# Journal

of the



# December 2022

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# Thursday, December 1<sup>st</sup>

Nottingham Emmanuel School Gresham Park Road, West Bridgford, Nottingham, NG2 7YF

7:45pm (doors open at 7:15pm)

This evening we have our own

# **Dr Julian Onions**

of Nottingham University

who will be speaking on

'Crazy Interstellar Rockets'

# The Nottingham Astronomical Society: E - SERVICES

Whether or not you are a NAS member, you can keep up to date with details of the Society's meetings and other events by visiting the NAS website: <u>www.nottinghamastro.org.uk</u>

#### NAS on Facebook

You are welcome to connect with other members and friends of the NAS on Facebook by going to: <a href="http://www.facebook.com/nas.org.uk">http://www.facebook.com/nas.org.uk</a>

#### NAS on Twitter

The Society has a Twitter account at https://twitter.com/NottinghamAstro

#### NAS Journal e-mailing list

To register for your monthly e-mailed link to the NAS Journal, and a copy of our SkyNotes, just e-mail <u>secretary@nottinghamastro.org.uk</u>

You don't have to be a Society member to take advantage of this service. If you happen to change your email address, please remember to inform the Society by emailing us at treasurer@nottinghamastro.org.uk



# Chairman's Message, December 2022

Hello everyone,

Well, it's coming to the end of the year. We have just two formal events left in 2022, a talk on 1st of December, where I'm afraid you'll have to put up with me. I hope it is a bit of a fun talk with some science about rocket ships to distant worlds. Then we have the Plumtree meeting which includes the AGM, mince pies and mulled wine, and a Quiz, so I hope as many people can come and eat, drink and be generally merry! It should be a good occasion, and we hope to get through the AGM part in reasonably quick order. We're also looking to hold an evening at the observatory if weather and conditions are suitable – see below.

We've done some more outreach. I'm just back from an event for the 1st Cropwell Bishop Beavers, where we met with 20 or so excited beaver scouts (6-8 year olds). It was scheduled to be at the observatory, but unfortunately with all the recent rain it is rather waterlogged up there, so for safety reasons we met in a school. Both Leigh and Richard had telescopes, James did an excellent Moon station, and Holly and Chris helped manage the general mayhem! It was somewhat quieter than the previous one where a pack of brownies (20+ again) came to the observatory and were equally excited, and we all left with all our ears ringing!

Best wishes to all!

**Julian**, NAS chair

# The Partial Solar Eclipse of October 25th

Dane Atkin captured this image of the eclipse.



# Sky Notes December 2022

#### **Compiled by Roy Gretton**



All times given below are in Universal Time

**The Winter Solstice**, when the Sun will be 23.44 degrees south of the celestial equator, will occur at 21:48 on December  $21^{st}$ .

## PHASES OF THE MOON

Phase	Date
Full Moon	December 8 <sup>th</sup>
Last Quarter	December 16 <sup>th</sup>
New Moon	December 23 <sup>rd</sup>
First Quarter	December 30 <sup>th</sup>

This month the Moon is closest to Earth on the 24<sup>th</sup>, and furthest on the 12<sup>th</sup>.

## THE PLANETS

**Mercury** puts in an evening appearance at Christmas, with greatest eastern elongation (20 degrees) occurring on December 21<sup>st</sup>, but this will always be a difficult one for northern hemisphere observers, with the planet about 24 degrees south of the celestial equator.

**Venus**, having passed through superior conjunction in late October, has now moved into the evening sky but, like Mercury, will be about 24 degrees south of the celestial equator and difficult to observe. We shall have to wait until the spring to see Venus at its spectacular best. In May, for example, it will achieve a declination of more than 26 degrees *north* of the equator, and therefore be high in our sky after sunset.

**Mars** will be at opposition to the Sun on December 8<sup>th</sup>, when it will be 25 degrees north of the celestial equator, have an angular diameter of just over 17 arcseconds, and be shining at magnitude -1.9. This will also be the night of the Full Moon, when the Moon will be passing just half a degree to the north of Mars. The Red Planet's closest approach to Earth will by then already have occurred, on December 1<sup>st</sup>, when the two bodies will be separated by 38.6 million miles. As is always the case with Mars, the window of opportunity for close examination of surface details is relatively narrow. By the end of January its angular diameter will have fallen below 11 arcseconds.

**Jupiter** is visible throughout the whole of the evening during the first half of December, but by the close of the month will be setting shortly before midnight. By then its angular diameter will have dipped just below 40 arcseconds, and its brightness will have faded to magnitude -2.3.

The constant movements of the four brightest satellites are fascinating to observe. Interesting phenomena include: **eclipses** (when a satellite disappears into Jupiter's shadow, or reappears from the shadow), **occultations** (when a satellite passes behind the body of the planet), **transits** (when a satellite passes in front of the planet) and **shadow transits** (when a satellite casts its shadow on to the visible surface of Jupiter).

Of these, the **reappearance of a satellite from eclipse** by Jupiter's shadow is the easiest to observe, even with a small telescope (say, 50mm aperture). As we are currently viewing Jupiter after opposition, satellites reappear from Jupiter's shadow on the east side of the planet (viewed from Earth). The satellite is invisible before emerging from shadow, and therefore mysteriously appears out of apparently blank sky some distance away from the body of the planet. Next in ease of observation (with instruments of 100mm aperture and above) are **shadow transits**. In this case, look for a dark spot crossing Jupiter's disk. Lists of eclipse reappearances and shadow transits visible in the evenings this month are given below.

December	Reappearance from eclipse of
$4^{\text{th}}$	Io 20:35
$6^{ ext{th}}$	Europa 19:39
11 <sup>th</sup>	Io 22:30
13 <sup>th</sup>	Io 16:59
13 <sup>th</sup>	Europa 22:17
$19^{\text{th}}$	Ganymede 17:09
$20^{\text{th}}$	Io 18:55
$26^{\text{th}}$	Ganymede 21:11
$27^{\text{th}}$	Io 20:50
31 <sup>st</sup>	Europa 16:53

December	Shadow transit of
$1^{st}$	Ganymede 16:34 to 19:14
$3^{rd}$	Io 21:11 to 23:24
$4^{\text{th}}$	Europa begins 22:13
$5^{\text{th}}$	Io ends 17:52
$8^{ ext{th}}$	Ganymede 20:38 to 23:16
$10^{\text{th}}$	Io begins 23:08
$12^{\text{th}}$	Io 17:37 to 19:48
$19^{\text{th}}$	Io 19:33 to 21:44
22 <sup>nd</sup>	Europa ends 19:11
$26^{\text{th}}$	Io 21:29 to 23:40
$28^{\text{th}}$	Io ends 18:09
29 <sup>th</sup>	Europa 19:21 to 21:47

Happy Jupiter-watching!

**Saturn** is a magnitude 0.8 evening object in the constellation of Capricornus, setting at 9pm as December begins, and at about 7:30pm at the end of the month, so opportunities for observation are now fast diminishing. In 2023 Saturn's declination will move north of -11 degrees, so next year we can look forward to an improvement in observing conditions (which will continue to improve until 2032).

**Uranus** is well placed for observation throughout most of the night. It is fairly high in the constellation of Aries and shining at magnitude 5.7 with an angular diameter of 3.9 arcseconds.

**Neptune** is an evening object 4 degrees south of the celestial equator, close to the border between Aquarius and Pisces, shining at magnitude 8. It will be setting at 10:30pm as December ends.

#### **METEORS**

December provides the richest of our annual meteor showers, the **Geminids**, with over 100 events per hour visible under ideal conditions. This year the peak of activity is expected in the early morning of December 14<sup>th</sup>. This coincides with a 21 day-old (waning gibbous) Moon in the constellation of Virgo, which will interfere with observations after midnight. However, Geminids can be bright, so they are well worth looking for.

By contrast, the **Ursids**, which reach maximum activity on December 23<sup>rd</sup>, produce far fewer events, but this year luckily coincide with a New Moon.

# CALDWELL 33 IMAGED BY LEIGH BLAKE

One of the elements of the Cygnus Loop, the Eastern Veil Nebula (also known as Caldwell 33) is part of a supernova remnant. This image was captured over a period of 2.5 hours using a colour camera with a dual band filter, the regions of double-ionised Oxygen and Hydrogen alpha shown as cyan and red respectively. The image on the right is processed with StarNet2, a software tool that removes the stars from an image, revealing the complex filamentary structure.



# **DIARY DATES 2022-23**

# Monthly Meetings of the Nottingham Astronomical Society

## 1. Meetings at Nottingham Emmanuel School Gresham Park Road, West Bridgford, Nottingham, NG2 7YF

#### Held on the FIRST Thursday of each month (unless otherwise stated) except August

#### Doors open at 7:15pm for 7:45pm start.

These events are normally centred around a talk by a visiting speaker, except Quiz Nights, etc, when NAS members provide the activities. Normally we have a **Helpdesk** open at each meeting.

Date	Торіс	Speaker
December 1 <sup>st</sup>	Crazy Interstellar Rockets	<b>Dr Julian Onions</b> Nottingham University
*January 12 <sup>th</sup>	A Guide to the Nearest Stars	<b>Prof Colin Steele</b> Manchester University
February 2 <sup>nd</sup>	New Science from the JWST	<b>Dr Henrik Melin</b> Leicester University (STFC James Webb Fellow)
March 2 <sup>nd</sup>	Stars and Sensationalism: Searching for the First Stars in the James Webb Space Telescope Era	<b>Dr Emma Chapman</b> Nottingham University
**March 30 <sup>th</sup>	(To be announced)	
May 4 <sup>th</sup>	Cosmic Rays	James Miller

## Note unusual dates: \*second Thursday of the month \*\* fifth Thursday of the month (no meeting in April)

# 2. Social and Practical Astronomy Meetings at the Burnside Memorial Hall, Plumtree

Church Hill, Plumtree, Nottingham, NG12 5ND Held on the **THIRD Thursday** of each month from **7:30pm** 

These meetings are of a more informal nature, providing opportunity for members and guests to share their hobby over a cup of tea or coffee, as well as listening to a short talk or discussion

The next meeting will be on December 15<sup>th</sup> and will be our Annual General Meeting to be followed by cheese, wine and cake, and a Quiz

# A Plea for Help

"I have a Celestron Omni XLT 120 refractor but need some help in the use of the equatorial mount specifically polar alignment and also using a dual-axis motor drive...also I would like some step by step written instructions which would be of immense help to me. I am in the Bulwell area and I would be prepared to pay £50 for this assistance."

My email address is : garethwilliams714@msn.com

(Please contact Gareth directly if you would like to help)



# Images of Mars taken by Bryan Lilley in 2005

# Social and Practical Astronomy, Plumtree, November 2022

The November Plumtree meeting was by Tom Williams, a 3<sup>rd</sup> year physics student at the University of Nottingham. Tom may only be 20 but is one of the best amateur planetary imagers in the UK. He has been twice runner up in the Photographers Astronomy of the Year competition run by the Royal Museums Greenwich, and many will have seen his images in print and on social media.



Tom gave us a potted history of his interest in astronomy and his fascination and journey in astrophotography. Tom now uses a 16" Newtonian on a Dobsonian mount and the Player-One Uranus-C colour CMOS camera which has an IMX585 sensor.



Tom showed us several of the images he has captured, including his very first image of Saturn. Tom has managed to capture the moons of Mars, detailed images of the international Space Station (image left, courtesy of Julian), and amazingly clear images of the lunar surface amongst others.

Turnout for the talk was great and possibly one of the largest attendances we've had at Plumtree since starting the meetings there in September 2016. I can't believe we started Plumtree in 2016!

There was a barrage of questions for Tom and after the talk he was inundated with people going up to speak to him.

We are truly grateful for Tom for giving up his time to come and talk to us, and we were all blown away

by his images and his presentation. We wish him all the best with his studies, and we will be hopefully seeing Tom at the Observatory in the coming months where we hope he will impart some of his knowledge and skills on to us to improve our imaging of the solar system. Thanks also to Tom's brother for providing transport for Tom.

The **December** meeting will be the AGM and social event with seasonal refreshments.

James Dawson Observatory Director <u>helpdesk@nottinghamastro.org.uk</u>

# Memoirs of an Astronomer, Naturalist and Weather Recorder

#### A self-publishing journey

Many will have met or have heard of Alan Heath who first joined NAS in 1952 and has served as its president

amongst other roles. Alan is now an Honorary Life Member and despite being in his 90s, continues to observe the Sun every day the clouds allow, and take daily meteorological readings from his back garden.

I first met Alan in 2015 when I was conducting research into the history of Nottingham Astronomical Society. Alan has been to our Plumtree meetings and given a talk on planetary observation; he has no computer (or computer skills) so any projected images are with 35mm slides or electronically scanned versions of these.

Over the last year and half, I've been working with Alan to get his



memoirs published. Alan had planned for some years to get this undertaken, but the COVID-19 pandemic hindered his attempts, and the publishers he had identified locally wouldn't accept a manuscript typed on a typewriter... I worked out how to use OCR software to convert his type-written text into an electronic format which saved me having to re type the whole book. Having said that, the OCR software isn't perfect, just like the keys on Alan's typewriter, so there were countless errors to identify and correct. I suspect several have fallen through the numerous rounds of proof reading. Once we had an electronic manuscript and after scanning in high resolution 150 photographs, figures, tables, graphs etc, I set about exploring publishing options. It seemed to me the easiest way would be to self-publish, giving us both full control of how the finished product would turn out. I found a company online (mixam.com) which had various tools and guides for setting out a book and could print and deliver copies in a relative short time frame. The cost to get a couple of trial copies printed was very cheap and indeed we had about four trial runs at getting the page size, paper thickness, paper type, margin sizes etc just how we wanted it. I also felt if the book had an ISBN, then it would be easier to get it registered and catalogued by the British Library and other National Deposit Libraries. Once we were both happy, we had 60 copies printed, a number Alan thought would be about right for his friends and family and some spare. Within 10 days the boxes arrived at Alan's house and his book was finally published.

Both Alan and I are overjoyed with the result. It is a tremendous book, recording just some of the activities of a tremendously kind and knowledgeable gentleman. It has been a privilege to help Alan to get the book printed.

Copies have been sent to the British Library, and the other five Legal Deposit Libraries: Bodleian Libraries of the University of Oxford; Cambridge University Library; The National Library of Scotland; The Library of Trinity College Dublin, the University of Dublin; The National Library of Wales.

A copy will go into the Nottingham Astronomical Society's Library in due course, and if anyone wants to buy a copy, Alan does have a few left and they are £15 each. Contact me and I'll get hold of one for you.

The experience of doing a selfpublished book was a good one, albeit time consuming. As indicated before, the benefits are one has full control over the finished product in terms of paper thickness, cover type and design, margins, layout, index etc. The downside is that one has to do all that stuff, rather than someone doing it who does it for a living. Clearly there is a cost saving by doing it oneself.

The one thing I would have probably done differently is the overall size of the book. The book is 25cm x 19cm and 1.5cm thick. We opted for this size as it was a



compromise in terms of font size (we didn't want a very small font size), and also the content fell onto pages in an efficient fashion with this paper size. The downside of this paper size is that it turned out to be more expensive to print than say a book nearer to A5 size, and also is more expensive to post. So one thing I would advise anyone going down the self-publishing route is to think about the end product at the very start of the process and undertake the layout of the text and images with the end product size in mind.

We suspect Alan is going to run out of copies very soon as I have put them on Amazon and sold a few through there, and word of mouth means he has been asked for copies through the various groups and societies he is affiliated with.

James Dawson Observatory Director <u>observatory@nottinghamastro.org.uk</u>

# **Telescope donated to the Society**

Back in August 2022 the Society was contacted by David Jennings who lived in Nottingham. His brother Malcolm had sadly passed away and David was sorting through Malcolm's possessions. Malcolm had a 10" reflecting telescope and David wondered if the Society would like it as a gift. I accepted David's kind offer and have since collected the telescope which is now at the Observatory and is to be used by members. David has written a short piece about Malcolm and sent a photograph of his brother. I felt it would be fitting to include these in the Journal as a record of the kind donation and in memory of a fellow amateur astronomer. *James Dawson*.

"I am delighted that your society is accepting my late brother Malcolm's telescope. I hope that it will prove useful and enjoyable in your pursuit of astronomy.

Malcolm's own interest in astronomy started in early life, a family holiday stay at a farmhouse in the country where a permanent resident kept a large reflecting telescope that was periodically wheeled out from a barn to be used under clear 1950's skies.

The result of that meeting was the construction of my brother's own reflecting telescope. At very low cost, as far as possible made of wood, it was a bulky and heavy object that was trundled out under

the night sky, but amazingly effective. The passion for astronomy and cosmology were to last a life time.

Malcolm was a physics teacher but he was also fascinated by most subjects, especially cosmology in its widest sense, constantly questioning and speculating, firmly believing that progress means that today's received explanations will inevitably be questioned, modified or replaced.

I think he would hope for us all to enjoy open minds and clear skies for our astronomy."

#### **David Jennings**





# A Bracket for use with Binoculars on a Tripod

As discussed last night at the NAS meeting, the attached photos of the bracket I made up may be of use for your practical astronomy sessions. As you know, binocular astronomy can be quite frustrating due to 'image shake' when the binoculars are hand held and this becomes more pronounced the more powerful the binoculars - all unavoidable unless you invest in the expensive Canon image stabilised range of binoculars. The last tripod I owned was a Skywatcher AZ5 alt/az, and from my own research I couldn't find a suitable binocular bracket arrangement to really suit. The two photographs attached to this email show:

1. Bracket from above - a simple piece of wood which acts as a dovetail to fit into the tripod clamp with a small wooden platform attached to this by a metal 'L' bracket , and then the binocular bracket attached to the platform . You will see that the binocular bracket is set at a bit of an angle - this ensures that you can move a bit to one side when the binoculars are attached so that you are not constantly clashing with the tripod legs.



Bracket from below with another metal support made up, head of the bolt used to secure the binocular bracket to the platform, and holes drilled into the wooden 'dovetail' to accommodate the tripod clamp screw (which for the AZ5 fastens from below) - in practical terms I only used one of the holes. Couple of points - I carved a little bit of recess in the platform wood for the bracket bolt head to sit in so that I could really tighten it up, additionally the holes in the wooden 'dovetail' are made deliberately a bit shallow so that the tripod clamp screw can bite into the wood for security.



I have attached another photo



showing my 10x50 binoculars mounted on the overall bracket. I did use this arrangement when I had my AZ5 with larger 15x70 binoculars also and it was fine.

#### **Dave Mattison**

(sent to James Dawson as an email but adapted for the Journal)

# **Bryan Lilley Telescope Sale**

A big thank you to all members who purchased one of Bryan's telescopes which we sold on behalf of the family. All the proceeds have now been sent to Averil. The family have asked me to pass on the following message:

"As we approach the anniversary of Bryan's death, we'd like to send many thanks to NAS for taking the time to organise the sale of Bryan's astronomy equipment. We'd also like to say a big thank you to everyone who bought something. Bryan spent many happy days and nights recording sunspots and exploring the night sky using it- so It means a great deal to us that it's gone to good homes of people who will hopefully get as much joy from it as he did.

Best wishes from Averil, Greg & Joe Lilley"

**Richard Severn** 



# **Bryan John Lilley**

27th November 1943 - 20th November 2021

Bryan Lilley, the eldest son to John and Edith Lilley, he had three siblings Colin, Pauline and Eileen. His childhood playground was anywhere outdoors, with his brother at his side, climbing, creating dens and building things; only coming home when it was dark or when they were hungry.

Bryan was bright and did well at school, passing the 11+ to attend the Grammar School. He developed an interest in the wider world and indeed universe, becoming a skilled photographer and astronomer. He spent many hours tracking sun spots and recording the data.

He was a husband, first to Diana then, for over 40 years, to Averil. He was father to Steven, Suzanne, Greg and Joe; grandfather to Elliott and Imogen, Joe, Sol, Tom, Calisto, Summer, and Alice and also became a great-grandfather to Theo.

A long time member of Nottingham Astronomical Society he regularly helped out at outreach events, bringing along some of his many telescopes. He had a really strong knowledge of the night sky and definitely didn't need a Go To telescope mount! Bryan will be missed and remembered by the group.

# An Evening at the NAS Observatory, 30<sup>th</sup> October

John Dignan captured the following images at this event:

1. A wide angle shot taken with an Canon EOS 90D camera on a Skywatcher Star Adventurer mount. The exposure was 42 seconds at f/3.5 (18mm lens), ISO 1600. The 'W' of Cassiopeia can be seen in the centre of the lower portion of the image, while the Perseus Double Cluster can be spotted near the bottom, and M31 in Andromeda to the lower right. The Milky Way runs top to bottom through the image.



2. A shot showing some of the activity in the area close to the observatory



# **Advertisements**

# **British Interplanetary Society Publications looking for a new home**

I have an incomplete run of the journal Spaceflight (BIS publication) from 1959 to 2007, most years are complete but various editions missing, also a few bound copies of the Journal of the British Interplanetary Society from the 1960s. Spaceflight is loose and most in good or better condition. Far too heavy to post so can be delivered or collected in Nottingham area. I suspect if stacked on a shelf, they would occupy about 2m in length.

Sell individually for at least  $\pounds 5$  each on eBay, but I don't have the time to sell them individually so just looking for a token donation to go towards the Nottingham Astronomical Society for them all. They need to go as a job lot, not as individual copies.

For more information contact me.

James Dawson Observatory Director <u>observatory@nottinghamastro.org.uk</u>



# FOR SALE

Atik 460EX Monochrome Cooled CCD, with original box and cables - £600

More details and pictures available on request.

Contact leigh@xanthic.co.uk

# FOR SALE

## Contact Mark Fairfax at fairf77@icloud.com or at NAS meetings

Celestron accessories: All in excellent condition

• Celestron X-Cel LX 1.25" eyepieces

Fully multi-coated, wide 60-degree field of view, 6-element optical design, twist-up eyecups giving a generous 16mm eye-relief.

- 9mm £45 [new £89]
- 18mm £45 [new £89]
- 25mm £45 [new £89]

• Celestron Neximage 10 Solar System Colour Imager (model 93708) £180 [new £369] Easy to use colour camera, provides live video for quick focusing - High performance CMOS imaging sensor with exceptional sensitivity and low noise, High frame rate, Hardware ROI (Region of Interest).

• Celestron Corrector/Reducer f/6.3 (model 94175) £70 [new £139] Reduces your Focal Length for wider field and brighter images with four-element design to improve field flatness - compatible with all Celestron Schmidt-Cassegrain telescopes.

• Celestron deluxe tele-extender (model 93643) £40 [new £99]

Allows you to use an eyepiece for eyepiece projection photography with your 5 to 14-inch Celestron SCT, to take magnified images of the Solar System.

• Celestron T-adapter for Schmidt-Cassegrain telescopes (model 93633-A) £10 [new £20]

Attaches an SLR or DSLR camera to a Schmidt-Cassegrain telescope for prime focus photography.

# **Nottingham Astronomical Society**

Affiliated to the British Astronomical Association Member of the Federation of Astronomical Societies Supporters of the Commission for Dark Skies

#### CHAIRMAN:

Julian Onions email: <a href="mailto:chairman@nottinghamastro.org.uk">chairman@nottinghamastro.org.uk</a>

VICE CHAIRMAN: Richard Severn email: vicechairman@nottinghamastro.org.uk

#### SECRETARY: Chris Sneddon

email: secretary@nottinghamastro.org.uk

TREASURER: Mike Provost email: treasurer@nottinghamastro.org.uk

JOURNAL EDITOR: Roy Gretton email: journal@nottinghamastro.org.uk

#### Meetings

Our formal meetings, often with an illustrated talk by a guest speaker, **normally** are held on the first Thursday of each month (except in August) at:

#### Nottingham Emmanuel School Gresham Park Road, West Bridgford, Nottingham, NG2 7YF

Doors open	7:15pm
Meetings start	7:45pm
Meetings end	9:15 pm

These meetings are open to the public, and visitors are welcome to attend, subject to a charge of £3 per meeting for adults.

## MEMBERSHIP SECRETARY

Richard Severn email: <u>membership@nottinghamastro.org.uk</u>

## WEBMASTER:

Leigh Blake email: leigh@nottinghamastro.org.uk

OBSERVATORY DIRECTOR:

James Dawson email: <u>observatory@nottinghamastro.org.uk</u>

#### **OTHER COMMITTEE MEMBERS:**

Andrew Green Holly Gonzalez McNiven Mark Fairfax

#### Annual subscriptions 2022

Full£30Joint rate for partnersliving at the same address£45Under-18s and full-time students£5

Subscriptions become due on 1<sup>st</sup> January. Half-price subscription is charged if joining after 30<sup>th</sup> June (minimum subscription £5).

Please make cheques payable to: Nottingham Astronomical Society.

If you would like more information about the **Nottingham Astronomical Society**, or would like to become a member, please contact the Secretary <u>secretary@nottinghamastro.org.uk</u> or speak to any NAS committee member at one of the regular monthly meetings.

#### The Nottingham Astronomical Society

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