Stargazey Pie!

A slice of Highlands astronomical life!

Tues 2nd Aug 2011

INTRODUCTION

Despite taking place in "summer", August's meeting did not require the use of sandbags or snow-shovels in its preparation. In fact, even the hailstones stopped for a while. Although not as heavily attended as some meetings, we were assured by Arthur that we certainly had the best members in attendance! And who can blame them? With the lure of a talk about one of the most interesting space research missions, an extended tea-break and plenty of club-related news, why would anyone rather be away on holiday?

- **Membership and an endorsement.** We currently have 84 members. We have come close to, but never reached, 100. Could this be the year we make our century? We received the following e-mail from Ken Kennedy, our June speaker. "I was overwhelmed by the welcome and interest of the members. Thank you all for the book token gift so appropriately presented in the aurora illustrated card (made by Pauline). I was most impressed by the observatory and wish I was up there to use it. I feel that HAS have much to offer in good ideas about running a society." With such an endorsement how can we fail to reach our 100?

- **2011-2012 programme update – dates for your diary:**

  Saturday 3rd September 14:00 to 20:00 - Doors Open Day at the Observatory.

  Saturday 17th September - HAS visit to the Glasgow Science Centre. An early start will be required. Details in the August newsletter. Please let Pat Escott know if you wish to come. **RSVP ASAP**. Any charge will be nominal.

  Saturday 3rd December - HAS Christmas Dinner. Pat Escott would welcome suggestions for a suitable venue; ideally in the centre of Inverness, in case of snow, and with HAS having sole occupancy. We anticipate around 40 members and partners attending.

  Saturday 21st January 10:00 to 16:00 - Outreach Day at the Eastgate Centre, Inverness with viewing at the observatory from 20:00 to 23:00.

  Volunteers will be needed for most of these events. Please contact Pat Escott.

- **Solar Saturdays – Fun in The Sun!** Solar Saturdays are back. The Observatory will be open, weather permitting, from 14:00 – 16:00. Please check the website first. If you are interested in training as a solar supervisor please contact Gerry or Rhona.

- **July Meeting and Stargazey Pie.** 31 people attended the June Meeting. The raffle raised £20.00. Many thanks to Arthur and Lorna who organise it each month, to Pat Escott who sold the tickets and to all of you who bought tickets and donated prizes. The July issue of the *Pie,* written as ever by Antony, was sent to the 50 members who were unable to attend the meeting. If you did not receive your copy please contact Pat Williams by e-mail.

- **Help Needed – Apply Within…**
  Break-out Groups - Help is required to organise these. Gordon McKenna is away on business most of the time, so is asking for a member to assist him. Volunteers please contact Gordon or Pat Williams.

  Technology Team -Smithton-Culloden Free Church has state of the art technology including a sound system that frequently needs the volume tweaked. HAS requires a member with some experience in this field to join the Technology Team. Volunteers are asked to contact Paul. Specialist skills required are the ability to turn a volume knob UP. (NB: there's probably a little bit more to it than that…)

- **HAS Exhibition.** Please visit The Scottish Archive Centre at the Bught where HAS has staged an exhibition on the first floor. Thank you to all who contributed to this. See www.highlandarchives.org.uk. Mon. Tues. and Thurs. 10.00am - 5.00pm, Wednesday 10.00am - 7.30pm, Friday CLOSED.

- **Telephone contact list.** This season you will receive a text message either by landline or by mobile. Latest times may need to be altered slightly. This should be in place by the September meeting.

Shooting Stars: Other Important Club News!

Chairman Arthur Milnes was in attendance this meeting, and had a few things to say. First of all he welcomed his son and daughter in law, Robin and Cathy to the meeting. They had been helping with the sale of raffle tickets (though once again I was not selected for one of the "lucky" tickets. I think I may have offended someone high up…)

The financial state of the Society is such that we will be having much of the expense of the planned trip to Glasgow Science Centre subsidised by the club. There may be a nominal charge for the day-trippers to pay but it will not be a large one. We can also look forward to some technological (read: equipment) additions to the observatory, though these are being discussed at the moment and have yet to be revealed.

We were then handed over to Pat Williams who discussed the current Telephone Contact List with us again, and made us aware of some potential changes to how it is implemented. At the moment it seems to be breaking down if one or more members are not available. It then falls to someone to keep on trying until someone below them on the list is contacted – meaning that the caller doesn't get a chance to see the event that set off the chain in the first place! Then there is the question of latest contact time.

It has now been suggested that the members state their latest contact time and the list divided into "anytime", 9pm, 10pm, 11pm and midnight. If no time is put down it will be assumed you are happy to be contacted anytime of the night and a mobile would probably be better for this. It is hoped that the new system will become mostly automated too, with text messages being used rather than calls that require someone actually answering the phone.

The Main Event:
'Getting Close to an Exo-Earth' by James Mactaggart

James McTaggart works as an educational psychologist for Highland Council with special interests in neuropsychology and in post-traumatic stress. Before that he had a chequered career that included teaching, farm management and running a bookshop. James first remembers an interest in astronomy at the age of five when his father read him the names of the planets from the Children's Encyclopædia.

Finding an Earth-like planet outside of the solar system, in orbit around a vastly distant star, is not an easy task. NASA's Kepler mission utilises a 0.95m Schmidt-camera in a wheely-bin sized orbiter, launched in March 2009, which is now in constant Earth-trailing orbit. The optical system is constantly trained on the same area of sky, which increases the accuracy of the data search.

James compared 2011 as a year of potential importance as great as 1492 – the year of Columbus's "discovery" of America. The Kepler probe has its work cut out for it. For an exo-planet to be of the type we are looking for, it has to be the right size, have a rocky core with internal heat, have the right kind of atmosphere, be the right age and have liquid water. That's quite a shopping list!

So how does Kepler know if it's looking at the right sort of planetary system? Light tells us everything. When a planet passes in front of its star, the total amount of light collected will drop slightly. As the planet orbits the star, the total amount of light seen also changes in a specific way which can be modelled. Study and analysis of these "light curves" can tell scientists the composition of the planet, size, distance from the star, orbital period, type and amount of atmosphere. It's all very clever stuff.

How many stars is Kepler monitoring? How does 156,000 sound? Pretty good going for a Dyson hoover lookalike. Of those, there have been more than a thousand suitable candidates, but in March this year the team announced the first definitely rocky exo-planet to be discovered: Kepler-10b. The planet has 4.56x the mass of Earth and 1.456x the radius. It is more dense too and has a very high albedo of 0.6, making it as reflective as Venus. It is thought that this might be the old iron core of a now evaporated ice giant.

How does this discovery come to be authenticated? Well, first the data from the probe is gathered and analysed, and then it is double checked by observations from ground-based telescopes, primarily the 10-meter telescope at the Keck observatory on Hawaii. The whole process is a mixture of automatic and manual operations. Humanity and machine working together to make the greatest discoveries so far of the 21st century

In May this year another rocky exo-planet was confirmed: Kepler-10c. This planet has a radius 2.2 times that of Earth's, and orbits its parent star at a mean distance of just 0.25 Astronomical Units (1 AU = the distance from Earth to our Sun) with a period of 45 days. Both of the newly discovered planets would be blisteringly hot – they are simply too close to their stars to be comfortable, but they represent a step in the right direction after all the discoveries of gas giants that this and other projects have made so far.

So, in two years we have 156,000 stars being studied, more than a thousand candidates being scrutinised and two solid Earth-type planets confirmed. James asked the question, where will we be in three years time? Will we have discovered an Earth-type planet in the "Goldilocks zone"? At just the right distance from its star, with just the right atmosphere and composition, with just the right temperature range and gravity?
Maybe. Keep watching the latest revelations on the Kepler website: http://kepler.nasa.gov/

Thanks, James, for a very interesting talk. I'm sure none of us will ever look at our wheely-bins or vacuum cleaners the same way again.

Highland Skies – August 2011-08-07

August is a very exciting month for us HAS members. The observing season is looming, the Sun is at the most active part of its cycle and the observatory team is in good spirits – what more could we ask for?

I'll once again make mention of the Solar Saturday events. Sadly, the weather has conspired against us on recent weekends, though Saturday 30th July was an exception. It was a beautiful sunny day with little wind, and Solar Squaddie Gerry was joined at the observatory by other team members Pat Williams, Paul Jenkins, Rhona Fraser and myself. No other HAS members attended, so they missed out on some of the best solar views we've had there since starting these events. As well as the Society's Lunt solar 'scope there was my six-inch refractor fitted with a Herschel Wedge for high contrast views in white light, and Gerry had his 125mm Maksutov along too with its high-tech wizardry all raring to go.

The video view through the Lunt, displayed on the screens in the Observing Station, was excellent with much of the visual detail readily discernible through the Society's webcam display system. There was some interest from the public too, so can I once again extend our invitation to you to come along and sample the fantastic solar views that are on display this year. You will be made most welcome.

The nights are beginning to slowly draw in now, to the extent that it's becoming possible to take a telescope out in the very late evening and observe some of the brighter objects in the summer skies. Polaris is visible for star-testing your telescope: a process which allows you to determine both the optical quality of your 'scope's lens or mirrors, and the accuracy of the alignment of the optical train in it. This is important, as misaligned optics can result in less detail or clarity at the eyepiece. The difference between a well-collimated telescope and a poorly collimated one is quite obvious to experienced observers. Collimating a 'scope can be a daunting procedure if you haven't done it before, but thankfully there is a lot of help and support out there for first-timers or people who are having problems getting it right.

Within the club we have occasional "Collimation Days" at the observatory. These can also be requested, so if you need some help with it, just ask one of the observatory team and we'll get you up and running. Outside the club, there are some great webpages and online videos of what is required. Here are some good ones:

Collimating a Newtonian reflector using a laser collimator: http://youtu.be/yd3mjOr8rc0

Collimating a Newtonian reflector without a laser collimator:
http://www.skyandtelescope.com/howto/diy/3306876.html

Refractors occasionally need to be collimated as well, though a lot less frequently than Newtonian reflectors. It is generally a simpler procedure too, as can be seen here:
http://www.spacealberta.com/equipment/refractor/collimate.htm

The f-ratio of your reflector or refractor will affect how obviously the effects of miscollimation show themselves. Recent observations through a f4.7 reflector that was slightly miscollimated showed an "obvious" softening of the lunar image to me. Checking with a laser showed that it was off by only a few millimeters, but that was enough! By contrast, I had a f11.25 refractor that showed miscollimation of at least 5mm but the actual star-test appeared perfect and there was no softening of the image or optical defects at all in the view through the eyepiece. The high f-ratio of long refractors covers a multitude of sins, especially slight miscollimation. Telescopes of high f-ratio (slow 'scopes) will hold collimation better than "fast" ones too – my f6 Dob needs adjusting once a year while my f4.7 required collimating every time it was set up.

Contrary to popular urban myth, Schmidt-Cassegrains and Maksutovs also need to be regularly collimated, and their procedures are a little more complex than the other designs of telescope. Good tips for SCT owners can be found here:
http://sctscopes.net/SCT_Tips/Maintenance/Collimation/collimation.html and here:
http://legault.perso.sfr.fr/collim.html. Maksutovs are a little simpler, as generally only the primary mirror is adjustable. There will be minor differences between brands, but here are the instructions for collimating Skywatcher/Orion US Maksutovs, which are very popular models:
http://www.company7.com/library/orion/Inst_makcasscollim.pdf.

Collimation is merely a mechanical adjustment, like tuning your telly (hey – remember that?) so as they used to say on TV, "Don't have nightmares"!

Next Time

The next meeting will take place on Tuesday September 6th, when our speaker will be John Rosenfield and his subject "Mercury Messenger". The Youngstars session with Pauline and Triona will run from 19:00 – 19:30 and the main meeting will then start at roundabout 20:00 (well, it seems to recently!).

The usual chit-chat, tea & biscuits, and Breakout groups will all be available too, so be sure to load up on astro-info to share with your fellow members.

Until then, enjoy the darkening skies – and Happy Collimating!

Antony McEwan