

Stargazey Pie!

A slice of Highlands astronomical life!

Tues 1st Mar 2011

INTRODUCTION

March's meeting saw HAS return to the warmth and comfort of Smithton-Culloden Free Church, now replete in its "New and Improved" status! In fact, it was pretty good before but now it's almost unrecognisable! A reasonable number of members and visitors turned out to sample the improvements and experience one of the most interesting talks we've had for a long time: Nick Forwood's report on his visits to American Space Camps.

- **Raffle Prizes.** Our very successful raffle continues to generate useful income for the running of the Society. Any prizes that can be donated by the members will be gratefully received. Arthur and Lorna will continue organising prizes but, as Arthur is now chairing the meetings, it will be Pat Escott who will sell you tickets.
- **Venue.** We are now back in the new Smithton-Culloden Free Church, Murray Road, Smithton IV2 7YU. Our thanks to Smithton Primary School and particularly the janitor for making us so welcome while the Church work was taking place. We hope that their investigation into the human body's tolerances of low temperature extremes and study of pain response from the buttock area continues productively.
- **Joint Meeting.** We are invited to attend a joint meeting with SIGMA on Sat 2nd April from 19:00 – 21:00 in the Nairn Community Centre. The talk is "Black Holes – No Need to be Afraid" by Ian Morrison from Jodrell Bank. No entrance fee is expected but donations will be gratefully received. For further information please contact Pat Escott.
- **Observing Sessions: JSL Observatory** – Nighttime sessions open at 20:00 with last admission at 22:00. Finish time is around 23:00. Solar Saturday events are open to anyone, so please spread the word. 2011 sees the Sun approaching a very high level of activity, so will give us some outstanding dynamic views! Please check the website for the most up to date information.

Fri	4 th	Mar	-	public & members	supervisor: Rhona
Sat	5 th	Mar	-	members & guests only	supervisor: Paul
Fri	25 th	Mar	-	public & members	supervisor: Paul
Sat	26 th	Mar	-	members & guests only	supervisor: Paul
Fri	1 st	Apr	-	public & members	supervisor: Pauline
Sat	2 nd	Apr	-	first 2011 Solar Saturday session 14:00 – 16:00	

- **HAS Seeing Stars articles.** The eagle-eyed amongst you may have noticed that the Inverness Courier Editor has changed the title of our article to "Sky Watch" and cut its length. Happily they will continue to pay us at the same rate, will continue to advertise our meetings and observing sessions and it will now feature on page 2. Thank you to Antony, Pauline and Rhona who have been the main contributors recently.

- **HAS Stargazey Pie.** Antony has taken up the reins again of his very popular newsletter. From the AGM Meeting onwards the *Pie* will be sent to all members who are unable to attend the monthly meeting.
- **Next Meeting.** April's meeting will be on Tuesday 5th and is the **AGM**. Nominations are sought for the posts of Chairman (2 years), Secretary (1 year) and Treasurer (2years). You may nominate yourself. All nominations to Pat Williams by the start of the AGM please. Following the AGM the speaker will be Amanda Smith of HAS speaking about "Stellar Cannibals". The **"Youngstars"** sessions for children (8-14 years old) is held before every main meeting, running from 19:00 until 19:30. It is anticipated that membership fees will remain unchanged unless members decide otherwise at the AGM. Membership forms will be available if you wish to rejoin after the break.
- **Mercury Messenger** – On March 18th Messenger will become the first space craft ever to enter Mercury's orbit. <http://messenger.jhuapl.edu/>

Shooting Stars: Other Important Club News!

Arthur, in his role as Society Chairman, expressed our thanks to Smithton Primary School for allowing us to have our meetings there for the past few months. Arthur also expressed his thanks to now-absent Eric Walker, his predecessor in the role of Chairman, whose work duties have prevented him from retaining his position within the club. He continues to remain a valuable member though and has done a lot of work in various aspects of the Society's projects.

Arthur then gave a brief report on the observatory's activities recently, and talked about his recent visit there on the night of Saturday 26th Feb. This was a good viewing night with moderate temperature, a reasonably clear sky and a handful of very interested visitors. It was also the night of our first fully planned Video-feed from a telescope to the Observing Station! The Society's video camera was hooked up to the 80mm f5 refractor piggybacked on the main 14" telescope and the link supplied images to the two screens in the Observing Station building, where the images were enjoyed by all present, including Craig Ferguson!

This event was the result of a lot of hard work and effort, particularly by Gerry Gaitens and Maarten de Vries, and it is great to see another of the Society's goals being achieved. This application now means that the main telescope and the refractor can be used to observe the same target object, but with the 14" being used visually and the 80mm one with the camera fitted. There is more planned for this, so keep your eyes and ears open for future updates!

Paul Jenkins took the floor to welcome us on our return to the newly expanded Smithton-Culloden Free Church. It really is a superb building and has fantastic facilities. The seats are very comfortable and the sound system alone has had £35,000 invested in it! If you were present at the meeting and have any feedback (apart from that induced by the microphone system), please pass it on to Arthur or one of the other committee members.

Astrofest Report

It's become a familiar thing, seeing James McTaggart and Michael Marett-Crosby give their annual report on activities on Astrofest. Are they the Ant and Dec of HAS?

Once again we were treated to a resume of various talks that the pair had attended, including those given by many famous astronomical luminaries. These included (but were not limited to) Charles "Chuck" Wood

of Sky & Telescope's lunar column fame; Ed Krupp, director of the Griffith Observatory in Los Angeles, and Brian Cox, hero of British cosmological television programmes (and apparently responsible for stealing the Cup of Eternal Youth from Sir Cliff Richard).

No mention of any purchases from the trade-stands were made though, which leads me to doubt if the two speakers were actually there, as it's impossible for "real" astronomers to visit Astrofest and not buy *something*. Isn't it?

Some fascinating tidbits gleaned from the talks were shared with us. For example, did you know that there are more than 7000 Near Earth Orbiting objects being tracked at the moment? And that the number increases by 25 per day? Or that it is now doubtful whether Stonehenge was actually built along astronomical lines, and it might just be coincidental that certain stones now mark positions of the Sun through the seasons? Did you realise that there is dispute as to whether the moons of Mars, Phobos and Deimos, are in fact captured asteroids? Minerals known as Phyllosilicates have been discovered on the surface of Phobos. These indicate interaction between silicate materials and water, and have been discovered on Mars too. Did Phobos then originate on Mars itself?

Astrofest is an annual event, taking place over two days in London each February. As mentioned there are dozens of fascinating talks to attend, by some of the world's most famous authorities on matters astronomical and cosmological. The trade stands have the very latest hardware and software on display and many at discounted prices too! It's worth considering visiting, but if you can't make it I'm sure we can depend on Michael and James to keep us updated with their annual Astrofest Reports!

Mercury Messenger

John Rosenfield then made us aware of the fascinating revelations that the Messenger probe is sharing with Earth-bound scientists as it photographs the tiny planet's surface. During its fly-bys, the probe has sent back the most detailed images of Mercury yet. However, there is more to come! This statement from NASA's Messenger website promises great things: *"On March 18, 2011, MESSENGER will enter into orbit about Mercury, and the mission's extensive, year-long science observation campaign will begin. That campaign includes capturing color images of Mercury's surface at higher resolution than ever before."*

If the insertion into orbit on the 18th is successful, not only will it be exciting for us weirdo astronomers, but it should also make it onto mainstream news broadcasts! This will be a very great achievement for NASA and will make for very exciting times for planetary specialists everywhere.

To find out more, simply Google (I love verbing nouns ☺) "messenger" and "Mercury". The link to the NASA site will be near the top of the list presented and will give all the latest news.

History-Man Rosenfield then announced that he had discovered ancient texts buried deep below trap-laden and monster-infested catacombs. These showed that the earliest recorded sighting of Haley's Comet was made by Greek astronomers in 466-467 BC, and that associated reports of a large meteoric impact in Northern Greece were made at the same time. Of course, at that time it wouldn't have been called "Haley's Comet" but you know what I mean...

Highland Skies – March 2011 **(Written 27th Feb)**

I'm writing this late. I was supposed to write it last night but I got called out to an emergency – the sky was clear and it needed to be examined very urgently! Sometimes you just don't get any warning of these things...

I took my new motorised Dobsonian up to the JSL Observatory for my first proper observing session for a couple of weeks. Three telescopes were in operation: the Society's 80mm f5 refractor (operating via videolink) and 14" f10 LX200R SCT, and my own 12" f5 Dobsonian.

The sky was clear, although transparency wasn't that great, and there was only a very slight breeze and no dew, which made for a welcome change. Visually, many galaxies and nebulae were examined through the two larger telescopes. The views of large nebulae M42 (the Great Orion Nebula was much revisited) and M78, and of single or closely grouped galaxies, were pretty similar.

One member who was present commented that when viewing larger groups of objects, such as the Leo Triplet of galaxies M65, M66 and NGC 3628 or more extensive objects like M44 (the Beehive), M35 or the famed Double Cluster, the Dobsonian "embarrassed" the larger 14" LX200R. While trying to remain strictly neutral, I shall try to explain why there were differences between the two telescopes in the observations made that night, and hopefully shall put to rest any "embarrassment" issues!

First off, the Society's SCT is a 14" f10. F10 refers to the focal ratio of the telescope, and means that the focal length is 10 times the diameter, making it 3556mm. My Dobsonian is a 12" f5 – the focal length is 5 times the aperture – so has a focal length of 1500mm. The focal length of the club scope is more than twice that of my Dobsonian! This makes it far easier to achieve high magnification in the club's telescope, though eyepieces of similar focal lengths were being used in both scopes last night: a 26mm 82 degree in the SCT and a 23mm 82 degree in the Dob.

The magnification given by any eyepiece is the focal length of the telescope divided by the focal length of the eyepiece. So for the SCT it would be $3556 / 26$ giving 136x. In my Dob it was $1500 / 23$ giving 65x. Can you see that relationship? The focal length of the SCT is more than double the Dob's, and the magnification given by broadly similar eyepieces differs by almost the same ratio! Clever huh?

Related to that, field of view is given by apparent field of view of eyepiece (82 degrees for both eyepieces in this comparison) divided by magnification. The SCT yielded a field of 0.6 degrees and my Dob showed 1.26 degrees of sky. See that relationship again? Approximately double the field of view.

The "embarrassment" mentioned by the observer was because in extensive objects and groups of galaxies etc, the wider field of view offered by the Dobsonian at f5 gives a much better "framing" of the objects, allowing them to be presented against a spatial backdrop. The Leo Triplet, for example, showed clear space all around the triangle of galaxies, and thus gave a higher "wow" factor. By comparison, the field of view offered by the f10 SCT was such that only two of the galaxies could be squeezed in together! No comparison? Well, not in regards to grouping, but in actual detail resolved the views were pretty similar, and under better skies the 14" would have shown them as being a touch brighter than my mere 12". When viewing M35 in the Dobsonian the effect was a nicely framed open cluster that fitted well within the field of view with a nice frame around it. In the SCT you were actually almost looking "through" the cluster rather than "at" it because of the field of view limitation and higher magnification.

Another difference between the two telescopes was that the club's 14" was being driven using its built-in GoTo computer system, which is now operating excellently after many tweaks and tests by the current team of observatory operators. My Dobsonian was being steered using a Telrad zero-magnification finder and frequent referral to star charts!

My point this month is that it's easy to make sweeping comparative statements when comparing telescopes based on only limited experiences with them. I would bet that under perfect seeing conditions, the f10 14" SCT would show more detail and higher contrast on the gas giants than my f5 12" Dob would. Also, that extra 2" aperture gives it a higher magnification ceiling than the 12", dependant on seeing conditions of course. On the other hand my Dob gives significantly wider fields of view when observing Deep Sky Objects, though with a slight drop in resolvable detail. Does this make either one "better" than the other? To my mind they are simply different. When thinking about how a telescope will perform, it's always worth considering the focal length and focal ratio, what eyepieces will be used with it, what magnifications will be desired, and then doing the sums to see if it's appropriate for what you want it to do.

One day the club's 14" f10 may have its f6.3 focal reducer fitted, and that will reduce the magnification and increase the field of view offered by any given eyepiece fitted to it. This will be a nice evolutionary step for an already superb telescope.

The Main Event

'Space Camps USA' by Nick Forwood

Nick Forwood is principal teacher of physics at that scholarly centre of excellence (totally unbiased view from an ex-pupil), Fortrose Academy. He has spoken briefly at a HAS meeting before, mentioning a distant relative who served with Captain James Cook on HMS Endeavour. He does not own a telescope of his own (being a poverty-stricken teacher and all) but does spend time on the remotely controlled Faulkes Telescope, which should be familiar to long-standing members of HAS. Nick works with Royal Observatory of Edinburgh and is a member of the Institute Of Physics.

Nick's career has resulted in him having a lot of contact with people and events that would greatly interest us in HAS. He has actually stood inside the Large Hadron Collider at CERN and has organised a visit to Fortrose Academy by a real live astronaut. As a result of this, he put forward teams of Fortrose school pupils into a competition, the winners of which would go to "Space Camp" in the USA. Such are the qualities of Fortrose's students that so far the organisers in America have selected a team of 5 or 6 Fortrosian pupils each year since they started entering. Naturally they have to be accompanied by a volunteer teacher. And teachers say they have it hard?

The Space Camp at Houston takes place at the Johnson Space Centre, the central control hub of NASA's space programme. Nick showed pictures of the exterior and interior of the Centre, as well as many of the activities that he and the pupils took part in during their weeklong stay. One picture showed Nick meeting Suni Williams, the holder of the world record for longest time spent in space by a female astronaut, having spent a total of 195 days outside the Earth's atmosphere.

During their time there, the attendees are split into teams of pupils and teachers, and they then compete against each other in a series of tasks. Rewards come in the form of virtual money – millions of dollars per task – which can then be used to "buy" components for the team rocket at the end of the course. The training tasks are accompanied by lots of absolutely fascinating lectures and demonstrations on aspects of real-life astronaut training, as well as others more geared towards general scientific interest. Building a rover vehicle out of Lego and then controlling it was a good example. Speaking of Rovers, we were shown a picture of the outside "Mars Terrain" training area, which is supposed to simulate typical Martian terrain. By contrast, there was also the pic of the world's largest indoor swimming pool, or more correctly, the Neutral Buoyancy Tank. This is used to simulate low gravity for astronaut training and has a sunken mock-up of a module from the International Space Station so that astronauts can practice doing Extra Vehicular Activity maintenance tasks on the outside of a life-size replica in low gravity. Despite this, Nick commented, they still manage to drop handbags in space. I mean toolkits.

We were shown some pictures of a vast cylindrical object with a heavy door standing open at one end. Assuming that it might have been a portion of a rocket assembly, we were surprised to learn that it was actually a giant vacuum chamber! It is used for testing the airtightness of space modules, and it takes several days for all the air to be slowly extracted from it, inducing a state of total vacuum. It looked like an amazing piece of engineering, and this was one of Nick's comments about the camps generally: they are filled with examples of the most amazing feats of engineering and technology around!

The visit to Johnson Space Centre was finished off with a comparison of the teams' rockets, built with the funds from their task-completion rewards. Naturally, the teachers' team rocket was more impressive, though the masking tape used to hold it together got a bit soggy in Houston's soggy conditions and it proceeded to fall apart during its flight! The final night's entertainment included a dance with music being played by an all-astronaut rock band! "Not only are they proficient in space exploration, but also as rock

musicians", said Nick of the seven-piece outfit. I wonder if they played Dark Side of The Moon or Space Oddity?

Nick also shared some fascinating pictures and experiences from his all-teacher trip to Huntsville, Alabama. This was a slightly differently organised trip, in that it was only for teachers, though the centre itself runs training camps for schoolchildren and students as well. Again, much elaborate (and historic) technology was on display, and the area is littered with fine examples of America's military aircraft. After all, most astronauts enter the training program through the military air force. Some, for example Neil Armstrong, were experienced military test pilots: a high risk profession that prepares astronaut candidates well for the pressures involved in the Space Program.

Nick himself was extremely proficient in the hands-on shuttle flight simulators that the teachers were allowed to try. He excelled in several missions, with the tutors gradually increasing the level of difficulty to try to shake him off form! It seems Nick neglected to tell them that he is a qualified glider pilot, which is relevant as the shuttle is itself a glider and has no onboard engine power when it is brought in to land. I remember reading once that the space shuttle was described by one of its commanders as having the same flight characteristics as a brick.

There was so much more to Nick's talk, with so many anecdotes that were informative, interesting and funny, that it would be impossible to list them all here, or at least impossible to write them in half as interesting a way as they were delivered to us. One example of the hardships of astronaut training which stands out though is Nick's story about the Multi-Axis Trainer. A fiendish device into which potential astronauts are strapped, and which then spins and gyrates in random unpredictable fashion to simulate an out-of-control re-entry into Earth's atmosphere. Despite the victim's stomach remaining in roughly the same physical position throughout the ordeal, the same cannot be said of its contents.

Space Camps USA was a thoroughly interesting talk about the behind the scenes activities that are involved in training Earth's space explorers and we look forward to hearing about any more such "endeavours" that Nick is lucky enough to attend!

Next Time

The next meeting takes place on Tuesday 5th April and will be the Society's AGM (see notice above). The meeting will start at 19:30 as usual with the Youngstars group meeting at 19:00. After the AGM business has been attended to, member Amanda Smith will talk to us about "Stellar Cannibals", a subject that will have many of us hungry for the facts! Personally the only unusual cannibals I've heard of are the vegetarian ones. They only eat Swedes.

The other usual activities will all be present too: the tea and biscuits in the luxurious new dining area, the chance to catch up on the latest observations and happenings at the observatory, the chit-chat and equipment discussions, and of course the chance to win some lovely prizes in the club's raffle.

See you then at Smithton-Culloden Free Church. Until then, Clear Skies!

Antony McEwan