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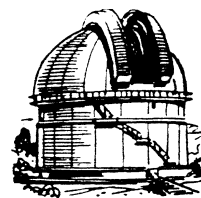
# Journal

of the

## Nottingham Astronomical Society

**February 2019**

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**Thursday, February 7<sup>th</sup>**

**Gotham Memorial Hall**

**Gotham, NG11 0HE**

**8 pm (doors open at 7 pm)**

**Tonight we welcome**

**Prof Martin Barstow**



**of the**

**University of Leicester**

**who will be speaking on**

**Diamonds in the Sky**

***White Dwarfs in Modern Astrophysics***

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**The Pleiades – riding high on a winter's night**



Just the **central portion of the cluster**, imaged at the prime focus of the Editor's 30-cm reflector  
*Total exposure time 2 minutes at ISO 1600 using a Canon 450D camera*

# Sky Notes

## February 2019

Compiled by Roy Gretton

*All times given below are in Universal Time (UT)*



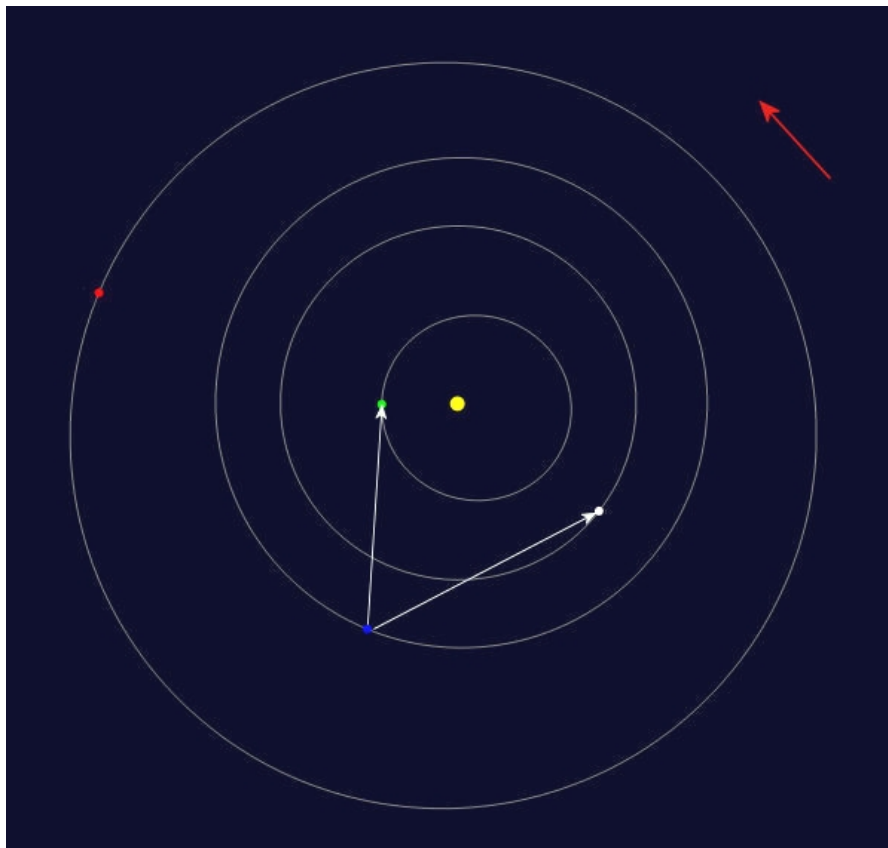
### PHASES OF THE MOON

<i>Phase</i>	<i>Date</i>
New Moon	February 4 <sup>th</sup>
First Quarter	February 12 <sup>th</sup>
Full Moon	February 19 <sup>th</sup>
Last Quarter	February 26 <sup>th</sup>

This month the Moon is closest to Earth on the 19<sup>th</sup> (when we shall have **the biggest Full Moon of the year**, some 33.5 arcminutes across – call it a **supermoon** if you wish), and furthest on the 5<sup>th</sup>.

### THE PLANETS

**The inner Solar System viewed from above the north pole on 27<sup>th</sup> February 2019**  
*(the red arrow shows the direction of rotation)*



*The inferior planets are on opposite sides of the Sun when viewed from **Earth** [shown as the **blue dot**]: **Mercury** [**green dot**] at greatest elongation to the east (in the evening sky), and **Venus** [white dot] to the west (in the morning sky, about 7 weeks after greatest elongation). Following last year's opposition, Earth has left **Mars** [**red dot**] far behind, but it will linger in the evening sky until September when the two planets will be 180 degrees apart.*

As February begins, **Mercury** has just emerged from superior conjunction to become an evening object. Throughout the month it gradually moves away from the Sun until it reaches greatest eastern elongation on February 27<sup>th</sup>. By then it will be just north of the celestial equator in the constellation of Pisces, and shining at magnitude  $-0.5$ . For observers in the northern hemisphere, this will be the best evening apparition of Mercury this year, although conditions are far from ideal. As the diagram above shows, the eccentricity of Mercury's orbit results in the planet being only **18** degrees from the Sun at greatest elongation, whereas under ideal conditions it can be as much as **28** degrees away.



**Looking west  
at 7pm on  
February 28<sup>th</sup>**

*Showing the  
positions of  
three planets in  
the evening sky*

**Venus** continues to adorn the early morning sky, appearing brighter than magnitude  $-4$  for all of February. While its elongation from the Sun is diminishing, this will remain greater than 40 degrees for the whole of the month. However it will still be some 20 degrees south of the equator, hence it will continue to be low in our sky. On February 18<sup>th</sup>, Venus will be just to the north of the much fainter Saturn.

**Mars** is a magnitude  $+1$  object in the southwest in the evening. Although continuing to fade, it is still easy to spot as it is the brightest “star” in that part of the sky (it begins February in the constellation of Pisces, but moves over into Aries on the 12<sup>th</sup>). This month Mars’ angular size falls below 6 arcseconds.

**Jupiter** is a magnitude  $-2$  morning object in the (non-zodiacal) constellation of Ophiuchus, rising before 4 am by mid-February. It hangs low in the sky, being more than 22 degrees south of the celestial equator.



**Looking SSE  
at 6 am on  
February 18<sup>th</sup>**

*Showing the  
positions of  
three planets in  
the morning sky*

**Saturn**, shining at magnitude +0.6, is 22 degrees south of the celestial equator in the constellation of Sagittarius. It will not be rising before 5 am until the end of February.

**Uranus**, close to the border between Aries and Pisces, is an evening object, setting at around 10 pm by the close of the month. On February 13<sup>th</sup>, Mars will pass one degree north of Uranus, an interesting conjunction through binoculars or a small telescope.

**Neptune** is now too close to the Sun to be observed, as it heads toward conjunction early in March.

## METEORS

There are no notable meteor showers in February.

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## Nottingham Astronomical Society 2019 membership

Membership subscriptions for 2019 are now due for renewal. All current members should have received their renewal forms by email detailing your membership rate.

Individual £30, Partnership £45 Concessions £5

### *To renew your subscription please either:*

- 1) Complete the renewal slip sent via email and return with a cheque (payable to Nottingham Astronomical Society) to the Membership Secretary, Nottingham Astronomical Society, 16 Maygreen Avenue, Cotgrave, Nottingham, NG12 3SH.
- 2) If you have an online banking facility then payment may be made direct into the Society's bank as follows: Bank: NatWest, Sort Code: 56-00-61, Account: 44992254. Please quote the following reference: your name and membership number if known on the bank transfer reference. Please confirm by email to [membership@nottinghamastro.org.uk](mailto:membership@nottinghamastro.org.uk) that you have made an online bank transfer.
- 3) Bring the renewal slip to a Gotham monthly meeting. Payment may be made by either cheque or cash. (If you are paying by cash it would be helpful if you could bring the correct change).

Looking forward to seeing you at our 2019 meetings  
**Richard Severn**, Membership Secretary

### 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: [www.nottinghamastro.org.uk](http://www.nottinghamastro.org.uk)

#### **NAS on Facebook**

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

#### **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 copy of the NAS Journal, just e-mail [secretary@nottinghamastro.org.uk](mailto:secretary@nottinghamastro.org.uk)

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](mailto:treasurer@nottinghamastro.org.uk)

# DIARY DATES 2019

## Monthly Meetings of the Nottingham Astronomical Society

### 1. Meetings at Gotham Memorial Hall

Nottingham Road, Gotham, NG11 0HE

Held on the **FIRST Thursday** of each month except **August**

Doors open at 7pm for 8pm start.

*These events are normally centred around a talk by a visiting speaker, except Open Evenings, when NAS members provide the activities.*

*Normally we have a **Library** and a **Helpdesk** open at each meeting.*

<b>Date</b>	<b>Topic</b>	<b>Speaker</b>
<b>February 7<sup>th</sup></b>	<b>Diamonds in the Sky</b> <i>White Dwarfs in Modern Astrophysics</i>	<b>Prof Martin Barstow</b> University of Leicester
<b>March 7<sup>th</sup></b>	<b>Beyond Pluto</b> <i>New Horizons in the Kuiper Belt</i>	<b>Paul Money</b> FRAS, FBIS
<b>April 4<sup>th</sup></b>	<b>Gaia's Galactic Survey</b>	<b>Dr Nicholas Walton</b> University of Cambridge
<b>May 2<sup>nd</sup></b>	<b>It's About Time</b> <i>Time's Arrow and Time Travel</i>	<b>Prof Ian Morison</b> University of Manchester
<b>June 6<sup>th</sup></b>	<b>From Tycho to Newton</b> <i>Foundations of modern astronomy</i>	<b>Dr Allan Chapman</b> FRAS
<b>July 4<sup>th</sup></b>	<b>Metal Detecting</b> <i>What are metals to astronomers?</i>	<b>Dr Julian Onions</b> University of Nottingham
<b>August 3<sup>rd</sup></b> (Saturday)	<b>Annual Barbecue at the Observatory</b> (Members and their guests only)	
<b>September 5<sup>th</sup></b>	<b>Where Are the Aliens?</b> <i>Might we be alone?</i>	<b>Prof Brad Gibson</b> University of Hull
<b>October 3<sup>rd</sup></b>	<b>The 200 at 70</b> <i>The Hale Telescope</i>	<b>Dr Steve Barrett</b> University of Liverpool
<b>November 7<sup>th</sup></b>	<b>Annual General Meeting</b> with a Wine and Cheese Social	
<b>December 5<sup>th</sup></b>	<b>Voyages to the Sun</b> <i>Probing our nearest star</i>	<b>Prof Lucie Green</b> University College London

## 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.*

**The next meeting will be on February 21<sup>st</sup> (see further details below)**

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Check our website: [www.nottinghamastro.org.uk](http://www.nottinghamastro.org.uk)  
for the latest information about the Society's meetings  
and for further information about the talks and speakers

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### Other astronomy-related events in the coming months open to everyone

(follow hyperlinks for more information and how to book)

21 <sup>st</sup> February	<a href="#">UoN Public Lectures</a> , Gut Microbiome and Health, Nottingham
28 <sup>th</sup> February	Open Dome Event - <a href="#">Orbit and Global Catastrophe</a> , Nottingham
2 <sup>nd</sup> March	<a href="#">BAA Back to Basics Workshop</a> , Ipswich
9 <sup>th</sup> March	<a href="#">Practical Astronomy Show</a> , Kettering
21 <sup>st</sup> March	<a href="#">UoN Public Lectures</a> , How Expectations About the World Structure our Perception, Nottingham
23 <sup>rd</sup> March	<a href="#">BAA Deep Sky Section Annual Meeting</a> , Cheltenham
30 <sup>th</sup> March	<a href="#">SPA Annual Convention</a> , Cambridge
27 <sup>th</sup> April	<a href="#">BAA One Day Spring Conference</a> , Galaxies, Raleigh

### **Social and Practical Astronomy, Plumtree**

The **January** meeting focused on astronomical mounts for the amateur astronomer. We had five stations which small groups rotated around. The stations demonstrated: Dobsonian mounts; an alt-az mount; a manual equatorial mount; a motorised equatorial mount and astrophotography equatorial one-arm mount. Each station demonstrated how the specific mount worked, and described their advantages and disadvantages. The comments on the evening and subsequently were that it was a useful and engaging session. We are pleased.

I'm grateful to those who brought mounts along and ran the stations: Leigh, Gareth, John, Rob and Richard. Thanks also to Chris for the cake which was very tasty and appropriately decorated.

The **February** meeting at Plumtree will see Leigh and Julian deliver part two of their Colour of Stars session.

**James Dawson**  
NAS Helpdesk  
[helpdesk@nottinghamastro.org.uk](mailto:helpdesk@nottinghamastro.org.uk)



## **The Seemingly Endless 50<sup>th</sup> Anniversaries for NASA's Apollo Programme**

*As we celebrated Christmas 2018 so the 50<sup>th</sup> anniversary took place of the Apollo 8 mission to the Moon took place, the first of many golden events for NASA Apollo Programme*

### **Apollo 8**

The second manned mission in the Apollo space program, was launched on December 21, 1968, and became the first manned spacecraft to leave low Earth orbit, reach the Moon, orbit it, and safely return. The three-astronaut crew—Frank Borman, James Lovell, and William Anders—became the first humans to travel beyond low Earth orbit, see Earth as a whole planet, and enter the gravity well of another celestial body. They were also the first humans to orbit another celestial body, see the far side of the Moon, witness an Earthrise, escape the gravity of another celestial body (the Moon), and re-enter Earth's gravitational well. Apollo 8 was the third flight and the first crewed launch of the Saturn V rocket.

Originally planned as the second crewed lunar module/command module test, to be flown in an medium Earth orbit in early 1969, the mission profile was changed in August 1968 to a more ambitious command-module-only lunar orbital flight to be flown in December, as the lunar module was not yet ready to make its first flight. Astronaut Jim McDivitt's crew, who were training to fly the first lunar module flight in low Earth orbit, became the crew for the Apollo 9 mission, and Borman's crew were moved to the Apollo 8 mission. This left Borman's crew with two to three months' less training and preparation time than originally planned, and replaced the planned lunar module training with translunar navigation training. Apollo 8 took 68 hours to travel the distance to the Moon. The crew orbited the Moon ten times over the course of 20 hours, during which they made a Christmas Eve television broadcast in which they read the first ten verses from the Book of Genesis. At the time, the broadcast was the most watched TV programme ever. The Apollo 8 astronauts returned to Earth on December 27, 1968, when their spacecraft splashed down in the Northern Pacific Ocean. The crew members were named *Time* magazine's "Men of the Year" for 1968 upon their return.

### **Apollo 9**

Apollo 9 was the third crewed mission in the US Space Programme and the first flight of the command and service module (CSM) with the lunar module (LM, pronounced "lem"). Its three-person crew, consisting of Commander James McDivitt, Command Module Pilot David Scott and Lunar Module Pilot Rusty Schweikart spent ten days in Earth orbit testing several aspects critical to landing on the Moon, including the LM engines, backpack life support systems, navigation systems, and docking manoeuvres. The mission was the second crewed launch of a Saturn V rocket.

After launching on March 3, 1969, the crew performed the first crewed flight of a LM, the first docking and extraction of a LM, one two-person spacewalk (EVA), and the second docking of two crew spacecraft—two months after the Soviets performed a spacewalk crew transfer between Soyuz 4 and Soyuz 5. The mission proved the LM worthy of crewed spaceflight. Further tests on the Apollo 10 mission would prepare the LM for its ultimate goal, landing on the Moon. They returned to Earth on March 13, 1969.

### **Apollo 10**

Apollo 10 was the fourth manned mission in the Apollo space programme and the second (after Apollo 8) to orbit the Moon. Launched on May 18, 1969, it was the F mission a "dress rehearsal" for the first Moon landing, testing all of the components and procedures, just short of actually landing. The lunar module (LM) followed a descent orbit to within 8.4 nautical miles (15.6 km) of the lunar surface, at the point where powered descent for landing

would normally begin. Its success enabled the first landing to be attempted on the Apollo 11 mission two months later.

Apollo 10 and Apollo 11 were the only Apollo missions whose crew were all veterans of spaceflight. Thomas P. Stafford had flown on Gemini 6 and Gemini 9; John W. Young had flown on Gemini 3 and Gemini 10, and Eugene A. Cernan had flown with Stafford on Gemini 9.

They were also the only Apollo crew all of whose members went on to fly subsequent missions aboard Apollo spacecraft Young later commanded Apollo 16, Cernan commanded Apollo 17 and Stafford commanded the U.S. vehicle on the Apollo – Soyuz Test Project It was on Apollo 10 that John Young became the first human to fly solo around the Moon, while Stafford and Cernan flew the LM in lunar orbit as part of the preparations for Apollo 11. Young was also backup commander of Apollo 13 and Apollo 17 and Cernan was backup commander of Apollo 14.

## **Apollo 11**

I feel this historic mission is so well known there is little I can add. The 50<sup>th</sup> celebrations on 20 July 2019 are likely to be special!

## **Apollo 12**

*The last 50<sup>th</sup> anniversary for NASA in 2019*

Apollo 12 was the sixth manned flight in the Apollo space programme and the second to land on the Moon .It was launched on November 14, 1969, four months after Apollo 11. Commander Charles “Pete” Conrad and Lunar Module Pilot Allan L. Bean performed just over one day and seven hours of lunar surface activity while Command Module Pilot Richard F. Gordon remained in lunar orbit. The landing site for the mission was located in the south eastern portion of the Ocean of Storms.

Unlike the first landing on Apollo 11, Conrad and Bean achieved a precise landing at their expected location, the site of the Surveyor 3 unmanned probe, which had landed on April 20, 1967. They carried the first colour television camera to the lunar surface on an Apollo flight, but transmission was lost after Bean accidentally destroyed the camera by pointing it at the Sun. On one of two moonwalks, they visited the *Surveyor* and removed some parts for return to Earth. The mission ended on November 24 with a successful splashdown

Apollo 12 launched on schedule from Kennedy Space Center, during a rainstorm. It was the first rocket launch attended by an incumbent US president, Richard Nixon. Thirty-six-and-a-half seconds after lift-off, the vehicle triggered a lightning discharge through itself and down to the Earth through the Saturn’s ionised plume.

The loss of all three fuel cells put the CSM entirely on batteries, which were unable to maintain normal 75-ampere launch loads on the 28-volt DC bus. One of the AC inverters dropped offline. These power supply problems lit nearly every warning light on the control panel and caused EECOM John Aaron (Electrical and Consumable Manager) to remember the telemetry failure pattern from an earlier test when a power supply malfunctioned in the CSM signal conditioning electronics which converted raw signals from instrumentation to standard voltages for the spacecraft instrument displays and telemetry encoders.

Aaron made a call, “Flight, EECOM. Try SCE to Aux”, which switched the SCE to a backup power supply. The switch was fairly obscure, and neither the Flight Director nor Mission Commander Pete Conrad immediately recognized it. Lunar Module Pilot Alan Bean, flying in the right seat as the spacecraft systems engineer, remembered the SCE switch from a training incident a year earlier when the same failure had been simulated Aaron’s quick thinking and Bean’s memory saved what could have been an aborted mission and earned Aaron the reputation of a “steely-eyed missile man”. Bean put the fuel cells back on line, and with telemetry restored, the launch continued successfully. Once in Earth parking orbit, the



crew carefully checked out their spacecraft before re-igniting the third stage for trans lunar injection. The lightning strikes had caused no serious permanent damage. Initially, it was feared that the lightning strike could have caused the command module's (CM's) parachute mechanism to prematurely fire, disabling the explosive bolts that open the parachute compartment to deploy them. If they were indeed disabled, the CM would have crashed uncontrollably into the Pacific Ocean and killed the crew instantly. Since there was no way to figure out whether or not this was the case, ground controllers decided not to tell the astronauts about the possibility. The parachutes deployed and functioned normally at the end of the mission. Otherwise the mission was a great success. So we have all these 50<sup>th</sup> anniversaries coming up for the Apollo space programme in 2019. Further 50<sup>th</sup> anniversaries will come up in 2020. It is my belief that the Apollo programme linked with the introductory Mercury and Gemini missions are man's greatest achievement.

**Bernie Besnard**

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## **ADVERTISEMENTS**

### **For Sale**

**1. 9.25" Celestron SCT with Starbright XLT coatings. Includes:**

Antares F6.3 focal reducer  
Antares 2" tube with twist grip  
Celestron 1.25" star diagonal  
Celestron 1.25" Visual back.  
Celestron 9x50 R.A.C.I. illuminated finderscope.  
Feather Touch focuser  
JMI electrical focuser attachment for feather touch.  
Telrad base  
Vixen mounting bar, (has been on Skywatcher HEQ5Pro.)  
Extra mounting bar on top.  
AstroZap flexiheat Dew shield and controller.  
Bahtninov mask.

**£700 for tube and accessories.**

**2. SkyWatcher 200PDS Newtonian Reflector. Includes:**

Finderscope  
Telrad base  
Dew Shield  
Skywatcher motor drive, can be easily connected / disconnected  
from Dual speed Crayford with turn of allen key.  
GSL 35mm extension tube.

**£200 for tube and accessories.**

Genuine reason for sale, need to rationalise to more manageable set up.

Contact Pete Hill on 01283716285

## Eyepieces for sale

All have been looked after and come with end caps but no boxes. All are 1.25-inch push-fit.

William Optics SPL 6mm. Retails [new](#) for £79. Price £40.



Celestron X-Cel LX 12mm. Retails [new](#) for £80. Price £40.



Sky Watcher Sky Panorama 15mm. Retails [new](#) for £80. Price £40.



TAL 2x Barlow. No longer manufactured; commonly sell for £50. Price £30.



Please contact **James Dawson** on the NAS Helpdesk: [helpdesk@nottinghamastro.org.uk](mailto:helpdesk@nottinghamastro.org.uk)

# Nottingham Astronomical Society

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

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**David Buxton**

e-mail: [observatory@nottinghamastro.org.uk](mailto:observatory@nottinghamastro.org.uk)

**Observatory line: 07726 940700 (line open during observing sessions)**

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## **Meetings**

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

**Gotham Memorial Hall**

**Gotham**

**Nottingham NG11 0HE**

Doors open 7.00pm

**Meetings start 8.00pm**

Meetings end 10.00pm

These meetings are open to the public, and visitors are welcome to attend.

## **Annual subscriptions 2019**

Full £30

Joint rate for partners living at the same address £45

Under-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.*

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If you would like more information about the **Nottingham Astronomical Society**, or would like to become a member, please contact the Secretary [secretary@nottinghamastro.org.uk](mailto:secretary@nottinghamastro.org.uk) or speak to any NAS committee member at one of the regular monthly meetings. A membership application form is inside this issue of the Journal.

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## **The Nottingham Astronomical Society**

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