatic (Air is dry, lapse rate = 10°C/1000m)
- Moist Adiabatic (Air is moist, lapse rate = 6°C/1000m)

Wind:

Despite it not being a very accurate way of measuring wind speed, the payload contained

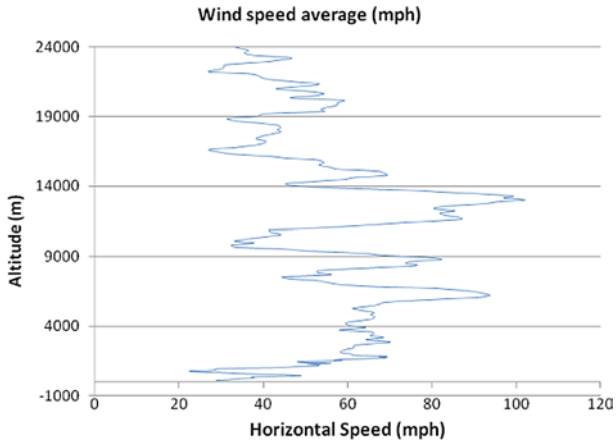
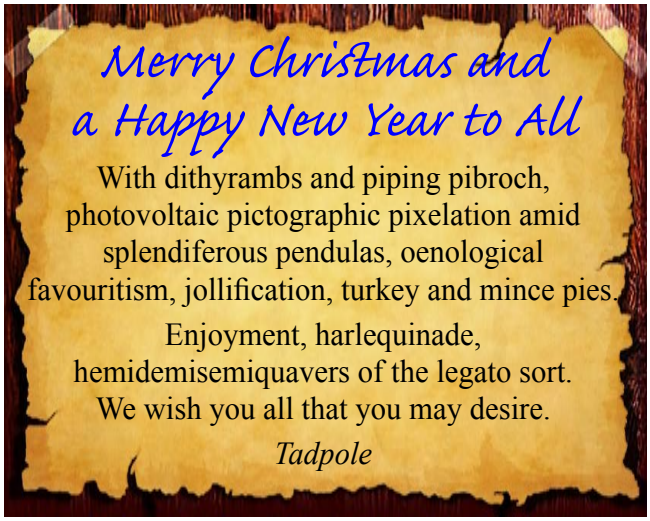


Figure 3) Velocity

an accelerometer which measured the horizontal velocity.

As you can see from the above graph (Fig. 3), the maximum horizontal velocity was recorded at 13,200m – the jet stream lies between 9,000m and 16,000m, which is clear from the graph.

Many thanks, Ryan... Ed.



Santa Claus Lappland

During this Christmas period do join in with countless others looking for a QSO with **OH9SCL** operating from the Arctic Circle in northern Lappland, Finnland. This station is on the air every year over the festive period. The station will be found on all HF bands, all modes. Usually the frequency will be 25kHz from the band edges.

One Man and his Station

Bob Bowden G3IXZ

My station has had so many changes since I was licenced in 1952 that it is impossible to find the space to recall them all. However in the beginning there was "TRF Rx and 2-Valve Tx" – fitting to my youth - I was 17 and lacked any money. I was earning £2.00 a WEEK as a PO Engineering apprentice, which forced minimal equipment and a simple CW only station. Phone (AM) was prohibited for the first year of the licence.

Bob's Station

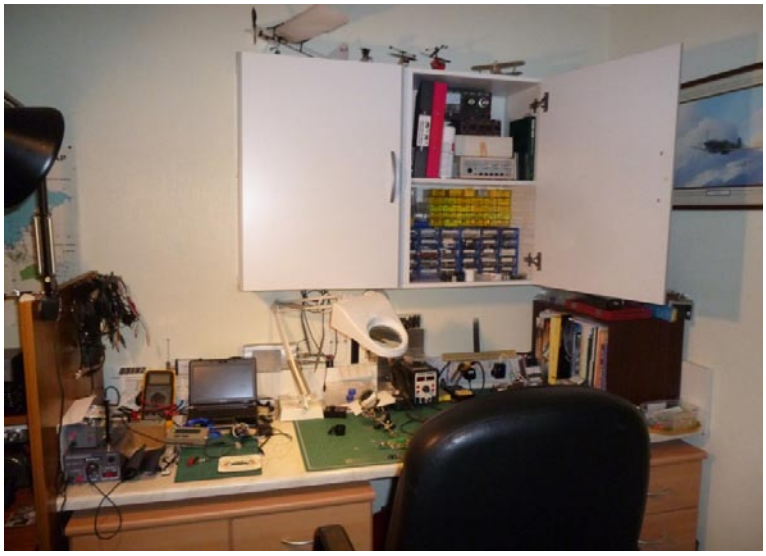
A year later, with the help of a loan from my Dad, I bought (for £5) an ex-RAF R1155 Rx. It was in a dire condition, but I acquired a circuit diagram and proceeded to remove all the MF D/F coils and cleared the decks on the chassis, which permitted me to build a small mains PSU in the space available, plus a compact 6V6 – 6L6 transmitter. CW only - of course. The R1155 performance as a receiver left a bit to be desired but I tweaked it as best I could and the rig gave me a lot of fun working all over Europe and also some DX, using xtal control on 7015 KHz.

When called up for my National Service in October 1953 I was "fast tracked" as a Junior Technician air wireless fitter, because of my Post Office Radio station apprenticeship and a lot of City and Guilds tickets I had acquired by extra study. This meant I soon took the rig to my Unit billet in Gosport, where I used it again working all over Europe – in particular working many Russian stations. This was a risky business, as my Unit was a secret ant-submarine torpedo trials unit - and I was the main radio element of the flight trials team. Thank God, no one monitored my operation while I was there !

After demob in 1955, I returned home to Essex and operated various bits of Ex-Gov equipment available in those days – eventually acquiring a RCA AR77E Rx, (for £10) which performed beautifully with Amateur Band band-spread and weighing about a quarter that of its big- brother the AR88. In 1962, Don G3FKH and I won the CW NFD Bristol trophy using this RX.

Despite getting married in 1957, I never stopped my amateur operations and in 1958 built a compact SSB Transmitter – partly from a design which appeared in QST magazine circa 1958, which produced a lovely quality single sideband signal. Uniquely, it used a home brew HF SSB filter using 4 surplus FT243 crystals, which I etched to frequency using ammonium bi-fluoride! I believe this might have been the first use of a, home brew, HF SSB xtal filter in the UK and I remember working the great G2DAF, while he was holding court about his own 455Khz filtered rig; when he summarily dismissed my efforts! Little did he know that within 10 years, HF filters would be just about the only game in town! You will gather that much of pleasure in the hobby has come from Home-brew and QRP and that theme has continued throughout.

My current station (above) however, uses commercial gear as you can see and is based around a centrally placed Flex 3000 SDR transceiver for HF and (to the right) a FT991 for VHF/UHF (and digi-modes). I also have a much used FT817, used when /P or /A, and also with transverters. It is hard to justify designing and building your own Transceiver now, with the sheer volume of relatively low-cost and second hand equipment available from the amateur "emporiums". However, I get a lot of pleasure building small circuit add-ons and converters and particularly, in recent times, using Surface Mount techniques. I still get satisfaction from simple design and always hope to produce an optimum simple QRP transceiver – possibly using some new element of technology.



Workspace and Antennas

My work bench, next door to the station, is usually a mess, but then it has always been like that.

Building equipment is an "iterative" process and proceeds in bursts with retrenchment between. This is how it has to be for real progress and continued stimulation, and I am deeply suspicious of immaculate workbench areas! There is nothing fancy in my test kit. The scope is a PC based design from China and the sig gen is a synthesizer also driven by the PC. A low cost SMT work-station is an important part and behind the open cupboard door are a pile of Ice Cream boxes containing current projects under design and/or construction. Many I will probably never finish unless I stop doing anything else!

The appended picture of antennas, shows that it is perfectly possible to mount 4 bands on a single 5 foot stub mast. A band triplexer helps! The 4 metre Moxon beam at the bottom is under redesign using aluminium tube, which should push up the Q and improve performance. All antennas provide a good VSWR despite the close spacing. Home, is only 75 metres AMSL and I have never heard anything on 23 cms!

I have to admit to being a CW man at heart and always have, which makes dx working with QRP quite easy – as long as you are patient. However, I do sink to QRO (100W) when working my old work colleagues from the past on regular skeds. Such QSOs are more than just "contacts" of course.

Tips, from an Old Timer? Well, I am not the only relatively OT club member but let me suggest:

- Keep a log; it's nice to look back many years later and recall the time and contacts. Make sure the log contains some reference to your current rig, you can easily forget as time goes by.
- Try to keep up with the technology if you can and "make" stuff, no matter how simple. Your licence provides privileges that many will envy – use them and keep active.
- Finally, as a hopeless CW "case" myself, try to learn the code. It opens up new vistas of world-wide contacts with simple equipment.

Amateur radio is a hobby for life and you don't need special health to enjoy it.

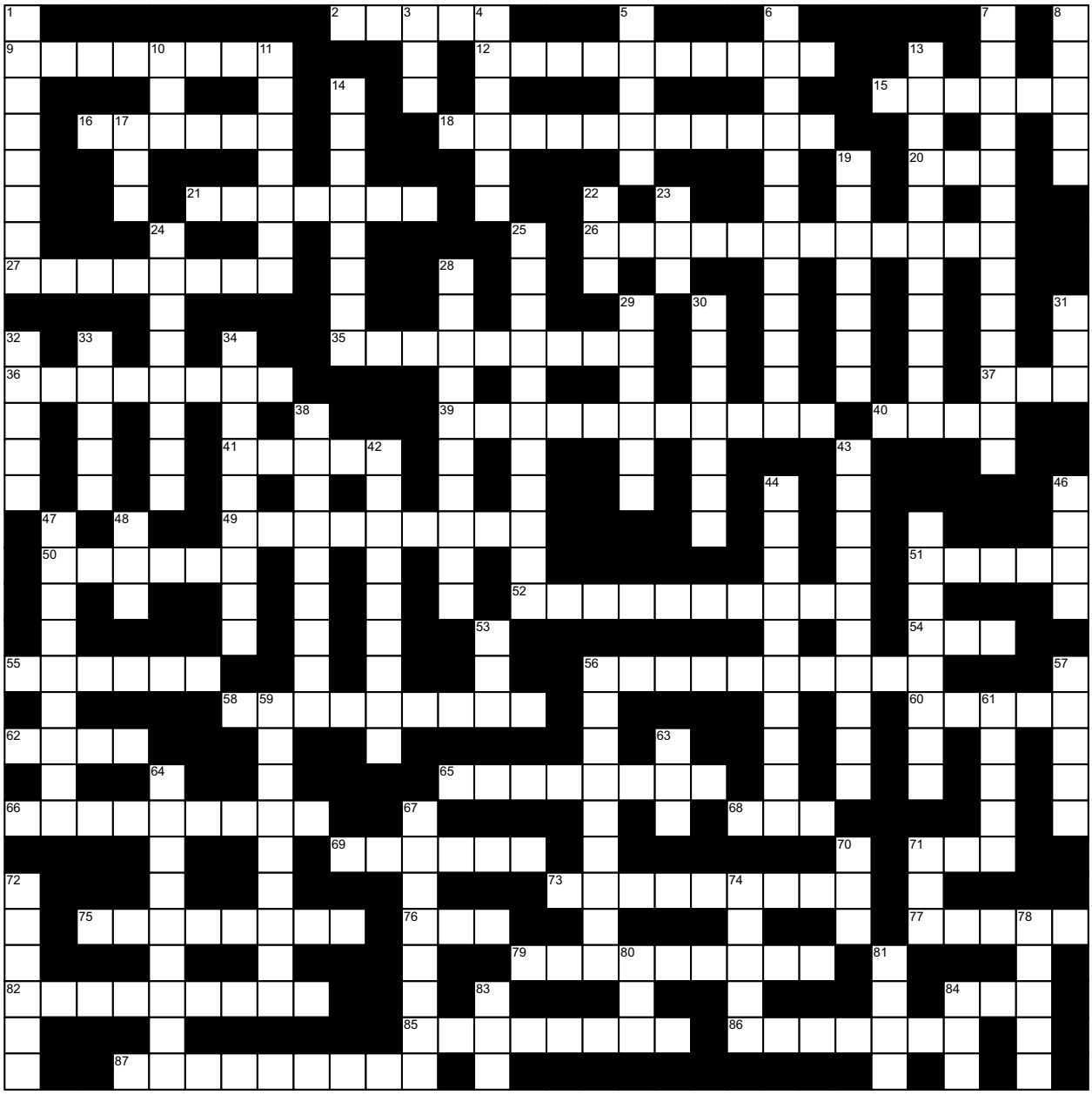
That's it. HARS has become a great and improving club, thanks much to Geoff's generosity in providing us with a really nice QTH. I believe we should involve ourselves in the hobby as much as we can and put Herefordshire on the map. Half the population of the UK don't even know where Hereford is, so let's ensure we disabuse them in this hobby at least !

Very best 73 de Bob G3IXZ

Wonderful, Bob... Ed.

Crossword

So you think you know the magic of the Foundation Licence?..... try your hand at this!



Across

2. RF Transformer (5)
9. Resonance checking device (8)
12. Signal reducer (10)
15. Colour code for 4 (6)
16. Receptacle for plug (6)
18. Omnidirectional antenna (11)
20. EM11 valve tuning indicator (3)
21. Cells in series or parallel
26. Polarised capacitor (12)
27. Two into one (8)
35. Crossed dipole (9)
36. Discharges antenna static (8)
37. Hot part of soldering iron (3)
39. Tunable vertical (11)
40 Eight bits? (4)
41. Full wave (5)
49. Efficient vertical antenna (9)
50. Difference between transmit & receive frequency (6)
51. Colour code for 5 (5)
52. Audio reproducers (10)
54. Transistor type (3)
55. Propagation indicator (6)
56. Simple AM receiver (10)
58. OZ (9)
60. VU (5)
62. Teleprinter signals (4)
65. Product of AM (8) (8)
66. Type of modulation (9)
68. Transistor type (3)
69. Type of balun (6)
71. Atmospheric noise (3)
73. HF frequencies (9)
75. Multiple of a frequency (8)
76. Ceramic insulator (3)
77. Colour code for 0 (5)
79. Frequency shift by modulation (9)
82. Three into one (9)
84. Contact
85. VOIP for radio amateurs (8)
86. Transistor lead (7)
87. Harmonic tester (9)

Down

1. The second of three (8)
3. Sideband lower in frequency than carrier (3)
4. Very selective bandwidth (6)
5. Positive electrode (5)
6. Needed to tune long wire antennas (12)
7. Variable inductor (13)
8. Energy (5)
10. Avoidance of interference (3)
11. Used to steer directional antennas (7)
13. Ability to separate one station from another (11)
14. Receiver with an I.F. (8)
17. Unit of resistance (3)
19. These happen when rare callsigns are operating(7)
22. Positive wire colour (3)
23. Paddle (3)
24. Cooling device (8)
25. Type of filter (11)
28. Reflective layers around the earth (10)
29. Transfers RF from radio to antenna (6)
30. Logarithmic power ratio (7)
31. Lower power (3)
32. Unit of capacitance (5)
33. Colour code for 1 (5)
34. Power that is not absorbed by antenna (9)
38. Type of modulation (9)
42. Initial setting up of a radio (9)
43. MRF646 (10)
44. The first of three (10)
45. LU (9)
46. Group of radio frequencies (4)
47. Transistor lead (9)
48. Type of oscillator (3)
53. Cooling device (3)
56. Type of filter (9)
57. Ground (5)
59. AC resistance (9)
61. FET connection (5)
63. Plug (3)
64. VK (9)
67. Monitoring device (8)
70. Antenna design software (3)
71. Fading (3)
72. Used to improve frequency selection (6)
74. Colour code for 9 (5)
78. Transfer memories between radios (5)
80. Charged particle (3)
81. Antenna sky hook? (4)
83. Unit of conductivity (3)
84. Standby (3)

The crossword answers will be available by accessing the club website www.HARS.Wagnet.co.uk by clicking on the "reveal" button.

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Dear Member

Please note that the *Journal* will be issued more regularly based upon available content.

Please think about submissions/projects you might like to send in or see.

General topics and key words are listed below.

Members projects	Events	Training
Members station	Notices	QRP/QRO
Construction	Help	Illustrations
Items wanted	News	Photographs
Items for sale	DX	Early radio
Hints and kinks	Militaria	Restoration...

... or anything else that you think might be of interest to HARS members. If you have an idea for a submission, but don't know how to present it, feel free to ask for advice.

Please submit anything and everything to topix@hars.wagnet.co.uk or talk with Mike at the Club meetings.

73s es GDX, G3LZM
Mike Bush (Editor)

What Happened in 1967?

Pulsars were discovered, the Torrey Canyon ship disaster happened, NASA launched Orbiter 3 to photograph the moon and Twiggy introduced the mini-skirt. But, more important than all of this, Stuart Powell obtains his G3WRA call!!

The picture shows willing amateurs putting up Stuart's new Mosely TA33Jr 3-element beam at his QTH at the back of Commercial Road. From left-to-right, Peter G3ESY, Brian G3RJB, Stuart G4CNY, Stuart's father, and Bob Beekar G3WY. The "well done" gift from Mr Powell to Stuart was a brand new SWAN500 rig, for passing the exams.

(Thanks for the photo Stuart…….Ed)

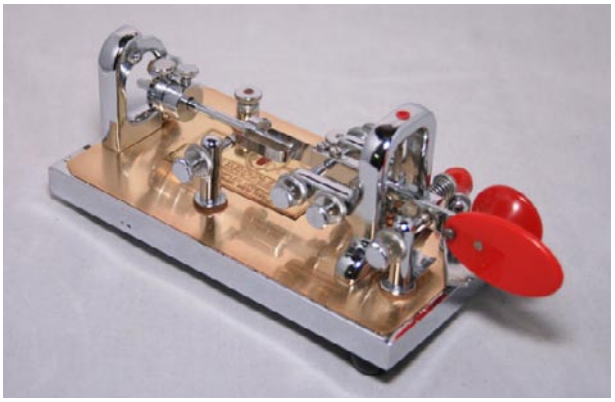
Assembling 3-element beam at G3WRA

Notable KEY notes

The Vibroplex semi-automatic "bug" key has been around for a long time, since 1905 in one form or another. Founded by Horace Martin, Vibroplex has played a great part in shaping communication by morse code where the tactile weighted-movements of this type of key causes the signature of operator's personality and identity to be recognisable.

The picture shows the Original Presentation Model which has 24K gold plating, polished chrome base and jewelled movements. The operating speed range is between 20 and 50 wpm.

I'ze got one of these….Ed



One Christmas evening, when the Sun Spots were roaring, a radio active old-timer was working great DX. Suddenly his XYL had simply had had enough and she blew her top.

"DX, DX, DX…. It is all you ever think about!" she groaned. "I'll bet you cannot even remember our wedding date."

"I most certainly can", he retorted, "it was June the 8th 1958, that was the night I worked the XT1, the CR0 and the VK0, Equatorial Guinea, Navassa Island and Timore."