

Issue: November 2015



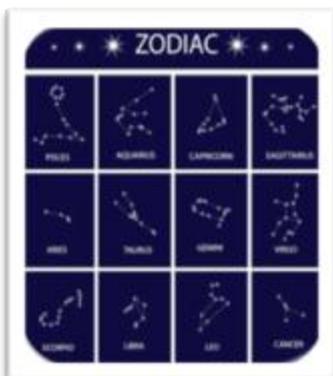
>>> Ayrshire Astronomical Society Newsletter

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Next Meeting: 26th October 2015

A Snowballs Chance in Hell

Comet – Sun Impact



Speaker: Prof. John Brown
Astronomer Royal for Scotland

Events Reminder

By Paul:

Summer is well underway - astronomy is all but forgotten (unless you are one of those strange folk who take pictures of clouds?) but don't worry darkness will soon be back and those glowing clouds will be forgotten! So what have I got planned for the new Astro season I hear you ask?



Next Astro Adventure trip will be going to the legendary White Laggan bothy in November if we spot a window of good weather, the bothy is in the deepest darkest part of Galloway Forest, so the skies should be pretty good, the bothy is small, so there will be a 6 person limit on this trip, although if it works out well, I am sure we will go back! Don't forget the cake! So let's go and have some fun! If anyone is interesting in participating in any of these events, please contact Paul at:

pjcayrshire@aol.com

President Word

Thanks to Allan, Paul Willie and Roger and their social media campaign to gain votes for our exoworld submission, this month has been a bit different. Early in the month due, I think mainly to Allan's persistence, we had a response from John Swinney, the Deputy First Minister in support of our bid and he issued a publicity statement urging the people of Scotland to support our submission. Not bad eh? Not only that, about two days later, we had another burst of publicity in that he took a photo opportunity in front of Schiehallion. We also had a couple of responses from other Scottish MSPs. Just before all this lot, our contact at BBC Scotland had run a short follow up article on our bid on the BBC Scottish News website. So lots of good local publicity for our bid and AAS.

Allan also contacted Sky at Night and received a polite email from Chris Lynott, wishing us well, but saying that unfortunately, he could not openly support our proposal as he was slightly involved in the competition process. If we win then there might be the possibility of a short piece on the "vote for us campaign" – we wait to see.

A bigger win was a piece in the local newspaper in the area where Sir Patrick used to live! This was a rather good article and named, indeed quoted !!! Allan McNyre of the Ayrshire Astronomical Society – wooooo! The day after, whilst the famed A Mcl was incommunicado in the depths of the Scottish Highlands well Avimore anyway, I received an email from BBC radio seeking a spokesperson for on air interview at 0730 the following morning on BBC Radio Sussex. "Well ok I said as Mr Mcl is not available". I then scurried off to seek out as many facts as possible about Upsilon Andromedae and anything else that might come up, and scribbled them on bits of paper spread around the breakfast bar ready for the interview. Sure enough at 0725 the BBC phoned and I was suddenly on air. It went well and to my relief - not a single technical question! I was surprised that they didn't even query the definitely non local accent.

Breakfast radio successfully completed I was relaxed and chilled, until later that day the BBC called again – wow! fame and fortune called, was I to be the new Brian Cox? This time it was to do an interview at 2045 that night on the Mark Forrest Show (never heard of it but then it is only broadcast south of the border). The plus here was that the interview would be broadcast on all BBC local radio stations in England. Notes on the breakfast bar plus a few star maps I waited. This time, a couple of technical questions – can we see it at the moment? And how many new stars are discovered each year that could be available for naming – how should I know? but I blustered through it.

Both shows said they would put links to the voting on their Facebook pages and for those of you who still haven't voted there is now a link on our website to help.

So well done the publicity gang and, sorry Allan but, unless you get on the Jeremy Vine Show and really come across well, I'm afraid I might have stolen your chance to replace Brian Cox.



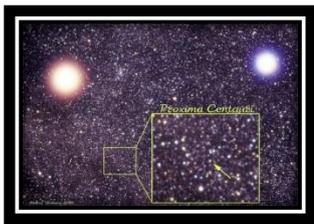
Prestwick Space Port



Early this month I was contacted to ask if AAS would be interested in being involved in “Space Week” exhibition to be held in the Aviator Suite at Prestwick airport and supported by the Space Port Bid Team – a no brainer if ever there was one! The event was aimed at school children with a view to getting them interested in science and was held outside school hours to allow more flexibility. Unfortunately on the first day of the “week” I was unable to attend and my “Events Team” of John, Alex and Juan, were left to sort things out as best they could. Anyway after a “difficult” start they got in and set up only to find that no one came to visit ☹.

Undeterred, we all turned up for the second day raring to go. This time we had some visitors who being young children were very active and interested. More importantly though I had the opportunity to talk to the Director of the Space Port bid> This was a useful conversation in that it allowed me to express AAS interest in being involved in local activities with the Bid Team and suggest that a few item such as solar pop up days and beginner days might fit in with their overall campaign. These ideas were well received and we look forward to some opportunities. I not being slow at coming forward, I also asked if one of the Bid Team could come and give us a talk about the Space Port – the answer was yes and I am waiting for confirmation of the date. This event, although not successful in terms of numbers attending, does show the benefits of getting involved as you never know what opportunities might fall out.

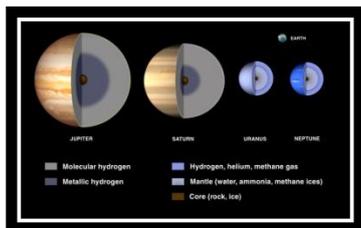
Alex Space



HOW BIG IS BIG?

How big is the Universe? Let’s try to put it into human terms. The fastest yet fighter plane can travel more than 2,000 thousand miles per hour, but even at that speed it would take one million years to reach the nearest star beyond our Sun—PROXIMA CENTAURI – It seems mind bogglingly unrealistic that astronomers claim to know so much about the Cosmos, but still modern researchers have many tools to help them in their quest to unravel the mysteries of Space. The last century shows more developments in science and technology than had occurred in the hole of history, so let’s go aboard starship “IQUISITIVE” which is about to embark on a voyage of discovery into our awesome universe.... don’t despair if you can’t get a seat this time, there will be another trip quiet soon.

So, what will we see on this short tour of everywhere....well, around us in every direction is a universe of planets, comets, stars, galaxies, nebulae and gas and dust clouds. On a clear dark night you will probably see several thousand stars, a planet or two, and perhaps a few smudgy patches. One of these smudgy patches is another galaxy – Andromeda (M51) – a gigantic ‘island’ of stars – It is probably the furthest and largest object you can see without optical assistance, but when you do spot it you are not seeing it is now, but as it was 2.5 million years ago!!

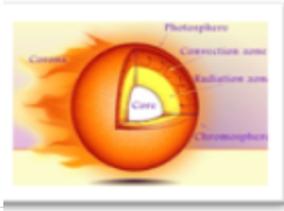


Before 1800 the only planets that were known were the innermost 6 of the 9 planets that make up our Solar System. However, astronomers now know that planets are common and probably exist throughout the Universe. As far as we know planets come in two varieties, the smaller ones are called terrestrial planets and are usually made mostly of rocky and metallic substances and have rugged surfaces, but they may or may not have an atmosphere. The second types of planets are known as gas giants even though they are not really made of gas! They are made up of substances that on Earth naturally exist as the gases Hydrogen and Helium, but within the giant planets themselves where they actually exist in liquid form! All these giant planets have atmospheres that blend into their interiors and they have solid cores.

More next moth!

Alex Baillie

Isabelle Article



Overview of the Structure of the Sun

Here is a very simplified image of the structure of the sun. Let's have a look at each part of the sun in detail in the upcoming newsletters. Hopefully, you are going to enjoy our journey of the structure of the sun, starting with the core.

The sun shines because it is able to convert energy from gravity into light. How does it do this?

The centre of the sun lies some 700000km below the visible surface of the photosphere. It is roughly 15 million degrees Celsius. The pressure in the core is about 200 billion times greater than the atmospheric pressure on earth. Heat, density and pressure make the core of the sun the perfect place for nuclear fusion to happen. Imagine being at the core of the sun. There is a huge amount of mass above you, squeezing down on you from all sides. This is what happens to the hydrogen gas in the core. Basically, it gets squeezed together so tightly that four hydrogen nuclei combine to form one helium atom. This is nuclear fusion and this process of converting Hydrogen into Helium is called *proton – proton cycle*. The actual process is a little bit more complicated.

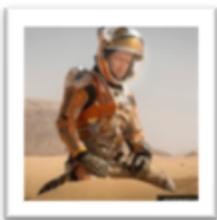
As the four Hydrogen nuclei fuse into one Helium atom, a tiny amount of energy is produced. Tiny, if you only do it once, but the sun converts roughly 700 million tons of Hydrogen into 695 million tons of Helium *every second*. The loss of mass (about 5 million tons) is transferred into energy, which escapes mostly in the form of very high energy photons (gamma rays). This energy is absorbed and re-emitted many, many times as it travels through the radiation and convection zone towards the surface. It can take between 10 000 and 170 000 years for these photons to reach the solar surface. How energy is transformed will be covered later in the series.

If you are thinking of thermonuclear bombs and how much destruction it causes on earth if just one of them explodes, well, the energy production in the sun's core is equivalent to 15 billion nuclear bomb explosions every second. Why doesn't the sun explode? Nuclear fusion in the sun's core happens in a controlled manner. The sun doesn't explode to pieces because of the tremendous weight of gas around the core. It exactly balances the pressure from all the energy produced.

If the fusion rate would go down, so less energy was produced in the sun's core, then gravity would cause the sun to start collapsing. This would in turn squeeze the hydrogen atoms closer together until the amount of fusion went up by just enough to produce the energy needed to hold it up again. If the fusion rate in the sun's core goes up too much, then the pressure makes the sun expand a little so that hydrogen isn't quite so closely packed. The right balance is again reached when the weight from the mass above the core exactly balances the pressure from all energy being produced.

“The Martian”

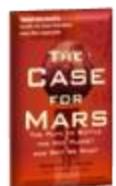
Juan Article



Well! What do you think about “The Martian” The Movie?

Some of us have seen the movie by now and it is a very entertaining and informative, No Green Men! No Aliens Creatures! No Beam Me Up Scotty! And No Darth Vader ether! Simply a very calculated movie, for anyone that already read the book and we know that for the director Ridley Scott it was impossible to compress into it all the things that Astronaut Mark Watney encountered and resolved before he can get to area of Ares 4.

The movie is well put together and I think it portrays a very human way to response to the problem of Watney and the difficulty for NASA to get to him; Almost all the things that you see in the movie, Dr. Robert Zubrin and David Baker, creators of NASA paper, Mars Direct programme in 1990 explains in how we can go to Mars with the technology we have now and Dr. Zubrin examine later and better on his 1996 book “The Case for Mars”



Sky Dairy

- November 5, 6 - Taurids Meteor Shower. The Taurids is a long-running minor meteor shower producing only about 5-10 meteors per hour. It is unusual in that it consists of two separate streams. The first is produced by dust grains left behind by Asteroid 2004 TG10. The second stream is produced by debris left behind by Comet 2P Encke. The shower runs annually from September 7 to December 10. It peaks this year on the the night of November 5. The second quarter moon will block out all but the brightest meteors this year. If you are patient, you may still be able to catch a few good ones. Best viewing will be just after midnight from a dark location far away from city lights. Meteors will radiate from the constellation Taurus, but can appear anywhere in the sky.

- November 11 - New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 17:47 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

- November 17, 18 - Leonids Meteor Shower. The Leonids is an average shower, producing an up to 15 meteors per hour at its peak. This shower is unique in that it has a cyclonic peak about every 33 years where hundreds of meteors per hour can be seen. That last of these occurred in 2001. The Leonids is produced by dust grains left behind by comet Tempel-Tuttle, which was discovered in 1865. The shower runs annually from November 6-30. It peaks this year on the night of the 17th and morning of the 18th. The first quarter moon will set shortly after midnight leaving fairly dark skies for what could be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Leo, but can appear anywhere in the sky.

- November 25 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 22:44 UTC. This full moon was known by early Native American tribes as the Full Beaver Moon because this was the time of year to set the beaver traps before the swamps and rivers froze. It has also been known as the Frosty Moon and the Hunter's Moon.

Space/Astronomy

Plant Farm

Today, astronauts on the International Space Station have an abundance of food delivered to them by cargo resupply vehicles, including some from [commercial industries](#). On Mars, humans would not be able to rely on resupply missions from Earth – even with express delivery they would take at least nine months. For humans to survive on Mars, they will need a continuous source of food. They will need to grow crops.



Left: In a scene from "The Martian," astronaut Mark Watney employs some ingenious methods to plant crops on Mars. Right: Real-life NASA astronaut Kjell Lindgren harvests lettuce grown from the Veggie experiment while on board the International Space Station. Credits: Peter Mountain/NASA

Watney turns the Hab into a self-sustaining farm in "The Martian," making potatoes the first Martian staple. Today, in low-Earth orbit, lettuce is the most abundant crop in space. Aboard the International Space Station, [Veggie](#) is a deployable fresh-food production system. Using red, blue, and green lights, Veggie helps plants grow in pillows, small bags with a wicking surface containing media and fertilizer, to be harvested by astronauts. In 2014, astronauts used the system to grow "Outredgeous" red romaine lettuce and just recently sampled [this space-grown](#) crop for the first time. This is a huge step in [space farming](#), and NASA is looking to expand the amount and type of crops to help meet the nutritional needs of future astronauts on Mars.

AAS Library

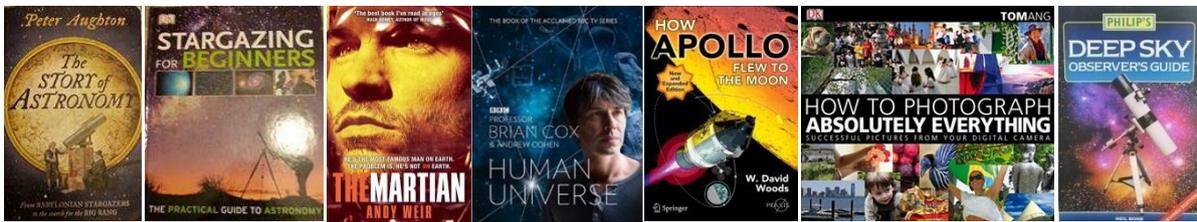
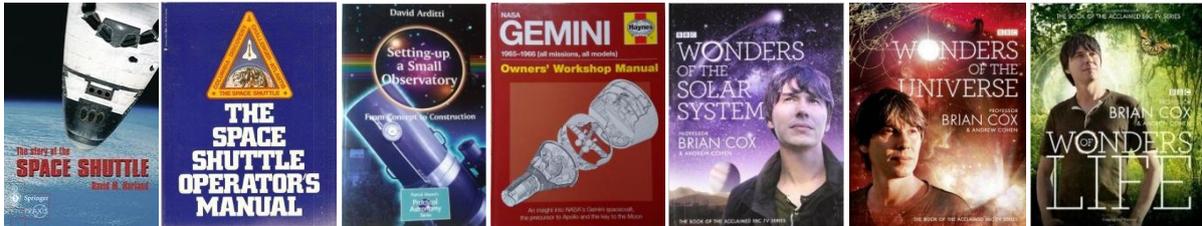
Dear Members:

Welcome to the new AAS Library, I hope you enjoy the variety of books our members kindly put for hire, so we can all have the opportunity to read something different and learn a bit more. Remember, it is only 50p per book; with this small contribution our Society can then buy new books that can help us with our hobby of Astronomy, Space and Astrophotography.

If any of you wish to put some of your books for hire, remember you always keep the ownership on your books, but you can help others to expand their knowledge and get a bit of enjoyment. If you do please send me a list of your books to library@ayrastrosociety.com, a picture of the covers will be good, so I can get them from the internet and put them on our website, so people can see the cover of the book they would like to hire. To the ones without internet facilities we will have some hard copies to bring to our meetings and will try to update this list every month or so.

AAS Library book List:

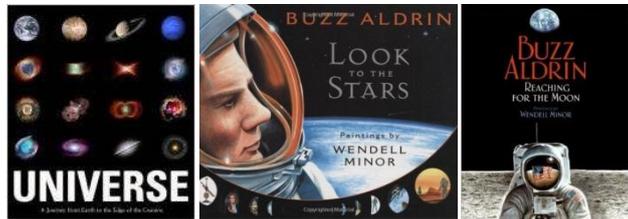
Update on 19/10/2015



New Books

Booked

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