FIVE AND NINE PLUS

THE OFFICIAL NEWSLETTER OF THE APPLEDORE AND DISTRICT AMATEUR RADIO CLUB

Club Callsigns: G2FKO and GX2FKO
Web Site : www.adarc.co.uk

CLUB'S OFFICERS

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Editor	Terry Adams	G4CHD	

August, 2013

EDITORIAL

Welcome to another Newsletter.
August is in the middle of the children's school holidays and the time for family and friends to visit us in our idyllic part of the world. For these reasons it was decided to have just a **general natter night this month** together with the opportunity for anyone to **bring along any odd items that they want to sell** to provide some additional interest to members.
The band conditions have been very difficult at times and together with Brian's (M0BRB) recovery schedule making it difficult for him to continue committed to running the **Friday HF Net, it has been decided to close this net until the Autumn** when hopefully conditions will have improved.
On the other hand, the **Sunday 70cm Net is going well** as can be seen from the report later in this Newsletter.
There is a further reminder for you to put the date of the **Holsworthy Rally into your diaries for the first Sunday in November.** It is so important to support our local events to ensure their continuance in the future.
As ever, a plea for any of you willing to put pen to paper and submit an article for the Newsletter would be most appreciated.
Finally, volunteers are needed to help setup and run our special event station at Arlington Court on Saturday, September 14th. Please give what help you can - liaise with Mike (G3PGA) who is organising the event.
So, enjoy this Newsletter

Terry (G4CHD)

CLUB MEETINGS

Unless otherwise stated, Meetings are held at the Appledore Football Social Club starting at 7.30pm for 8.00pm. Visitors are always welcome.

August 19th	Natter Night
September 14th	Arlington Court NT Special Event Station
September 16th	Antenna Analysers - Comparison and Demo
October 21st	Mountains & Canyons of SW USA by John (M0JKL) **This is our annual Open Meeting**
November 18th	Back to Basics : The Superhet by Terry (G4CHD)
December 16th	Club Christmas Party
January 20th	Audio Recording - Practical Demo by Laurence (G4XHK) & John (M0JKL)
February 17th	Radio Quiz by John (M0JKL)
March 17th	Club AGM
April 21st	'Plan B' by Steve (G6SQX)

For further information, contact Alan (M6CCH)

ADVANCE WARNING OF THE HOLSWORTHY ARC RALLY

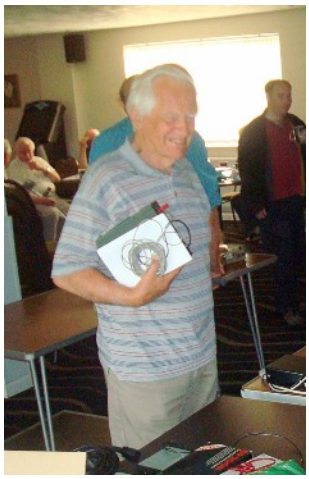
Need bits for a new rig or just fancy a bargain ?
Then a date for your diary - **Holsworth Radio Rally, Sunday Nov 3rd 2013 doors open 10 am.**
All enquiries Don G0RQL.
g0rql@hotmail.com

REPORT ON THE JULY MEETING

Bring & Buy Night

It was a lovely summer evening for the July Bring & Buy and thus provided an ideal opportunity for a few members

to bring along their radio controlled helicopters and test their flying skills on the football pitch. Indeed, one managed to traverse the whole width of the pitch and land without tears much to the owner's relief !
A few members brought along some tasty goodies to sell and bargains were had by some.
Even Len was happy after some haggling !!
The evening also provided an opportunity for a good old natter and enjoy a cuppa and biscuit.



Vin kindly brought along a bottle of wine to raffle and with help from Helen doing the selling of tickets and members also contributing prizes, the raffle provided a very enjoyable, successful, and profitable ending to the evening.

Terry (G4CHD)

LOCAL REPEATERS

70cm Handy Cross Repeater/Echolink (#221334) Gateway (GB3ND)
User: Listen 433.35MHz– Transmit 434.95MHz
Access 1750Hz Tone (Timeout 4.25 mins)/ 77Hz CTCSS
Repeater keeper is Jeff (G4SOF)

2m Stibb Cross Repeater (GB3DN)
http://www.g0rql.co.uk/gb3dn.htm
User: Listen 145.6375MHz - Transmit 145.0375 MHz.
Access 1750 Hz Tone or 77 Hz CTCSS Repeater keeper is Tony (G1BHM).
Yahoo users group for general chat and banter at :-
http://groups.yahoo.com/group/GB3DN/

LOCAL SKEDS

Zepp Net:	**Mon, Tues, Thurs : 145.450 MHz** **Wed : via GB3DN 1600 local time**
6m Net:	**Wednesday, 8pm, 51.5MHz FM**
HF Net:	**Friday** at **1500** local time **7.145 MHz ± qrm** **THIS NET IS NOW CLOSED UNTIL THE AUTUMN.**
Slow Morse:	This net run by Dave (G3YGJ) **has been suspended. Please contact Dave if you require Morse practice.**
70cm Net:	**Sunday, via GB3ND, 1100 - noon local time.** **Available on Echolink node 221334**

SUDOKU PUZZLE

The aim is to enter a number into each cell so that **any column, or any row, or any block of cells contains all numbers from 1 to 9**. This month's puzzle is categorised as **Advanced** difficulty.

		4	5		8			
3				2		6		
	2	1		7				
		7				4		2
	5						7	
9		2				3		
				3		2	8	
		9		6				1
			1		9	5		

Terry (G4CHD)

CROSSWORD

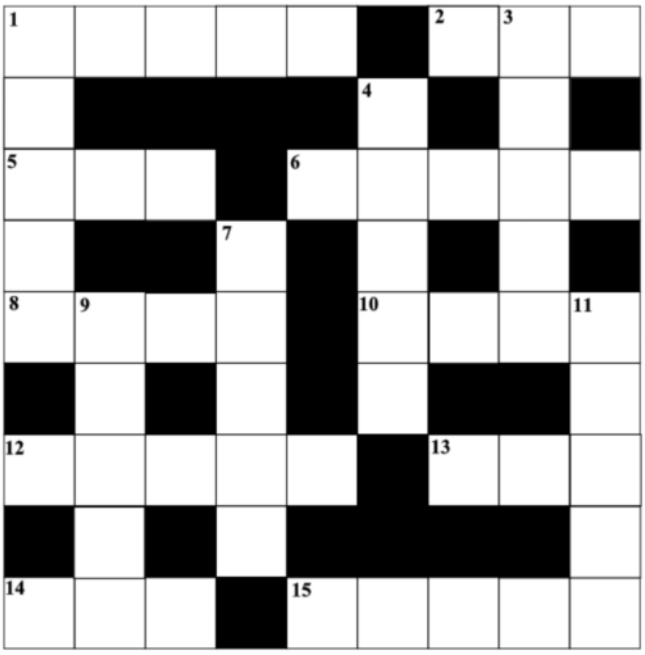
This month's Crossword by Stuart (M1FWD).
The answers will be published in the next month's Newsletter. Good luck !

Clues Across

1) Sierra Tango land (5)
2) Regular on-air gathering of a number of radio amateurs (3)
5) An atom or molecule that has gained or lost one or more electrons (3)
6) Many window frames are made from PVC. What is the 'V' ? (5)
8) Native of Tango Alpha land (4)
10) Newts (4)
12) Homeless people are said to have 'no fixed ?' (5)
13) Type of antelope of the genus *Connochaetes* (3)
14) Abbreviated surname of the 34th President of the USA (3)
15) The curved course of a planet, satellite, etc. (5)

Clues Down

1) A mode of transmission, Phase ? Keying (5)
3) Sierra Uniform land (5)
4) Device for merging r.f. Input signals to produce a combined output (5)
7) Colloquial term for QSOs where the start time is predetermined by those taking part (5)
9) Native of Uniform Kilo land (5)
11) A conductor joining two points of a circuit (5)



Last month's answers :-

Across 1) Eva 3) half 5) tubes 6) top 8) nana 9) Finn 11) Aga 13) romeo 14) balun 15) Rye

Down 1) Estonia 2) Albania 3) hash 4) Flo 6) trimmer 7) pentode 10) Iran 12) Goa

Stuart (M1FWD)

SUNDAY MORNING 70CM NET

Update on our 70cm net every Sunday from 11.00am until noon on GB3ND and Echolink node 221334.

Now that we've been running the net for a couple of months I wanted to thanks those who have joined in on a Sunday morning so far. I appreciate we have been enjoying better weather and there are much better things to do than radio! But if you want a break from painting the fence or mowing the lawn then please do have a go on a Sunday morning. We often have regulars on Echolink and have recently attracted USA listeners and one joiner using this mode. It's a relaxed net (as it's Sunday) and subjects covered over the opening period have ranged from helicopters to satellites, curries to Sunday lunches and photography to flight simulators. Oh and some radio!
All (and I do mean all) are welcome whether your drop in for 5 mins to say hello or join the list and have your say. We've averaged 5 contacts per week so there is plenty of room!
Thanks for your support so far this year and hope to hear you on Sunday.

Kevin (M6KBD)

IS YOUR RIG PROTECTED FROM LIGHTNING ???

Many thanks to Dave (M0JAP) for the following article which may well raise a hitherto 'Ah - I must look more into that !' From many members - including myself!

I decided recently that not only my home rig needed protection, but also several of my radio astronomy and geophysics measurement systems that I've nearly finished installing. I was not entirely surprised to learn that in practice only the smallest percentage of radio amateurs deploy arrestors of any sort. So I checked out prices and availability and thought it perhaps worthwhile jotting down some of this information. Nothing new, of course, but hopefully of interest or help. I think the main reason most of us do not have any protection is that we fondly hope that – literally – lightning will never strike ….. us …. er, our kit. After all this is the UK, not Texas, isn't it ?
There is estimated to be around 2,000 lightning storms active around the globe at one time, creating over 100 strikes per second. (One of my instruments, the ELF sensor, now detects 24/7 the Schumann resonances (from the global ionospheric waveguide cavity) at around 8 Hz, together with its several harmonics.) These thunderstorms generate a potential difference of 200-500kV between the Earth's surface and the ionosphere. Most lightning occurs in the storm cloud itself, with less than 20% of all lightning reaching the ground. However, in the UK sadly some 3 die each year from the roughly 50 who are directly struck. From our viewpoint, it's sobering to realise that there are some 0.3m lightning strikes hitting the UK ground annually, and nearly a third of these are said to cause "severe" (structural ?) damage. The nature of the actual strikes and paths are a complex subject.
Mainstream dealers in the UK sell such arresters as this Diamond one:
The cost is around £35, with IL<0.3 dB to 1GHz, VSWR <1.2 in 50Ω and 400W

PEP handling. These seem well made and have replaceable, miniature gas discharge ("spark") tubes, which can be purchased for ~$5. Note the decent size ground connection, which is of course essential. Will, it catch a direct strike ? Well, almost nothing will 100 % and at reasonable cost. Professional and military systems, esp. safety critical ones, do contain extraordinary measures sometimes to cope with this, and I have direct experience of engineering a couple, but it can and does cost a fortune. For the radio amateur this, to me, seems like a sound modest investment as it will certainly cope with that which can cause the most common damage viz. indirect and so-called 'static' discharge damage.

An Alpha Delta arrester costing some £50 can provide similar protection but with nicer O-ring sealed incorporation of the replaceable discharge tube. It seems to have a slightly better compensation for the match, <0.1 Db IL to >500 MHz and 2kW power handling. Most of these are available with SO-239 or N type connectors.

There are countless models, including this type (~ $25) that is widely used in CCTV, cable TV and similar areas, using F type connectors:

It will pass DC OK, as most all do, handy for CCTV or ham pre-amp etc., but is <u>not</u> rated for reasonable RF power that we would like to see for most amature radio. And some of these cheaper models do not have a grounding lug at all and the ground has to be supplied by the downstream outer ! In my view this seems quite dangerous in some situations; they appeal because they are so cheap (~£5). A very common model widely used for ham/CB radio in the US and elsewhere is the Workman A28, available for ~£5 and featuring PL-259 connectors:

They seem reasonably well made, but disposable in nature. What exactly is the spec. ? Well, I cannot find a complete specification anywhere, although I'm pretty sure from what I have learnt that they are OK for <u>most</u> all amateur radio usage, seemingly to VHF.

One point I would make is that not all suppliers clearly state the characteristic impedance level, but there's invariably a VSWR rating, regardless ! Sometimes the claim is that it's OK for 50 or 75Ω. Sure, but for which VSWR ?

One type I have found appeals to me greatly for radio astronomy use. Instead of just a simple, miniature discharge tube across the line (so a pF or so of shunt capacitance), it also features an inner high-voltage rated DC block and most importantly an inductive (toroidal) leakage bleed to ground on the other (antenna) side. The manufacturer ? Morgan Mfg in the USA, and this unit costs ~£50, selected from a wide range of frequency range, connector, IL, power rating choices:

This particular unit offers 0.1-50 MHz operation, 0.1dB IL, 1KW PEP handling (ignore the label here), SO-239 connectors and appears to be built like a battleship, some 3"x"x2" in size ! I will be trying out one of these shortly on my dual (phased) dipole fed Jupiter/solar (radio astronomy) Rxr at near 20 MHz – and which is in quite an exposed location. Morgan's range extends up 1.5 GHz and also includes open-wire feed versions. Why am I particularly interested in these ? Because of the possibility that some of the natural, static induced noise that is received will be reduced markedly well before a near or direct strike – and perhaps even some noise that is induced by non-lightning, natural conditions. But that's another complicated story, I think ……. Recall that it's the true Jovian/solar noise emissions I am seeking to 'hear', not the other.

So points to watch in selecting an arrester: IL, Z_0, VSWR, freq. range, RF power rating if it's for transceiver use, discharge tube replacement capability, rated no. strikes at specified current, connectors, grounding arrangement, overall quality. Of course each antenna used needs one suitably selected, with care taken to avoid pre-triggering due to excess VSWRs on the feed to the antenna (but we always ensure decent feed line match, and especially we <u>don't</u> coarse tune any rig-sited ATU at 'maximum smoke' … , yes ?)

We've considered above just the RF (antenna) path, of course. But attention should also be paid to the DC and AC supplies. One point I would make is that low voltage e.g. 90V strike rated, very fast arresters are now readily available from suppliers like CPC/Farnell. These can be less than £1 each and are very effective, with nS rise times and suitably high current capacity. You can also buy many protection 'boxes' via eBay suppliers, but typically they are just packaged versions of these solid state (Transzorb) or miniature discharge tube arresters. Mains surge protection is easy to buy, and the public is now attuned to paying attention - and excessive prices - for such retail units. But good, low cost insurance really.

One final point occurs in any discussion of lightning. It's VERY difficult at domestic or suburban level to engineer trustworthy lightning rod/spike ("air terminal") protection, regardless of the additional need for lofty antennas. And people naturally think if an antenna top is a few feet below some nearby edge/point that's OK. Not so. It's the Rolling Sphere Concept that is sobering here, used in compliance evaluation against international standards for protection of buildings/installations, as follows:

"Compliance is evaluated using the rolling sphere concept, which assumes a 150 foot
radius imaginary rolling sphere, rolling up, over and down the sides of the structure,
complying with the following:
1) The sphere never touches the building directly;
2) The sphere is tangent to earth and in contact with properly spaced perimeter air terminals;
3) The sphere rests on three or more air terminals properly spaced as determined by
using the rolling sphere concept so that the sphere never touches the structure
All possible placements, including three-dimensional, of the sphere shall be considered when determining the zone of protection using the rolling sphere model."

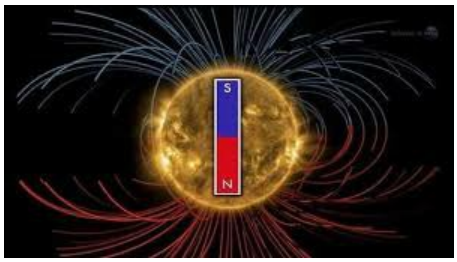
150 ft ! Sketch it out in your mind for your garden or neighbourhood and see what this means, then consider the local church tower as comparison. Then pray, or rather hope for the best …. and fit an arrester or two. J

Many thanks Dave for a most thought provoking article which may well form the subject matter of some of our 'natters' at this month's Club night.

The Sun's Magnetic Field is about to Flip

Once again, I am indebted to Dave (M0JAP) for bringing the following article to my attention which can be found on the web at http://science.nasa.gov/science-news/science-at-nasa/2013/05aug_fieldflip/

August 5, 2013: Something big is about to happen on the sun. According to measurements from NASA-supported observatories, the sun's vast magnetic field is about to flip.



"It looks like we're no more than 3 to 4 months away from a complete field reversal," says solar physicist Todd Hoeksema of Stanford University. "This change will have ripple effects throughout the solar system."

Field Flip (splash)

The sun's magnetic field changes polarity approximately every 11 years. It happens at the peak of each solar cycle as the sun's inner magnetic dynamo re-organizes itself. The coming reversal will mark the midpoint of Solar Cycle 24. Half of 'Solar Max' will be behind us, with half yet to come.

Hoeksema is the director of Stanford's Wilcox Solar Observatory, one of the few observatories in the world that monitor the sun's polar magnetic fields. The poles are a herald of change. Just as Earth scientists watch our planet's polar regions for signs of climate change, solar physicists do the same thing for the sun. Magnetograms at Wilcox have been tracking the sun's polar magnetism since 1976, and they have recorded three grand reversals—with a fourth in the offing.

Astronomers at the Wilcox Solar Observatory (WSO) monitor the sun's global magnetic field on a daily basis.

Solar physicist Phil Scherrer, also at Stanford, describes what happens: "The sun's polar magnetic fields weaken, go to zero, and then emerge again with the opposite polarity. This is a regular part of the solar cycle."

A reversal of the sun's magnetic field is, literally, a big event. The domain of the sun's magnetic influence (also known as the "heliosphere") extends billions of kilometers beyond Pluto. Changes to the field's polarity ripple all the way out to the Voyager probes, on the doorstep of interstellar space.

When solar physicists talk about solar field reversals, their conversation often centres on the "current sheet." The current sheet is a sprawling surface jutting outward from the sun's equator where the sun's slowly-rotating magnetic field induces an electrical current. The current itself is small, only one ten-billionth of an amp per square meter (0.0000000001 amps/m2), but there's a lot of it: the amperage flows through a region 10,000 km thick and billions of kilometres wide. Electrically speaking, the entire heliosphere is organized around this enormous sheet. During field reversals, the current sheet becomes very wavy. Scherrer likens the undulations to the seams on a baseball. As Earth orbits the sun, we dip in and out of the current sheet. Transitions from one side to another can stir up stormy space weather around our planet.

Cosmic rays are also affected. These are high-energy particles accelerated to nearly light speed by supernova explosions and other violent events in the galaxy. Cosmic rays are a danger to astronauts and space probes, and some researchers say they might affect the cloudiness and climate of Earth. The current sheet acts as a barrier to cosmic rays, deflecting them as they attempt to penetrate the inner solar system. A wavy, crinkly sheet acts as a better shield against these energetic particles from deep space.

As the field reversal approaches, data from Wilcox show that the sun's two hemispheres are out of synch.

"The sun's north pole has already changed sign, while the south pole is racing to catch up," says Scherrer. "Soon, however, both poles will be reversed, and the second half of Solar Max will be underway."

When that happens, Hoeksema and Scherrer will share the news with their colleagues and the public.

THOUGHT PROVOKING QUOTE FROM DAVE (M0JAP)

" I had the opportunity only yesterday of watching Sagittarius rise in broad daylight on the needle of a millivoltmeter …….. It is certainly gratifying to see gunlaying radar apparatus put to such uses !"

- Alan Hunter, Royal Greenwich Obs., 1946

So that's it for this month.
Enjoy the read

If any member has an article that they feel would be of interest to Club members, please send it in to me and it will make your Club Newsletter all the more interesting.

Terry (G4CHD)