



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

President	Terry Adams	G4CHD	
Chairman	John Lovell	G3JKL	
Vice Chairman	Steve Smith	G6SQX	
Secretary	Alan Fisher	M6CCH	01237 422833 Email: fisheralan@gmail.com
Treasurer	Mike Wogden	G4KXQ	
Committee	Graham Bailey	G1ZTJ	
	Dave Cottle	G4XWQ	
	Ray Hunter	M0TLO	
	Keith Luxton	G0AYM	
QSL Manager	John Lovell	G3JKL	
Web Master	John Lovell	G3JKL	
Exam Secretary	John Lovell	G3JKL	
Editor	Terry Adams	G4CHD	

June, 2017

EDITORIAL

This month's Meeting on **June 19th** is a talk and demonstration by yours truly on the use of the free **Antenna Modelling program - MMANA-GAL**. Several antenna designs will be discussed and built versions demonstrated. Hopefully the evening will prove to be both informative and enjoyable so why not try to come along. Our Club will be putting on a special event at the **Bideford Fair on Saturday, July 15th** (see below right) so again, please try to come along and help.



Terry (G4CHD)

LOCAL SKEDS

Zepp Net: Mon, Tues, Thurs : 145.450 MHz - 4pm
Wed via GB3DN - 4pm

6m Net: Wednesday, 8pm, 51.480 MHz FM

HF Net: Friday at 3pm 7.134 MHz ± qrm
If conditions poor - 145.450 MHz

70cm Net: Sunday, via GB3ND, 11am - noon local time.
Available on Echolink node 221334

Top Band Net: Sunday 1.860 MHz (LSB - 30W max)
9.30 - 10.15am
Contact Dave (G4XWQ) for details

CLUB MEETINGS

Meetings are held at the Appledore Football Social Club starting at 7.30pm for 8.00pm. Visitors always welcome. For further information, contact the Secretary, Alan (M6CCH) - details in the top panel.

June 19th	Antenna Design/Demo with MMANA by Terry (G4CHD)
July 17th	Heritage Day Special Event Debriefing
Aug 21st	Natter Night
Sept 18th	Open Meeting - Speaker to be arranged
Oct 16th	Clansman Radio by Chris (G0FJY)
Nov 20th	Club Bring & Buy
Dec 11th	Club Christmas Party
Jan 15th	Memory Lane Evening - mini talks by members
Feb 19th	BITX40 - Homebrew Made Easy by Mike (G4KXQ)
March 19th	Club AGM
April 16th	Talk to be confirmed

BIDEFORD FAIR SATURDAY JULY 15th

We are putting on a **Special Event Station** at this prestigious event which takes place in Victoria Park and would be most grateful for all the help you can give helping put up aerials/operating/talking/etc to the public. **We hope to start putting up the marquee etc from around 9am with the Fair opening at 10.30am - look forward to seeing you**



REPORT ON THE MAY MEETING

Club Bring & Buy

This is always a popular choice with members and this Meeting proved to be no exception with a very good attendance and lots of goodies changing hands.

It was also an opportunity to meet up with friends and have a good chat over a cuppa.

If anyone was unable to be there or has gear to sell etc then make a note in your diary that our November Meeting is another Bring & Buy.

Terry (G4CHD)

FORTHCOMING LOCAL RADIO RALLIES

A couple of dates for your diary :-

25 JUNE 2017

WEST OF ENGLAND RADIO RALLY

Cheese & Grain venue, Market Yard, Bridge Street, Frome, Somerset BA11 1BE.

Doors open from 10am to 2pm with admission priced at £3 for adults and children under 14 free. There will be inside & outside traders, free car parking, café, RSGB bookstall, accessible & facilities for disabled.

Details from Shaun, G8VPG on 01225 873 098
www.westrally.org.uk

9 JULY 2017

CORNISH RADIO AMATEUR CLUB RALLY

Penair School, Truro, Cornwall TR1 1TN

Car parking is available on site. Doors open 10.30am and admission £2 There will be traders, Bring & Buy and club stalls. Catering is available.

Contact Ken, G0FIC 01209 821 073 for more information.

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**

Terry (G4CHD)

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

CROSSWORD

Many thanks to Stuart (M1FWD) for this month's Crossword.

The answers will be published in next month's Newsletter. Good luck !

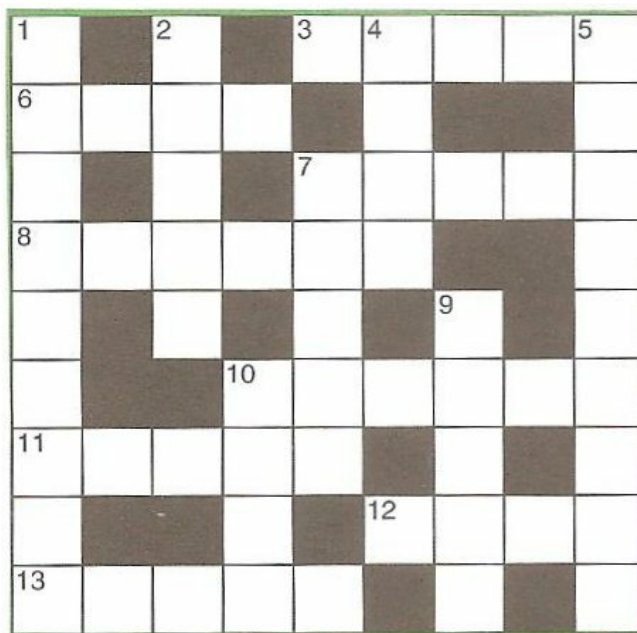


CLUES ACROSS

- 3) Single-masted sailing boat (5)
- 6) The older son of Isaac and Rebekah (in the Book of Genesis) (4)
- 7) ? Sadat, President of Sierra Uniform (SU) land, 1970-1981 (5)
- 8) Electro-mechanical rotor cipher machine (6)
- 10) An independent unit used in construction of an electronic system (6)
- 11) ? Valdez, 1989 oil spill off Kilo Lima Seven (KL7) land (5)
- 12) River flowing through eleven countries in Africa (4)
- 13) Clay pigeon shooting (5)

CLUES DOWN

- 1) Devices for the automatic retransmission or amplification of an electrically transmitted message (9)
- 2) Latin name for willow (5)
- 4) ? Lisa, a work of art by da Vinci (4)
- 5) Foxtrot Tango/X-ray (FT/X) island (9)
- 7) Capital of Malaku province in Yankee Bravo (YB) land (5)
- 9) Of three dimensions (5)
- 10) An artificial harbour (4)



Last month's answers :-

ANSWERS ACROSS: 1) wrench 6) ogre 7) horror
9) technique 11) Ibadan 12) band 13) easier

ANSWERS DOWN: 2) Rhodes 3) north side
4) Hornimans 5) red 8) curate 10) Ubi

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.g0rgl.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)

VHF PROPAGATION

An article from the RSGB which can be found at :-

<http://rsgb.org/main/get-started-in-amateur-radio/operating-your-new-station/vhfuhf-propagation/>

seemed very appropriate with today's HF propagation being at such a low ebb :-

While HF propagation pundits are concerned with the ionosphere, VHF/UHF enthusiasts generally have their sights set a little lower – on the troposphere.

Under normal or flat conditions most VHF and UHF communications are generally thought to be line of sight – the higher your antennas the better.

Fortunately, reality is actually a little different thanks to the way VHF and UHF signals can be refracted. This process is the same as that seen with light. Put a pencil in a glass of water and it seems to bend. Look along a hot asphalt road in the middle of summer and it looks like water in the distance. Both of these phenomena are due to the way that the velocity of light waves changes in different media.

Another way of looking at it is that different materials have different refractive indices. The same process applies to radio waves, which are electromagnetic and therefore part of the same “family” as light waves.

If our radio wave travels from a medium with one refractive index to another bending or refraction will occur. The amount of bending will depend on the differences in the two refractive indices.

Our lower atmosphere isn't a static, single temperature environment. It is a swirling mass of gases, all at different pressures and different temperatures. There is also varying amounts of water vapour in the atmosphere as well.

As Ian Poole G3YWX points out in his book “Your Guide To Propagation”, the dielectric constant of air is usually taken to be one, but in reality it changes very slightly. The average value is about 1.00030, but it can vary between 1.00027 and 1.00035.

The area of highest refractive index is near the earth. This causes radio waves to bend towards the area of higher refractive index and helps the signal to follow the earth's curvature.

The net effect is that VHF and UHF radio signals generally travel around one third further than our strict line of sight calculations suggest they should.

But it gets better!

Tropospheric enhancements

Under certain conditions the refractive index along the path of our signals can increase. If this rate is high enough signals that would otherwise not follow the curvature of the earth and be lost into space are returned to earth at much greater distances than you would expect.

They can even be trapped in an elevated duct where they can travel for hundreds of kilometres without being audible on the ground below – a similar effect to having a skip or dead zone on HF.

While these effects are less obvious on the lower bands in the VHF spectrum, they can be very pronounced at 144 (2m) and 430MHz (70cm).

So how do we predict these and what should we be looking for? As the effects occur in the troposphere it should come as no surprise that it is the weather that affects propagation in this region.

By studying weather maps and the forecast you should be able to predict when good conditions may occur, although there are always surprises.

One of the main things to look for is a temperature or humidity inversion. Normally the temperature in the troposphere decreases with height. But under certain conditions an inversion can occur with a corresponding sharp change in the refractive index.

Look for a high pressure area over the UK or our near European neighbours. The Met Office has a useful chart at: http://www.metoffice.gov.uk/weather/uk/surface_pressure.html

This is useful as it indicates what is “high” and what is “low”. You might also want to look at <http://www.meteorologica.info/Euroisobars.htm>

Better conditions can occur when a high pressure area is present and particularly in the summer when temperatures are higher and there are higher levels of humidity.

High pressure areas are usually quite stable and good conditions can last for a few days. Oddly, the best conditions can also occur as the pressure starts to fall from a high. So look for high pressure regions in or around Europe and UK and a falling barometer.

You can also get a temperature inversion with the approach of a cold front. This occurs as warmer air rises over the colder air beneath creating the inversion. This is normally associated with fast-moving fronts and any lift conditions may be over quite quickly.

Other inversions in the summer can occur near sunrise as air at higher altitudes is heated first. Fog and mist in the mornings can also be signs of temperature inversions.

Unfortunately, not all high pressure systems bring good conditions or “lifts”. It is up to you to monitor other indicators such as beacon and repeater reception.

You can also get enhanced propagation across the sea. Temperature inversions occur frequently along coastal areas bordering large bodies of water. This is the result of the movement of cool, humid air shortly after sunset when the ground air cools more quickly than the upper air layers. The same action may take place in the morning when the rising sun warms the upper layers.

This area can be very close to the water, which means that stations near the water's edge at sea level get good conditions while those on the top of hills don't.

There are other propagation modes available to VHF operators including aurora and meteor scatter. Microwave specialists can also include troposcatter and rain scatter in their armoury.

Summer Sporadic-E

The period May to mid August is best for Sporadic E (Es) which can affect signals on all bands from 14-144MHz, although it is most commonly noticed on 28MHz and 50MHz. Sporadic E openings on 2m are rarer, but do occur. For example, most summers there are one or two good openings to Spain.

You can watch for these using a portable FM radio and look for broadcast stations around 100MHz. If you are very lucky you may hear foreign language broadcasts. This is a sign that there could be an opening on 2m as well.

But what is Sporadic-E and how can we predict it?

We know what Sporadic E is, but its exact causes are still up for debate. It is an unusual form of radio propagation where signals are refracted or bounced off fast-moving "clouds" of unusually ionised atmospheric gas in the lower E region (located at altitudes of approx. 90 to 160 km).

Short skip Es occurs when patches form in the E layer of the ionosphere. This layer normally refracts shortwave and medium wave signals, but is transparent to VHF radiation. The ionisation patches drift westwards at speeds of a few hundred km per hour.

Es events usually begin mid morning, and there is a peak in the afternoon with another peak in the evening. Es propagation is usually gone by local midnight.

The cause of Es ionisation is not precisely known. Some people have tried to connect it with thunderstorms, but there are plenty of incidences of Es where no thunderstorms were in the area.

The best theory at the moment is that it is caused by wind shear in the upper atmosphere. You can get very fast-moving winds moving in different directions. Now, inject some ions into these winds and they will be forced up or down as they interact with the earth's magnetic field.

You can imagine a situation where some ions are forced upwards and some (in winds moving in the other direction) are forced downwards. The net result is a patch or cloud of ionisation.

These can be relatively long-lived, or come and go quite quickly. What we do know is that they move quite quickly and the propagation mode is characterised by very strong

signals, rapid QSB and signals that appear and disappear from areas as the clouds move. The propagation range for Es single-hop is typically 1,000 to 2,000 km, but with multi-hop, the distances can be increased.

Now you are probably wondering where these ions come from in the first place. One theory is that they are heavy metallic ions from meteor debris.

Jim Bacon (G3YLA), who is a professional meteorologist, has looked very closely at Sporadic E and has also managed to link it with weather patterns and high-level winds moving across the mountainous areas of Europe, including the Alps, the Harz mountains and the Pyrenees. He thinks that these winds over the mountains create gravity waves that move upwards, helping to compress the ionisation.

There is still room for research on Es, but for the new radio ham how do you make the most of Sporadic E?

Firstly, keep an eye on 28MHz and 50MHz. These will be the first bands to show the effects of Es. If you are away from the radio also check out www.dxmaps.com which has real-time maps of Es and other activity.

This isn't a complete guide to VHF/UHF propagation, but it at least gives you a flavour of two modes to look out for.

That's it for this month - hope you enjoy the Newsletter

73s de Terry (G4CHD)