

Stargazey Pie – December 2012

Society Notices

- 1. Current News and Dates for your Diary** – On Saturday 12th January we will be holding an Outreach event in the Eastgate Centre in Inverness, this will also include an evening viewing session at the Observatory and Pat E. will be looking for volunteers to help run this event. Astrofest 2013 will be taking place on the 8-9th of February and will be held in Kensington Town Hall, London, for tickets and more information please visit; <http://europeanastrofest.com/>. Please also check out the updated version of our website and let us know what you think of the new design! <http://spacegazer.com>. We are also currently looking for members who would like to volunteer their help in running the society, for more information please see below.
- 2. Winter Observing Sessions – JSL Observatory, NTS Visitor Centre Car Park, Culloden Moor.** Please check www.spacegazer.com before setting out as this will let you know if the session is still on and who will be supervising. Please feel free to bring your own telescopes and there will be binoculars available to borrow.

Date	For Whom	Time	Supervisor
Fri. 7 th Dec.	public and members	20:00 – 23:00	Paul
Sat. 8 th Dec.	members and guests only	20:00 – 23:00	Gerry
Fri. 14 th Dec.	public and members	20:00 – 23:00	Pauline
Sat. 15 th Dec.	members and guests only	20:00 – 23:00	Paul
Fri. 21 st Dec.	public and members	20:00 – 23:00	Paul
Sat. 22 nd Dec.	members and guests only	20:00 – 23:00	Rhona
Fri. 4 th Jan.	public and members	20:00 – 23:00	tba
Sat. 5 th Jan.	members and guests only	20:00 – 23:00	tba

- 3. The next Meeting is on Tuesday 8th January 2013** - this is a week later than usual to allow for the festive period. The talk will be “Space Medicine” by Bethany followed by a discussion group on “Solar System Geometry and Terms” with Paul. As always the “Youngstars” session for 8-14 year olds will take place before the main meeting at 19.00 to 19.30, as run by Pauline.
- 4. The Aurorae and Telephone alerts** - Should you see an aurora, noctilucent clouds, sprites or anything else of astronomical interest, please alert Pauline (07751112586) or Paul (01667 456789). It is never too late at night to let us know.

5. **New Committee members and volunteers welcome** - We are looking for a wee bit more help on the volunteer front, whether you're interested in helping out up at the observatory, joining the Committee, helping out at monthly meetings or if you want to help but you're not sure how, please do get in touch with one of the committee members tonight or at another of our meetings.

Caroline Woods.

Special News

December was Pat's last meeting with us before she leaves for pastures new in Edinburgh. She has been on the Committee either as Secretary or a Committee member for many years and more recently also as a Supervisor at the observatory as well as helper with the many young people that visit. Pat has done a brilliant job helping to guide HAS to where it is today. Our loss will be another club's gain. Thank you Pat for all you have done and we wish you well in the future. Do come back and visit.

The Main Event

"Journey into Space" by Paul Jenkins. Paul originally wanted to join the RAF as a pilot but didn't quite get through the medical so became an engineer with them instead. He is, at the moment, building an aeroplane in his shed and Arthur wondered if he was also constructing a spaceship since getting into space is one of Paul's ambitions and he describes himself as a frustrated astronaut.

Paul's interest in spaceflight began with the Eagle comic with its hero, Dan Dare but it was a radio programme called "Journey into Space" that really caught his imagination. He played an audio clip from one of the episodes in which, apparently in the early 1970s, humans had walked on the surface of Mars...

So, Paul decided to explore what would be necessary to build our own rocket, bearing in mind that President Obama decided that America would now depend on private enterprise instead of NASA building rockets. Although, as was pointed out, it was aerospace companies that actually built them.

In designing a rocket to reach the ISS we must start small and be able to carry a light payload, consisting of something very Scottish, perhaps a dram and an anti-clockwise haggis, with bubble-wrap for protection, an external cover and fuel. Then we need to do the maths perhaps many times over to check that the design works. The rocket motor must provide lots of thrust for a short period and we need a chemically fuelled propulsion system, some of which are illegal but a hybrid rocket motor would be fine. A video clip of a Reliant Robin car taking off on a rocket was shown next and it almost worked. However, the rocket motor of choice for us is the same as the one in the Bloodhound car, which is going to be used in the land speed record. Then Paul showed us his half-scale silhouette of a rocket that he had prepared earlier with HASA written on it – very appropriate.

Since the rocket being built is conceptual, any aerodynamic effects are ignored even though punching through the sound barrier should have an effect. Plugging in the numbers for our single-stage hybrid rocket shows we wouldn't reach the ISS, so more stages need

to be added and each stage requires more than one rocket motor. The final result is a four-stage rocket with five hybrid motors in the first stage, five in the second, three in the third and one in the last stage. This should allow our rocket to reach a height of 80km and a speed of 7,630 metres per second. Unfortunately, although we reach the speed required, we don't reach the height of 330km we need to get to the ISS, unless we burn off more speed but if we do this, we would hit the ISS on the nose at over 6,000 km per hour.

It seems that for HAS, reaching the ISS is not going to be possible. Paul then began to tell us about some of the commercial rockets and showed some video clips of strange looking but real rockets making some extraordinary flights e.g. the Goddard low altitude rocket built by Blue Origin and the Delta Clipper experimental rocket (DC-XA) by McDonnell Douglas. Alternatively, Virgin Galactic's LauncherOne concept launches a rocket from high up in the atmosphere. Not everything goes according to plan resulting in some dramatic explosions. NASA was working on the Ares 1-X, which was to be the successor to the Shuttle, when President Obama declared they should switch to commercial space launches.

The two main contenders are the Orbital Sciences Corporation's 'Antares' rocket and the Space-X Falcon 9 craft, which is the most successful so far. It made an uneventful resupply trip to the ISS when requested to by NASA and has now been commissioned to make 12 cargo shipments. NASA has also given Space-X 440 million dollars to develop a manned version to carry up to seven astronauts into space. However, Boeing have also been given 460 million dollars to develop its CST-100 capsule to carry astronauts and Sierra Nevada will receive about half that money to develop Dreamcatcher which looks like a mini space shuttle.

The most important thing about commercial spaceflight is that the firms manage to develop something that is consistently safe. However, the budget has been cut so one firm may lose out. Paul's only regret is that one of the rockets won't be carrying him into space! Although when at the science museum in London he had a chance to view a film about the repairs of the Hubble Space telescope and when the Shuttle took off, the speaker energy, along with the huge screen, made it feel as though he was actually in the Shuttle.

If he ever finishes his spaceship in his shed, he may yet reach outer space. Thank you Paul for a very amusing and interesting talk.

Pauline Macrae.

Highland Skies – December 2012

As I write this, Jupiter is in a very special place. It has just passed its point of opposition. This is when the planet lies in the part of the sky that is directly opposite the Sun. In 2012, this event is made even more special by the fact that Jupiter is also lying at its perigee. This is when its orbit passes through its closest point to Earth.

Naturally, the fact that Jupiter is lying so close to Earth, and at a very high point in the sky, makes it eminently observable with virtually any optical instrument. It shines at approximately magnitude -2.8 and is easily detectable, even through thin cloud, by the naked eye. The apparent size of the disc that it presents us is just over 47 arcseconds, making features on the disc very easy to observe in detail.

What can you expect to see? Well, binoculars will show the planet as a bright non-stellar object surrounded by its four brightest moons. These moons change position very noticeably over subsequent nights, and following their progress across the sky around Jupiter can be a project in itself.

Stepping up to a small telescope, even a 60mm refractor, such as the one I used myself the other night, will show beautifully crisp cloud details. The main belts will be obvious, and as the steadiness of the air improves (or the “seeing”, as it is known) ever more subtle features will gradually pop into view. At this sort of small aperture, the trick is to take your time and slowly adapt to the view before you, allowing your eye to accustom to what is on show, and allowing it to tease ever more intricate detail out.

Moving up in aperture to say a 102mm refractor or 150mm reflector or catadioptric, will show the main belts much more obviously, as well as a selection of much fainter ones. Darkening of the poles will become apparent, and details within the belts themselves will begin to stand out. You may, seeing allowing, notice swirls and storm-like features in the belts, sometimes spilling out into the zones between the belts themselves. Hollows and white spots may become viewable too. In short, you will be starting to see some of the plethora of fine details that are on offer on the disc of Jupiter.

Step up in aperture again, to a 12” reflector or larger scope, and, if conditions allow, you will start to see the planet in the same sort of manner as is shown in some of the photographs in the astronomy magazines. Photographs of planets are usually acquired by CCD chips or webcam ships, which capture hundreds or thousands of images in the form of video files. Software is then used to filter out the best images and stack them together to give outstanding images, usually in colour that will show more than the human eye can perceive at the eyepiece of a moderately sized telescope.

But, that is not the end of the argument for actually visually observing planets. The eye has some tricks that a camera or CCD cannot replicate, such as the ability to give an impression of a sense of 3D when viewing bright objects against the dark backdrop of space. Also, the human brain is very adept at gathering the information passing through the eye and “adding it all up” into a final image, which is what we see in our mind. Subtle details are quite often seen at the eyepiece, which are not so easily seen in a photograph.

Finally, assuming that you’ve observed Jupiter for a reasonable time and think you’ve seen all that’s on offer that night, go on and change the eyepiece. Try different focal lengths and types of eyepiece. Increasing magnification can bring out more detail. Pushing it too far can dim the image. Try different powers and aim for one that gives a bright image with good detail level and sharpness. It might not be the highest magnification your eyepiece collection is capable of rendering, but quality is more important than quantity when it comes to magnification.

Planetary observing is not just a case of pointing the scope, sticking a single eyepiece in and having a look for a few seconds. Time at the eyepiece, willingness to experiment with different eyepieces and filters, and patience are all prerequisites for rewarding planetary views. Oh, and co-operative skies of course. But, when it all comes into line together (as the Sun, Earth and Jupiter are at an opposition) the results are well worth waiting and working for.

Antony McEwan.

OBSERVATORY REPORT DECEMBER 2012

1. OBSERVATORY FENCE

The completed work on the observatory fence has been very successful and Arthur's efforts to organise this undertaking are much appreciated along with the efforts of those who volunteered to help out with the work.

2. LX 200

The repaired LX200 continues to perform well, however the LED display on the handset has shown signs of deterioration over the past few months and I would recommend that the current handset be replaced with a new one as the scrolling characters are now illegible.

3. STARGAZING LIVE 2013

Stargazing Live 2013 will be broadcast on BBC2 on the 8th, 9th and 10th of January.

Gerry Gaitens.

Next time (a week later than usual) Bethany Jones will be delving into Space Medicine to look at what happens if astronauts are ill in space. Come along to tea and chat followed by a discussion on the subject of the main meeting with Bethany and Arthur or join Paul in talking about "Solar system geometry and terms".

Happy Christmas and all the best for 2013.