Autumn 2015 Number 9





KIELDER OBSERVATORY

NEWS SC

20" refurbished What killed the

SCIENCE What killed the

dinosaurs? - part 2

OBSERVING

Highlights for Oct/Nov/Dec

A TRIP DOWN UNDER

A report from Australia



EDITORIAL

The darker skies of winter are now approaching fast, and people's attention is naturally drawn to the night skies. It is a busy time for the observatory - so book your slot now to avoid disappointment! In this edition we look into space for an answer to what killed the dinosaurs, and delve into trustee Jurgen Schmoll's shed to see what has been happening to our 20" telescope. Meanwhile, my much-travelled fellow editor reports from his latest exploits in Australia.

Nigel Metcalfe

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Kielder Observatory Astronomical Society

Registered Charity No: 1153570. Patron: Sir Arnold Wolfendale 14th Astronomer Royal

Full Membership £75 per annum Friends of Kielder £25 per annum

Kielder Observatory Astronomical Society is a Charitable Incorporated Organisation.

Its aims are to

- * Promote interest in the science of astronomy to the general public
- * Facilitate education of members of the public in the science of astronomy
- * Maintain an astronomical observatory in Kielder Forest to support the above aims



http://www.kielderobservatory.org E-mail: chairman@kielderobservatory.org secretary@kielderobservatory.org membership@kielderobservatory.org admin@kielderobservatory.org



DIRECTOR'S CUT

Welcome to our latest version of the newsletter! Dark skies are now well and



truly here, as the summer Milky way rides high it is proving as big a draw as ever. I am now working tirelessly with the board of trustees to ensure we have a healthy and robust charity that can achieve our objectives. A huge part of that is managing the finances of the facility; without the guests there are no finances and we all go away and work elsewhere. Well I'm happy to tell you all that not only are we matching previous years' performances, we are exceeding them! With bookings flying out of the door we are now in the superb position of being able with increased resources do more astronomy outreach, so the focus moving into 2016 is going to be maintaining our strong position as well as improving the offer and reaching more people with the Kielder Observatory message, 'infinite inspiration'. So a massive thank you for your continued support to our fantastic band of volunteers and, of course, committed staff members.

2015 saw me celebrate my 50th orbit around the Sun, so I would like to thank all of you who turned up at my home and joined in the celebrations! Ouch, sore head the next morning, but a great night nevertheless. Details of the KOAS Christmas party will be released soon...it's looking great tho!

I finally managed to get the Paramount ME II mount working and I'm pleased to say it's been quite happy after major surgery; as well as that, guess who is back? the 20" has landed and is now fully operational, with a few new eyepieces, it's going to improve even more the visitor experience. As noted in the news section we have a new deck, which is proving to be a very popular haunt for stargazers as it provides a nice and safe environment to watch the sky. I have asked the the same contractor to fit some external benches on the deck so quests can sit and relax. We are also finally taking down that horrendous lump of cloth that currently covers the sky light - it is being replaced with blinds that will prove to be much safer. All in all a great year ahead and keep looking up! In the next report I will be telling you all about our Chile trip..oh yeah!

Gary Fildes (FRAS MSc Hon.Caus.)



KOAS NEWS

NOTICE OF AGM

The Annual General Meeting of the Kielder Observatory Astronomical Society will this year be held in the Meeting Room at Hoults Yard, Walker Road, Newcastle Upon Tyne NE6 2HL on Saturday 31st October at 11:00 a.m. The meeting is expected to be complete by 12:30. All Members are encouraged to attend.

TRUSTEE NOTES

The trustees met on July 13th. The treasurer reported that some question over Gift Aid on previous sales still remained, but essentially the Society would now be able to claim Gift Aid on future ticket sales. This is good news for our finances and should enable us to take on more paid staff. Sales were up (which is also good news!). A budget would be drawn up to cover next year's expenditure.

The on-line shop was now up and running and selling artwork, mugs and a range of adult and child t-shirts. The initial Vermont Events had proved a great success. More were to follow. An opportunity had also arisen to run some events at Kielder Castle. In order to enable us to attend more outreach exhibitions, the idea of producing a 'pop-up' stand advertising the observatory, which could easily be transported around the country, was discussed. Our application to Trade Mark the Kielder Observatory logo has been approved - you should spot a little TM in the corner now!

In order to further our expansion plans for the observatory KOAS had now joined the KWFP (Kielder Water & Forest Park) Development Trust, whose other members include Northumbrian Water, the Forestry Commission, Calvert Trust Kielder and Northumberland County Council. Interviews were now talking place for a Project Director to draw up a business case/ prospectus for the expansion (since the meeting we have appointed two consultants to this end). The next meeting will be in November.

Want to help Kielder Observatory become one of the top astronomy attractions in the UK ?

For just £25 per year you can join the Friends of Kielder Observatory. For £75 per year you can have voting rights at our AGM and access to two free events of your choice.

Contact membership@kielderobservatory.org for further details.



OBSERVATORY NEWS

There was great excitement on September 22nd when the Kielder Observatory Twitter feed acquired its 10,000th follower! If you haven't done so already, for the very latest from the observatory find us at @kielder_obs (https://twitter.com/kielder_obs). We are also on Facebook (https://www.facebook.com/KielderObserv atory).

The Vermont evenings have been going extremely well. The last one, on September 20th, attracted 65 guests. The next such event will be on 22nd November (see our advert on the rear page). The observatory has also just had its Visit England accreditation renewed for 2015.

Meanwhile, up at the observatory a new observing deck has been constructed. In homage to a certain well-known radio astronomy project, this has been unofficially named the SKA (the Square Kielder Array!). This has given those running events much more flexibility, enabling free-standing telescopes to be set up away from the rather flexible decking of the observatory itself.

We have just ordered 4 sets of Sonido



Gary wows the audience at the Vermont Hotel with a description of the microwave background left over from the Big Bang.



OBSERVATORY NEWS



Work progresses on the new decking.

listening devices for visitors who have hearing loss - these should be in place by the time you read this newsletter. We have also decided to renew the on-site generator, to improve reliability, and replace the stove in the observatory building (which was showing its age).

Some of you may have heard Gary on Radio Newcastle on September 15th talking about life in the Universe, whilst getting in a good plug for the observatory!

By the way, if you like the front cover then you can now buy a copy as a mounted print from our on-line shop http://www.kielderobservatory.org/productcategory/mounted-print/ - there is also a new print of the Perseid meteors.



The new decking ready for action!



OBSERVATORY NEWS

One again we are running a series of Dilston Stargazing events at the Dilston Physic Garden, near Corbridge, where the 12" Dobsonian telescope will be in action. The next event will be on December 4th. They tend to sell-out quickly, so book your place now! You will also need to book quickly for our New Year's Eve Stargazing Party on 31st December -

http://www.kielderobservatory.org/events/ new-years-eve-stargazing-party/ . Join us at the observatory for night under the darkest skies in the UK, celebrating the end of 2015 and a New Year beginning. Our now famed New Years Eve parties are a real show-stopper! Let us guide you through the facility using our high tech instruments and team of astronomers as we show you the wonders of the night sky. With the winter constellations overhead and the Milky Way still visible it promises to be a great night.



Farewell to the old stove!

And finally, look out for our 2016 Kielder Observatory calendar - an ideal Christmas gift, with 12 stunning pictures of the night sky . It will be on sale from our on-line shop in the next few weeks.



'We would like to tell you how FANTASTIC my wife and I found the Blood Moon Morning. It went way beyond what we expected. The blood moon was a beautiful sight but the unexpected clarity of the rest of the sky, including the Milky Way, took our breath away. We spent a good two and a half hours alternating between the two magnificent sights of the Milky Way above us and the Blood Moon off to the South(?), the clarity of both, even just using the naked eye, was almost surreal and these observations, which we made sitting together, have affected us deeply despite not being religious. We feel so lucky to have witnessed such a cosmic event, and we are very grateful to the lads who gave the talks, set up the telescopes etc., please send them our thanks. Seeing the Blood Moon has knocked another one off both of our bucket lists, however if we are still around in 2033 we would love to come back and see the blood moon again, weather permitting.'

Paul & Karen Wakefield



We follow on from our last newsletter with part 2 of Lee Moorhead's fascinating insight into the demise of the dinosaurs ...

What Killed the Dinosaurs? -Part 2 – Extra-Terrestrial Causes

In an article in Scientific American in October 1990, Walter Alvarez and Frank Asaro summarised over a decade of data collection and research which suggested that a large asteroid or comet had hit the Earth at 65 million years ago, coinciding with the extinction that ended the dominance of the dinosaurs on Earth.

HOW DID THE IMPACT HYPOTHESIS EVOLVE INTO A PLAUSIBLE EXPLANATION FOR THE EXTINCTION?

The impact hypothesis had been first suggested in the 1970's and was billed as the only theory that fitted with all the evidence available at that time. Over the next decade or so, samples that were dated as 65 million years old from 95 sites in 13 countries around the globe from a wide variety of environments (marine and non-marine) were found to contain elevated levels of an element called Iridium. Iridium is very rare in Earth's crust but is found in higher quantities in meteorites: therefore, the elevated levels 8 | Kielder Newsletter | Autumn 2015

found in so many sites pointed to some sort of global event, possibly involving an asteroid impact.

In addition to Iridium, samples of another element. Osmium, were recorded at various sites too. Osmium can exist as one of seven isotopes. Isotopes are variations of the same chemical element: they have the same chemical properties but each one has a different mass than the others. This is important as some isotopes are unstable and cause the atom to split, resulting in it becoming a different chemical element or another isotope of the same element. For these samples, the ratio between two of the isotopes of Osmium (Osmium 187 to Osmium 186) is greater than that found in the Earth's crust; however, this higher ratio is also known to exist in meteorites, inferring it may exist in asteroids too. Furthermore, samples of clay dating from around 65 million years ago also showed

'mineral spherules'; these are a signature of what is called 'shock melting' or 'shock metamorphics'. These spherules are droplets of rock that have been melted by a huge collision (delivering lots of energy) and then recrystallized to form these droplets as they cooled.

HOW WAS THE CRATER LOCATED? Gathering all this chemical evidence





Satellite image of the Chicxulub impact crater: Landsat8 image centred on the impact crater. No visible signs of the crater can be seen from the air or the ground. Credit: US Geological Survyey/NASA

throughout the 1980's was adding plausibly to the impact hypothesis; however, like a detective who has found a murder weapon but not the body of the murder victim, scientists had not located a suitable impact site. In other words: one that occurred 65 million years ago, had enough speed and energy to have delivered the Iridium and Osmium in their relevant states and abundances to the Earth and to have dispersed them throughout the globe, along with minerals that had undergone 'shock melting'. Independently of this research, in 1978, a geophysicist named Glen Penfield carried out a magnetic survey for the Mexican state oil company, PEMEX; this survey covered an area off-shore near the town of Chicxulub, on the Yucatán peninsula, Mexico. This type of survey is routinely carried out to assist in the mapping of geology to find oil and minerals and relies on changes in the magnetic signature of Earth's crust.



His data showed an odd, semi-circular. very prominent feature about 180 km across at its widest. Further analysis demonstrated that the cause of this feature lav buried over a mile beneath the surface and was not volcanic in origin; it did, however, have a central bulge. These characteristics were very similar to those seen when conducting similar surveys over known impact sites (although these sites were a lot smaller). Modern satellite imagery and magnetic data (shown in the inset images) demonstrate how the crater. now infilled with sediment/rock/soil both on and offshore, cannot be seen on the surface but its magnetic signature is very clear. Note the grey area in the centre of the first (Landsat8) image is the town of Chicxulub and not the centre of the crater.

Penfield and his colleagues came to the conclusion that it was an impact site. One issue was that these data were confidential, as they were owned by PEMEX. Also, seeing these anomalies on a geophysical map is one thing but samples would need to be taken, analysed and dated to prove it was an impact crater. Some samples had been taken - however, a fire at the storage facility had apparently destroyed them. Then, in 1990, after talking to another scientist, Alan Hildebrand, who was studying rocks in Haiti, they both began to search for samples. Fortunately, not all the samples from the Chicxulub area had



Magnetic TMI image of the Chicxulub impact crater: the crater, although buried under sediment, can still be seen by its disruption to the magnetic response of the Earth's crust. Credit: Gtech Group plc.

been destroyed in the fire; a significant number had been distributed to colleagues in Mexico and the US. Once they got hold of some of these, they discovered geological evidence that the feature seen in the magnetic survey was indeed an impact crater; dating the rock put it around the 65 million year old mark. Now scientists not only had global chemical evidence of an impact around 65 million years ago but the location of an impact site of the same age which was big enough to have had enough energy to dissipate the Iridium and Osmium throughout the planet. It has been



calculated that the asteroid was around 10 kilometres in diameter and was travelling at around 10 km per second when it hit. Such an impact would have had catastrophic effects both short and longer term.

CONSEQUENCES OF THE IMPACT Many effects would have been very similar to those resulting from super volcanism. Short term effects would have included huge (mega) Tsunamis that would have traversed very long distances wiping out animal life on land both near the coast and far inland; large atmospheric turbulence would have been generated resulting in huge storms; the heat generated by the impact would have created wide-spread, global fires. Longer term effects would include sunlight being blocked out for years after the impact as vast amounts of dust and rock would have been thrown high into the atmosphere and distributed globally by air currents; rain would eventually pick up the dust in the atmosphere as it fell and deliver it into rivers, lakes and oceans, altering their chemistry; together with a dramatic fall in temperature due to sunlight not getting through the dust and debris. All these effects would have resulted in ecosystems collapsing all around the globe leading to mass extinctions over a, relatively, short timescale of several tens of thousands of years.

Next instalment: What Killed the Dinosaurs? – Part 3 – Comparing Theories

Lee Moorhead

Not been to Kielder yet?

Then why not book one of our events for you or your family?

Advanced booking is essential. Weekend events can fill up several weeks in advance. Please book online at http://www.kielderobservatory.org/events/ or call us on 0191 265 5510. We can also be contacted at admin@kielderobservatory.org

SPECIAL EVENTS:

- * On Nov 22nd we will be running one of our special evening shows at the Vermont Hotel in Newcastle.
 - * On Dec 4th there will be a stargazing event in Dilston Physic Garden.
 - * Dec 31st 8pm-1am is our New Year's Eve Stargazing Party.



OCTOBER 2015 (times in BST)

Lunar phases

Last quarter	04/10/2015	20:06
New moon	13/10/2015	01:06
First quarter	20/10/2015	19:31
Full moon	27/10/2015	11:05

PLANET SUMMARY

Mercury is a challenging morning object rising in twilight. Venus is the Morning Star rising nearly 4 hours before the Sun. On the 15th, Venus, Mars and Jupiter will make a nice sight, rising and setting at almost the same time. Saturn is a difficult evening object visible low down in the western twilight after sunset. Uranus is visible for most of the hours of darkness.

THE STARS AT 9PM (BST)

North – Cepheus is prominent. Draco and the two Bears are nicely placed. Auriga is low down in the north-east.

East – Cassiopeia and Andromeda are nicely placed for viewing as is Perseus. Look out for M31 in Andromeda and the Double Cluster in Perseus. Delphinus and Sagitta are nicely placed. Capricornus and Sagittarius are low down. West – Lyra is high up, with Hercules and Corona Borealis nicely placed. Ophiuchus and Bootes are low down. Just below Vega, Lyra's brightest star, is a lozenge shaped group of four stars. About half way between the two lower pair of stars is M57 – which looks like a 'smoke ring' in a medium sized telescope.

METEOR SHOWERS

The Draconid Meteor shower was active around Oct 8th. The major meteor shower this month is the Orionids, which peak on Oct 20th/21st. Expect 20-30 shooting stars per hour – the best time should be around 0300 on Oct 21st. There will be a First Quarter Moon on Oct 20th so it will be a favourable opportunity to see this shower (which has bright, colourful shooting stars) once the Moon has set around midnight.

COMETS

There are no bright comets in October.

South – Cygnus is high overhead.

The Planets 15/10/2015

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	07:33	05:45	03:12	09:54	03:43	03:51	11:21	18:01
Transit	12:53	11:49	10:01	14:47	10:31	10:34	15:35	00:43
Set	18:12	17:52	16:50	19:34	17:18	17:17	19:48	07:22

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NOVEMBER 2015 (times in GMT)

Lunar phases

Last quarter	03/11/2015	12:24
New Moon	11/11/2015	17:47
First quarter	19/11/2015	06:27
Full Moon	25/11/2015	22:44

PLANET SUMMARY

Mercury is in solar conjunction, with Venus still a Morning Star. Mars is visible for ~4 hours before sunrise and Jupiter is starting to rise earlier in the night. Saturn is a daylight object and Uranus is visible for much of the hours of darkness.

THE STARS AT 8PM (GMT)

North – Cepheus is high overhead, with Draco and the two bears nicely placed. East – Cassiopeia and Andromeda are high up with Perseus nicely placed. Taurus is near the horizon and to its top RHS is Aries containing Jupiter. South – Pegasus is nicely placed with Pisces – Jupiter sits between Pisces and Aries. Aquarius is low down and you can find Formalhaut in Pisces Austrinus – which is the most southerly placed bright star visible from the UK.

West – Cygnus dominates this view along with Sagitta, Vulpecula and Lyra. Low down you can find Hercules.

METEOR SHOWERS

November hosts two meteor showers: 1) Taurids – around Nov 12th – this is a short shower but the particles are quite 'large' and the meteors can sometimes outshine Jupiter or even the Moon. They tend to be few in number but are bright, slow moving and often quite colourful. Each year the date of the peak for this shower shifts - in 2015 it is guite late; the peak can be as early as Nov 1st. 2) Leonids – on Nov 16/17/18 – another annual shower that usually puts on a good show of 50-100 meteors every hour. These particles are fast moving and 'small' and so the meteors are guite faint. The Moon is waxing, so once it has set [2135 on Nov 17th] there should be good conditions to see this shower.

COMETS

Late in the month, Comet Catalina may be visible before dawn in Virgo.

The Planets 15/11/2015

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	07:32	07:26	03:04	10:40	02:31	01:20	08:38	14:57
Transit	11:52	11:47	09:00	15:03	08:38	07:52	12:47	21:33
Set	16:11	16:06	14:55	19:27	14:45	14:24	16:55	04:13

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DECEMBER 2015 (times in GMT)

Lunar phases

Last quarter	03/12/2015	07:40
New moon	11/12/2015	10:29
First quarter	18/12/2015	15:14
Full moon	25/12/2015	11:11

PLANET SUMMARY

Mercury is now almost lost in the evening twilight. Venus is still the Morning Star. Mars is visible from around 0300 until dawn. Jupiter is now rising before midnight. Saturn is an evening object.

THE STARS AT 8PM (GMT)

North – Cassiopeia will be near the zenith, with Draco nicely placed splitting up the two bears

East – Perseus, Auriga and Taurus are nicely placed

South – Andromeda is high up with Pisces nicely placed. Pisces Austrinus [with its brightest star, Formalhaut] is near the horizon

West – Cygnus, Vulpecula and Delphinus are nicely placed, as is Lyra. Hercules is near the horizon

METEOR SHOWERS

December has two meteor showers: 1) Around the 13th December the Geminids are active – originating from Asteroid 3200 Phaethon – the only shower to do so, this shower regularly performs with typically 30-90 shooting stars per hour and is visible as soon as it gets dark - when Gemini rises. For 2015, the Moon is a few days past new so it is a reasonable year to try to see this shower once the Moon has set. On the 12th the moon sets at 1719. on the 13th sets at 1819, on the 14th sets at 1926 and on the 15th sets at 2017. 2) Ursids – the Christmas shower has its peak on the 22nd and 23rd December. It musters only about 5 per hour and for 2015 there will be a near full moon so making it a challenge to see this shower.

COMETS

Comet Catalina should still be visible in early morning sky moving from Virgo to Bootes.

Night Sky credits: Lunar and planetary data sourced from Cybersky 5

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	08:17	09:43	04:23	10:45	02:15	23:38	06:59	12:58
Transit	12:02	13:09	09:14	15:37	07:45	06:07	11:03	19:33
Set	15:48	16:34	14:03	20:37	13:15	12:32	15:08	02:12

The Planets 15/12/2015

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The Planets are coming - part three

In our last two newsletters we looked at some interesting interactions – scientifically known as conjunctions - between the planets and with the Moon, up until October. So, here is part three of our guide, which is a run-down of the events from the end of October until the end of December. As with any conjunction event it is best to start observing a few days before the actual date described so you can see the dance of the planets.

Planetary alignments in October

On the 23rd of October; Venus, Jupiter and Mars are very close in the pre-dawn sky. Start looking out for this group a few days before, when Mars will pass Jupiter on the 17th - on the 23rd the three planets are separated by less than 4 degrees from Mars to Venus.

On the 25th/26th Venus passes Jupiter and you may get to see what some people do consider to be the 'Christmas Star' apparition.



7th November



Planetary alignments In November

Venus and Mars are close in the early morning sky at the beginning of November, with the two planets separated by just 0.7 deg at dawn on the 3rd.

On the 6th November Venus, Mars, Jupiter and the Moon make a nice, close group in the east in the pre-dawn sky. Then on the following night the crescent Moon has moved to make an even tighter group with Venus and Mars.

Planetary alignments in December

On the 4th December the crescent Moon makes a close pass (about 1.5 deg) of Jupiter in the pre-dawn sky. On the 6th it passes very close to Mars - unfortunately the closest approach is below the horizon from Kielder, but they are still within a degree or so of each other when they rise in the early hours of the morning - and then on the 7th/8th the Moon passes within half a degree of Venus.



4th December



OBSERVERS' SLOT

A SHORT HISTORY OF THE 20" TELESCOPE

Visiting our observatory you may have wondered of the whereabouts of the iconic 20 inch telescope in the Patrick Moore Observatory. It has been replaced by one of the computer controlled 16 inch Dobsonians and you may wonder why.

The 20 inch telescope was the main work horse for years, being purchased together with the 14 inch LX200 in its fork long before Kielder Observatory even got drawn up! During this early stage, the instrument got displayed at various star parties but spent most of the time in storage. Then in 2008 the telescopes moved into their domes at the observatory. At the beginning, there were some problems with the large instrument. The mirror did not deliver sharp images at higher magnifications, and when the front turret with the eyepiece was rotated to enable a comfortable view for our visitors, the instrument became mis-aligned. So around that time the telescope was dismantled and moved to my garden shed, where I rebuilt it. A coma corrector was fitted which also removed the spherical aberration that was introduced by the mirror being not parabolic but

slightly hyperbolic (as I found out in a Foucault test). Using this corrector required shortening the trusses, and I chose this opportunity to fit a system that allowed the effective length of the four trusses to be adjusted. By doing so, the rotating front ring can be tilted until the mechanical axis of rotation coincides with the optical axis, which can be verified with a laser collimator. If the collimator beam remains in the mirror centre when the front ring is turned, the plane defined by the trusses is just right to assure the alignment does not change. When I did this. I made use of a metal mill that I had just acquired. Apart from this mill having huge backlash, I was not experienced either, and the job when done looked rather agricultural. However, it worked for the years coming. The instrument came back to the observatory to show the beauties of the skies to scores of visitors.



A bit of work with the milling machine was required.



OBSERVERS' SLOT

Around 2012 the mirrors were really deteriorated with the moisture, dust and pollen that is around in the forest environment. We decided to get the optics re-coated at a company near London, and the mirrors went back - just to find out in disbelief that the new aluminium layer deteriorated again within weeks! Finally, chosing another coating company made the mirrors shiny again, although by now (mid 2015) the secondary (especially) could do with another go. As there were more complaints about the telescope not keeping alignment any longer, it was put out of action and replaced by the 16-inch Dobsonian. Recently the 20-inch disappeared from the observatory entirely. Was this the end of the 20-inch?

No!

The telescope is back in my garden shed observatory (filling it up nicely) to get a major overhaul. The plan is - to replace the fasteners of the trusses by better ones which allow the beams to keep in place to stiffen the tube up. - to revisit the adjustment system for the front cage and to assure it works again. - to add the Argo Navis digital setting circle system to allow objects to be found without star hopping

- to add a drive system so finally the

objects stay in place when the visitors are on the ladder!



The repaired 20" almost ready for action!

At the beginning I thought it was a quick job, with a large worm wheel at the mount base. But once having the telescope at hand I noticed that the maximum size of worm gear would be a bit too small to pull the horseshoe mount securely. Also measurements have shown that the mount is not pointing at the correct angle



OBSERVERS' SLOT

towards the pole, being obviously designed for a latitude of 50 degrees instead of 55 degrees. So back to the drawing board! I now came up with a mount that has an additional wedge on the southern bearing base to bring the latitude up to 55 degrees. Furthermore the two massive blocks that hold the roller wheels for the horse shoe in place need replacing by ones that are 60mm taller. Those new blocks will have axles in ball bearings with the new rollers being rigidly attached. Each axle will carry an 80mm worm wheel connected to a stepper motor, and both stepper motors will be connected to the same control box. So the two rollers will move the telescope with great leverage while the horse shoe can slip in case of accidental bumps into the instrument, avoiding damage. The telescope operator can disengage the worm wheels by opening two clamps and move the telescope around in the usual way before clamping the worm wheels back to allow tracking.

Where are we now ?

The tube trusses have been reinforced and the top slots of the adjustment system reworked to work properly. Fourprong grips are holding the trusses at the bottom end, while Allen bolts will fix them into place at the top. With this modification the telescope can go back to Kielder soon. All other alterations will need longer, so I decided to do all the measurements and get the parts made and ordered while the telescope is being used at the observatory the usual way. Once we have the parts, the instrument can be upgraded at the observatory. The chunky aluminium blocks need fabrication as my machines are too small, and the stepper motors with controller will be a custom job for a UK company that deals with astronomical tracking systems. Gears, axles and bearings are standard parts I will order "off the shelf". The Argo Navis system is not complete, as one encoder and the cables are missing and those parts need to be found or to be re-ordered.

So while the telescope will be back soon, in a few months it will go through another change making it better then ever before!

Jurgen Schmoll, September 2015

Update: the telescope is now back in the observatory. More significant changes (correcting polar height and tracking) will follow - Ed.



ASTRONOMERS' TALES OUTBACK ASTRONOMY

One of the main criteria for viewing a good night sky is the absence of extraneous and artificial lighting. In England this can be found on a few places such as Kielder [obviously], Dalby Forest, parts of Wales, some areas of southern England well away from the big cities and towns and quite a few places in western and other parts of Scotland. When you go overseas, many countries offer similar dark skies and often these can be on a much larger scale in terms of area. Australia is one such place and you only have to travel some 20-30Km away from the big cities such as Melbourne, Adelaide and Sydney to be in places where the night skies can be as light pollution-free as Kielder village. This was one of the reasons why I set off on a vacation to Oz in 2015. When is the best time to go? - our Summer months are the Winter months in Oz and - on the whole - are the drier months as well in Oz.

There are many ways of getting around Oz and there are many places of interest to go, so the choices of vacation are many and numerous. I could have chosen a fullon trekking holiday from Broome to Adelaide but I would miss out on some places that I wanted to visit. I could have travelled on the Ghan Train, Adelaide to Darwin via Alice Springs [more of AS later], but again I would have to miss out on some places as well. In the end I chose a fly-fly-fly trip from Melbourne to Sydney via Alice Springs, Uluru and Cairns/GBR, which afforded me time to explore as well as a lot of included itinerary too.

How long does it take from Manchester to Melbourne – about 25 hours – 21 of them in planes, and about the same coming back from Sydney. Not perhaps for the faint hearted or for those who have only ventured to the Med – I am a very widely travelled traveller and – sad to say – my carbon footprint on planes over the past twenty five years is rather large – at the latest estimate around 200,000 air-miles so far.

So, this is a summary of my trip: <u>Melbourne</u> – the capital of the State of Victoria – is a busy city with lots of high rise modern buildings. But – and it's an important but – it contains many of its original Victorian-era arcades which are now lots of cafes and eateries and it also has a wonderful commuter system of integrated trams and buses. One of the tram lines has been set-aside for 'fine dining' experiences at night – which is very recommendable if you can get there.



ASTRONOMERS' TALES

Melbourne has an observatory which is situated in the Botanic gardens. My itinerary did not allow me enough time to visit the observatory but if you go there then it's a wonderful place to go by day. The original equipment is still in use but since it was installed in 1861-3 and expanded in 1902 the city of Melbourne has grown past the observatory and now the skies are severely light polluted. After a few days to take in Melbourne – which included a night out at the MCG [The Cricket Ground for those who may not know] to watch an Ozzy Rules Footie match - we then flew to Alice Springs in the Red Centre.

Alice Springs – developed from a place in the middle of nowhere as a result of a new railroad that crosses the continent of Australia. In the past few decades it has been the home of two of Australia's iconic - and almost unique - services to the spread out population of the outback. The Royal Flying Doctor Service began as a one man band with a doctor who saw how people in the bush were suffering because of the lack of primary emergency medical care. He set about recruiting pilots, doctors and nurses and now the service covers the whole of the Australian mainland. Tasmania and some of the off-shore islands as well.

The School of the Air is based around a similar model of providing educational service to all the children across the outback. This was started as a pilot scheme by volunteers and over the years the state governments saw it as a great way to educate children on some of the remote and huge sheep and cattle stations, which may be 1000 km away from the nearest towns.

Today, with the aid of satellite internet and material flown from the School to the stations, schoolkids of all ages get as good an education as can be achieved in schools in towns and cities of Australia. In Alice Springs there is very little to do for the traveller, however there are some amazing holiday hotels/resorts and it was from one of these that I had an experience in the outback. Based at the Chifley Resort an optional excursion was provided to travel into the outback for a 'fine dining experience' – at night! A group of about 90 people from all of the hotels in Alice Springs set off and we were driven about 20 km out of town and up a dirt track road. As we got off the bus we were greeted by waiters in black tie serving Australian sparkling wine from crystal glasses - a nice way to start the evening. Just on the off-chance of an opportunity to see the Southern night



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sky I took along with me my tripod, Canon 60Da camera and a fish eye lens. You will have seen the image in the last newsletter. I had taken the precaution of booking my trip around the June New Moon just in case I got an opportunity to do some stargazing. After some nibbles and more wine to get us in the mood we sat down at tables with white linen tablecloths, more fine crystal glasses and silver service and we were served with a sumptuous 3-course meal. Occasionally I would excuse myself to walk about 200 meters away from the party to take a picture of the night sky. The skies were dark – very dark – and the Southern Milky Way was clearly visible – Scorpio, Sagittarius, SMC/LMC, Omega Centauri and more were all there.

After about 2 hours we had to pack up and return to the hotel – I thought about staying out all night – but it was going to be a 20 km walk back to the hotel on unlit roads with who-knows-what likely poisonous wildlife lurking in the shadows. The following day we had an introduction to Aboriginal life and a session of 'picture painting' native Ozzy style. The Aborigines do not have books - they pass their memories down by story telling and – sometimes – painting pictures – sometimes the picture tells the story. So, we were tasked with painting a picture using traditional Aboriginal symbols - of a special event in our lifetime. What would you pick as a special event - most people have many to choose from. I chose a scene from a trip to see the Total Solar Eclipse in Libya in 2006. The method of painting is to apply dots of paint to make pattern - similar to how the native people paint themselves for special occasions. After our time in Alice Springs we drove to Uluru by way of Kata Tjuta – Uluru is a large lump of sandstone, Kata Tjuta is a collection of volcanic domes. We spent a day walking around Uluru [around 10 km] in searing heat – but the colours of the rock were amazing as well as the view at dawn and dusk. From Uluru we flew to



A distant view of Uluru - with some lovely clear skies!

Cairns – the gateway to the Great Barrier Reef. I am a non-swimmer and I had



some concerns that I might not get full value from a day out on the reef. However, based from a huge floating pontoon some 30 km and a 2 hour boat ride from the mainland, I saw the reef from



OK, so it's not really astronomy, but the Great Barrier Reef is very beautiful.

below, on an underway observatory, from the surface, as you can see the corals from the pontoon, and from above in a helicopter – all worth doing! In Cairns I also had a day out to Daintree Forest where there are interesting trees and plants as well as some big crocs [6m plus!]. From Cairns I then flew onto my final Oz destination Sydney. Sydney was discovered by Captain Cook – who is synonymous with Australia and the exploration of the Pacific islands. He commented that it has a superb harbour. Based in a very nice hotel in Darling harbour with a decent view of the city I

ASTRONOMERS' TALES

had a few days to explore the city. Before I went on this vacation I got in touch with the Astronomy Society of New South Wales. The ASNSW have a dark skies observing site well away from the streetlights of Sydney, and I could have attended their star party at the time I was in Oz. but it would have meant a 1000 km detour in the space of 24 hours to arrive back in Sydney on the day that I was due to fly home. Anyway, I did arrange to meet with the chairman of the ASNSW and we did talk shop. The ASNSW run the Three Rivers Foundation Australia http://www.3rf.com.au/ - which supplies telescopes to community groups for star parties in NSW - there are branches of 3RF in America too. We had a meal together and he gave me a piece of the Henbury Meteorite.

I did take the opportunity to visit the Sydney Observatory, but more of that in a future edition of the newsletter.

If you want to see more of my images of Australia then please look here.... https://www.flickr.com/photos/56553919@ N04/sets/72157654863053452/

Robert Williams



We would love to display your images here! All the better if they are taken up at Kielder, but it is not essential. Please send them to

newsletter@kielderobservatory.org

along with a brief description of how and when they were taken.



The morning of September 28th saw the total eclipse of the 'supermoon'. Gary Fildes took this image from the Observatory.



A taster for the next edition - from an observatory somewhere in Chile ...





An ice halo around the moon, taken at Kielder - Gary Fildes.



The Lagoon and Triffid nebulae taken with a Canon camera plus 55-250 mm lens set on 200mm, mounted on an loptron Skytracker. Taken by Nigel Metcalfe from Lincolnshire.





Visitors stare in wonder at the night sky. Gary Fildes.



Another beautiful night at the Observatory. The streak is an Iridium satellite not a meteor. Gary Fildes.





The night of October 7th saw a spectacular auroral display over much of the UK. Here is the view from the observatory. Matt Robinson.



Another view of the October 7th aurora. Matt Robinson.

'The Big Universe'

Bringing Kielder Observatory to Newcastle

Starring: Gary Fildes, Director Kielder Observatory

Kielder Observatory is coming to the Vermont Hotel in Newcastle once again to bring alive the wonders of our universe

The biggest question mankind has ever pondered has to be the origins of our Universe. Tonight Gary will introduce some of the mind boggling concepts science is trying to unravel.

This will be followed by a Q & A session and the Observatory team will be on hand to show you images, talk telescopes as well as astronomy

- Exploring the origins of our Universe
- Physics with Dr Fred
- Telescope Workshop
- · Finding and locating objects in the night sky

VENUE: Ball Room at The Vermont Hotel, Newcastle upon Tyne, NE1 1RQ.

DATE: Sunday 22nd November 7:00pm - 9.30pm

TICKETS: £16.50

FIND OUT MORE AND BOOK ONLINE:

www.kielderobservatory.org/events/kielder-observatory-comes-to-newcastle/

OR CALL US: 0191 265 5510

'We really enjoyed it - the staff were tremendously helpful, engaging, pitched the event at the right level for families, it was a real highlight of our week long holiday in the area.

Martin



'I enjoyed it very much and hope to come back soon. Gary and the team were brilliant. Thank you to Sam, Dan and Haydon for their depth of knowledge, enthusiasm and willingness and ability to answer the many questions thrown at them.'

Jacky

KOAS: Your Window to the Universe

http://www.kielderobservatory.org

KIELDER OBSERVATORY

