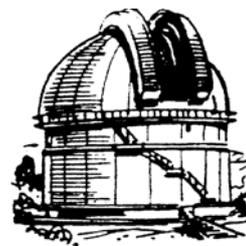

Journal

of the



Nottingham Astronomical Society

July and August 2015

In this issue

- Sky Notes for July and August
- NAS e-Services
- Diary Dates
- Advertisement
- Helpdesk Update
- Helpdesk – Equipment Basics
- Librarian Update
- Society Information
- Membership application form

Thursday, 2nd July

British Geological Survey

Nicker Hill, Keyworth

8 pm (doors open at 7.30pm)

Tonight's talk is entitled

“Cold Dark Matter – is it Cold? Is it Dark? – and is it Matter?”

and will be presented by

our member Julian Onions

(Note: The Rosetta talk will now be given at a later date)

A NEW OBSERVING SEASON BEGINS...

Of course, there was no reason to give up observing completely in June and July (the Moon and the bright planets are always a delight) but the beginning of **August** marks the return of dark nights to the Nottinghamshire skies, so that deep-sky objects are again visible in all their glory. By mid-August we have over three hours of true darkness every night, and many star clusters and nebulae are well-placed for observation at this time of year. A pair of binoculars or a small telescope should enable you to view (amongst many interesting objects):

M13 and **M92**, two globular clusters in the constellation of Hercules, high in the south at 10 pm BST in mid-August.

M57, the Ring Nebula (a bright planetary) in Lyra, almost directly overhead at the same time.

M27, the Dumbbell Nebula (another bright planetary) in Vulpecula, high in the southeast

...and of course we also have the rich star-fields of the Milky Way, visible in a broad band from above Cygnus down to Sagittarius in the far south. These are always a source of pleasure when scanned through binoculars or a wide-field telescope.

And don't forget the Perseids---conditions are highly favourable this year!

Sky Notes

July and August 2015

Compiled by Roy Gretton



All times given below are in British Summer Time (BST)

Earth's **aphelion** occurs on July 6th, when we shall be 152,093,481 km from the Sun (which is a mere 74 km further away than we were at last year's aphelion).

PHASES OF THE MOON

	July	August
Full Moon	3:20 am on the 2 nd and 11:43 am on the 31 st	7:35 pm on the 29 th
Last Quarter	9:24 pm on the 8 th	3:03 am on the 7 th
New Moon	2:24 am on the 16 th	3:53 pm on the 15 th
First Quarter	5:04am on the 24 th	8:31 pm on the 22 nd

THE PLANETS

Mercury begins July as a morning object, poorly placed for observation from the UK. It then moves in toward the Sun, passing through superior conjunction on the 23rd. Throughout August it is an evening object, but practically unobservable from our latitude.

Venus, which has delighted us with its brilliant appearance in the evening sky for the past few months, is now moving back toward the Sun, with which it will come into conjunction on August 15th. Even so, it will still be a prominent object in the northwest as July begins, and will be only 20 arcminutes away from (the much fainter) Jupiter on the 1st. Thereafter, Venus sinks toward the horizon, becoming a thinner crescent that will be difficult to observe once August has begun.

Mars is practically unobservable until autumn begins.

Jupiter is approaching the end of its current apparition, and as July begins will be only 10 degrees above the western horizon at the start of civil twilight. As already noted, it will be very close to Venus on that date. By the beginning of August it will be virtually unobservable as it moves toward conjunction with the Sun on the 26th.



SATURN

Looking SSW
at 10 pm
on August 1st

Saturn is an evening object, but never more than 20 degrees above the southern horizon at best, and therefore poorly placed for observation. It spends July in retrograde motion in the constellation of Libra.

Uranus is a morning object in Pisces, rising before midnight by the end of July.

Neptune is a morning object in the constellation of Aquarius, rising about an hour ahead of Uranus.

METEORS

There are three meteor showers visible in August: the **Alpha Capricornids**, which peak on the night of the 2nd-3rd, but this year will be badly affected by moonlight; the **Iota Aquarids**, which peak on the 6th, and may produce a handful of faint meteors per hour, and of course the **Perseids**, which this year will peak under highly favourable conditions, very close to New Moon. The Perseids are probably the best-observed shower of the year, with maximum activity predicted to be in the early morning hours of August 13th. So if you are fortunate enough to have a clear sky on the night of the 12th-13th, why not take the opportunity of a warm evening to go outside and enjoy the show. More than one event per minute is to be expected under ideal conditions. Also bear in mind that the Perseids are active for a number of days either side of August 12th-13th, so you can also make use of these dates.

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

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 now 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

You don't have to be a Society member to take advantage of this service.

DIARY DATES 2014-2015

Monthly Meetings of the Nottingham Astronomical Society

Our programme for this year is shown below. Check our website: www.nottinghamastro.org.uk for the latest information about the Society's meetings and for further information about the talks and speakers.

Our meetings are held on the **FIRST THURSDAY** of the month, at the British Geological Survey, Keyworth, Notts, NG12 5GG

(except **August**, when we meet at our observatory site, between Cotgrave and Cropwell Bishop)

Doors open at 7:30pm for 8pm start.

<u>Date</u>	<u>Topic</u>	<u>Speaker</u>
July 2 nd	"Cold Dark Matter – is it Cold? – is it Dark? - and is it Matter?"	<i>Julian Onions</i>
August 6 th	Society BBQ at the observatory, plus solar, radio and night time observing	
September 3 rd	Open Evening	<i>Organised by John Hurst</i>
October 1 st	"How our Galaxy came to be"	Dr Chris Lintott, University of Oxford, and <i>BBC Sky at Night</i>
November 5 th	Annual General Meeting	
December 3 rd	"New Horizons : Pluto and the Kuiper Belt Objects"	Dr Chris Arridge, <i>University of Lancaster</i>

Advertisement

<p style="text-align: center;"><u>FOR SALE</u></p> <p style="text-align: center;">MARS FILTER</p> <p style="text-align: center;">(by Orion Telescopes) 1.25-inch fitting</p> <p style="text-align: center;">£10</p> <p style="text-align: center;">Sam Boote s.boote@bcs.org or at Society meetings</p>
--



NAS Helpdesk

At the July meeting we will have some telescopes on show with various focal lengths and focal ratios. These terms are briefly outlined below. Come and say hello.

Equipment basics: [Focal length](#), [focal ratio](#), [field of view](#)

The [focal length](#) of a telescope is measured in millimetres (mm) and is the distance from the first optical surface the light hits (the objective lens in a refracting telescope, the primary mirror in a reflecting telescope, or the front corrector plate in an SCT or Maksutov-Cassegrain), to where focus is achieved. This value can range from under 400mm for short tube refracting telescopes to nearly 4000mm for the 14" Celestron SCT. [William Herschel](#) built a telescope in 1785 in Slough which had a focal length of 12000mm (40 feet). The [large telescope](#) in the NAS observatory has a focal length of 96" (2438mm), and an aperture of 24" (610mm); it is f/4 (see below).

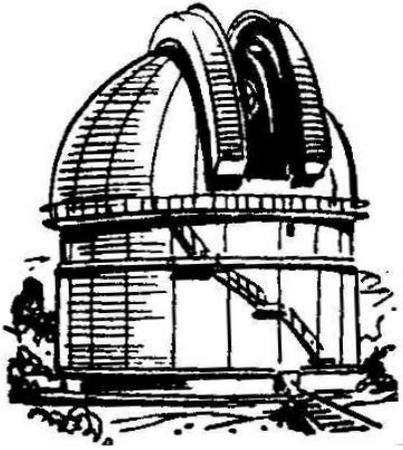
The [focal ratio](#) of a telescope (or other optical systems) is simply a value obtained by dividing the focal length of the telescope by its aperture; the Skywatcher 130P reflecting telescope has a focal length of 650mm and an aperture of 130mm, the focal ratio for this telescope is $650 / 130 = 5$; the focal ratio is often written as f/5. The term focal ratio is used in conventional photography too, but the way it is used in astronomy is subtly different. The [focal ratio](#) is largely unimportant for the astronomer who is purely interested in visual observation (aperture and focal length individually are more important here), but for the deep sky astrophotographer having a telescope with a low focal ratio (a so called "fast" telescope) allows them to capture light on their camera sensor more quickly compared to a telescope with a high focal ratio (a "slow" telescope). "Slow" scopes are those with a focal ratio of greater than f/8 to f/10; "fast" scopes have a focal ratio of about f/4 to f/7, but these are fluid definitions and not set in stone. The NAS observatory telescope is fast, f/4.

The [field of view](#) (FoV) is essentially how wide the view is that the user observes. In a 360 degree panoramic photograph the FoV is 360 degrees; the unaided human usually has a FoV of about 180 degrees when both eyes are open. Looking through a used toilet roll with one eye will give a FoV of about 10 to 15 degrees. The longer the tube the user looks through, the narrower the FoV becomes. This is why telescopes with very short focal lengths have a wide FoV and are ideal for looking at objects which appear large in the night sky such as open star clusters like the [Pleiades](#). Telescopes with very long focal lengths like the [SCTs](#) have a much narrower FoV and are therefore much better suited to observing (and imaging) apparently smaller objects such as planets and [planetary nebula](#). The FoV a user experiences will not only depend upon the telescope being used but also on the eye piece or camera they attach to it; various [online calculators](#) allow the FoV to be worked out using different eye pieces and cameras. Most binoculars usually have wide FoV.

As always if there is some specific equipment you'd like to see or ask about, drop us an email in advance of the meetings. If you need help with your own equipment then again email us or bring it along to a meeting; we can also come and visit you at your home at a mutually convenient time as long as live reasonably close to one of us.

James Dawson and Bob Richardson

NAShelpdesk@hotmail.com



Equipment basics: focal length, focal ratio, field of view

Facebook: <https://www.facebook.com/nas.org.uk>

Website: <http://www.nottinghamastro.org.uk/>

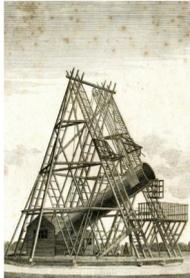
Twitter: <https://twitter.com/nottinghamastro>

Equipment basics: [Focal length](#), [focal ratio](#), [field of view](#)

The [focal length](#) of a telescope is measured in millimetres (mm) and is the distance from the first optical surface the light hits (the objective lens in a refracting telescope, the primary mirror in a reflecting telescope, or the front corrector plate in an SCT or Maksutov-Cassegrain), to where focus is achieved. This value can range from under 400mm for short tube refracting telescopes to nearly 4000mm for the 14" Celestron SCT; [William Herschel](#) built a telescope in 1785 in Slough which had a focal length of 12000mm (40 feet). The [large telescope](#) in the NAS observatory has a focal length of 96" (2438mm), and an aperture of 24" (610mm); it is f/4 (see below). The main telescope on the [Hubble Space Telescope](#) has an effective focal length of 57.6m; the [James Webb Space Telescope](#) will have a focal length of 131.4m!

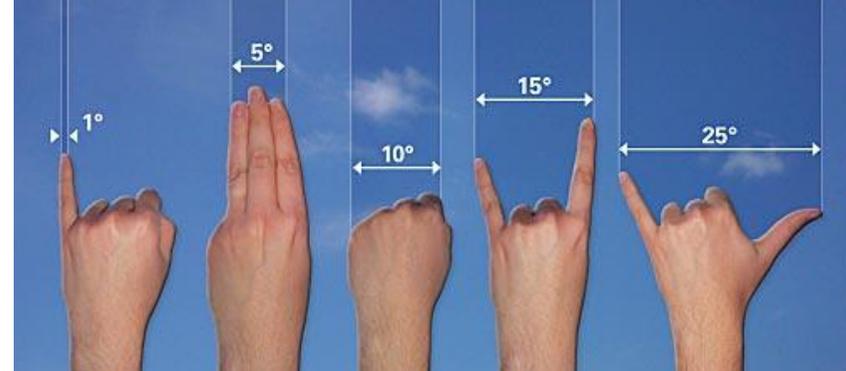
The [focal ratio](#) of a telescope (or other optical systems) is simply a value calculated by dividing the focal length of the telescope by its aperture; the Skywatcher 130P reflecting telescope has a focal length of 650mm and an aperture of 130mm, the focal ratio for this telescope is $650 / 130 = 5$. The focal ratio is often written as f/5. The term focal ratio is used in conventional photography too, but the way it is used in astronomy is subtly different. The [focal ratio](#) is largely unimportant for the astronomer who is interested in purely visual observation (aperture and focal length individually are more important here), but for the deep sky astrophotographer having a telescope with a low focal ratio (a so called "fast" telescope) allows them to capture light on their imaging sensor more quickly compared to a telescope with a high focal ratio (a "slow" telescope). "Slow" telescopes are those with a focal ratio of greater than f/8 to f/10; "fast" telescopes have a focal ratios of about f/5 to f/7, but these are fluid definitions and not set in stone.

The [field of view](#) (FoV) is essentially how wide the view is that the user observes. In a 360 degree panoramic photograph the FoV is 360 degrees; the unaided human usually has a FoV of about 180 degrees when both eyes are open. Looking through a used toilet roll with one eye will give a FoV of about 10 to 15 degrees. The longer the tube the user looks through, the narrower the FoV becomes. This is why telescopes with very short focal lengths have a wide FoV and are ideal for looking at objects which appear large in the night sky such as open star clusters like the [Pleiades](#); telescopes with very long focal lengths like the SCTs have a much narrower FoV and therefore much better suited to observing (and imaging) apparently smaller objects such as planets and [planetary nebula](#). The FoV a user experiences will not only depend upon the telescope being used but also on the eye piece or camera they attach to it; various [online calculators](#) allow the FoV to be worked out using different eye pieces and cameras. Most binoculars usually have a wide FoV.

Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm Meade 4000 Super Plossl eye piece	Magnification with 20mm eye piece; magnification = focal length of telescope / focal length of eye piece	
Helios Naturesport; 10x50 porro prism binoculars	?	50mm	?	n/a	n/a	
Unbranded; achromatic refractor	300mm	30mm	f/10	n/a	n/a	
Opticstar AR80S; achromatic refractor	400mm	80mm	f/5	156 arcminutes	20x	
Skywatcher Evostar ED80 Pro; apochromatic refractor	600mm	80mm	f/7.5	104 arcminutes	30x	
Skywatcher Explorer 150P; reflector	750mm	150mm	f/5	83 arcminutes	37.5x	
Vixen A80Mf; achromatic refractor	910mm	80mm	f/11.4	69 arcminutes	45.5x	
Skywatcher Skymax-90; Maksutov-Cassegrain	1250mm	90mm	f/13.88	50 arcminutes	62.5x	
Skywatcher Skymax-180; Maksutov-Cassegrain	2700mm	180mm	f/15	23 arcminutes	135x	
Celestron C11; Schmidt-Cassegrain	2800mm	280mm	f/10	22 arcminutes	140x	
William Herschel 40-foot; reflector, completed in 1789	12000mm 144"	1200mm 47"	f/10	5 arcminutes	600x	

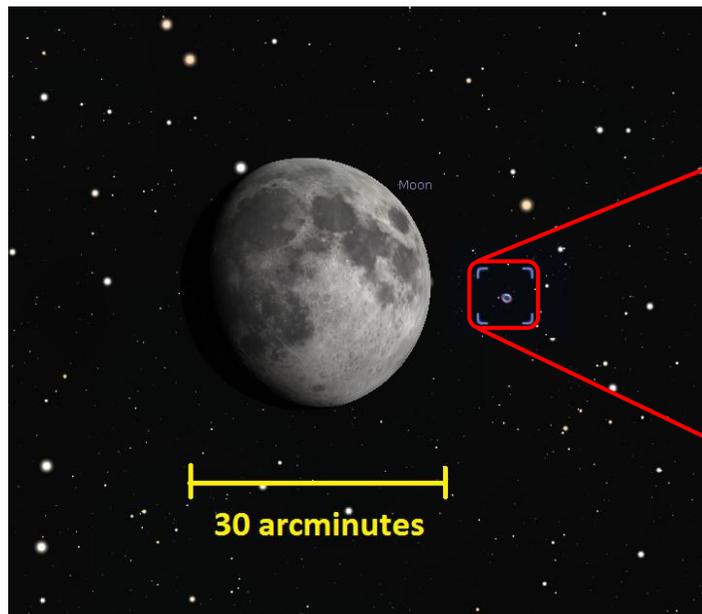
Angular diameter / angular size

- A full circle is 360 degrees (written as 360°)
- Each degree is made up of 60 arcminutes (written as $60'$)
- Each arcminute is made up of 60 arcseconds (written as $60''$).



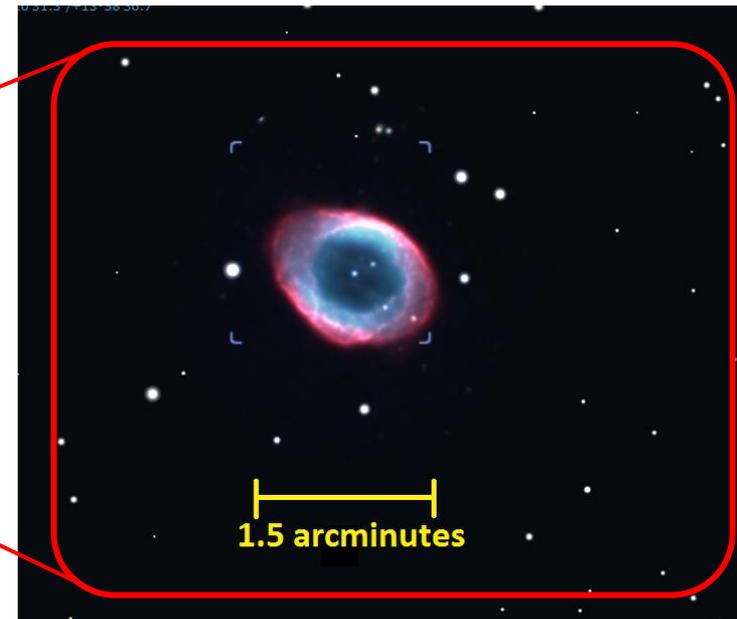
With the arm fully extended and hand held against the sky, it is possible to estimate the angular diameter (in degrees) of a distant object in the night sky, or on the horizon during daylight.

The Moon

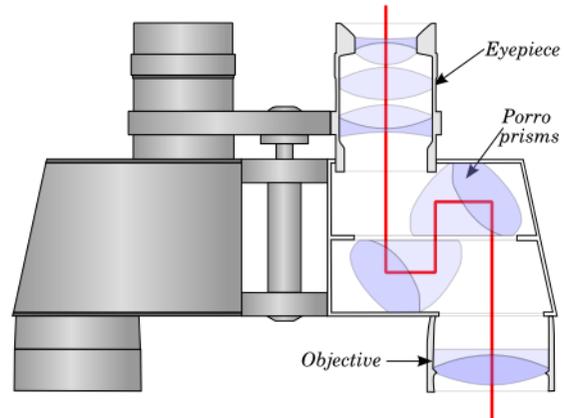


The moon is about half a degree in apparent diameter when observed from the Earth; this is about 30 arcminutes, and therefore 1800 arcseconds; M57 has been superimposed next to the Moon for illustration purposes.

Messier 57 (NGC 6720); The Ring Nebula

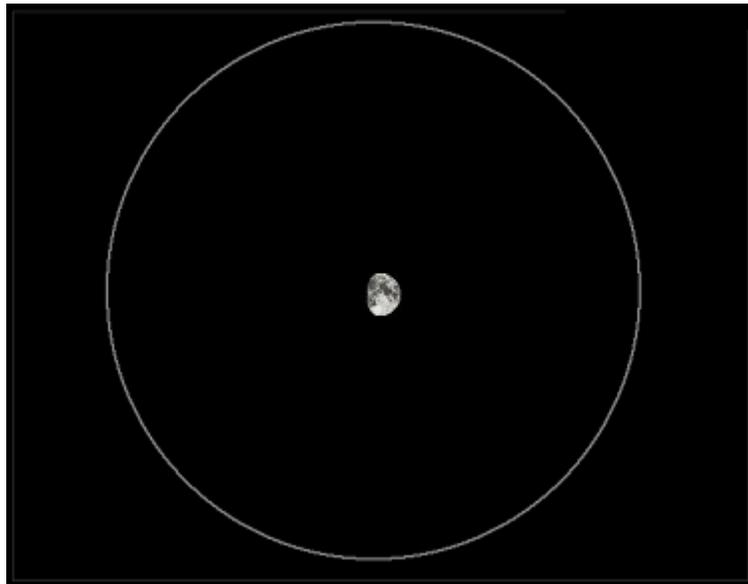


M57 appears much smaller than the Moon when observed from Earth though is actually MUCH bigger but MUCH further away. It is about 1.5 arcminutes in diameter, which is 90 arcseconds.

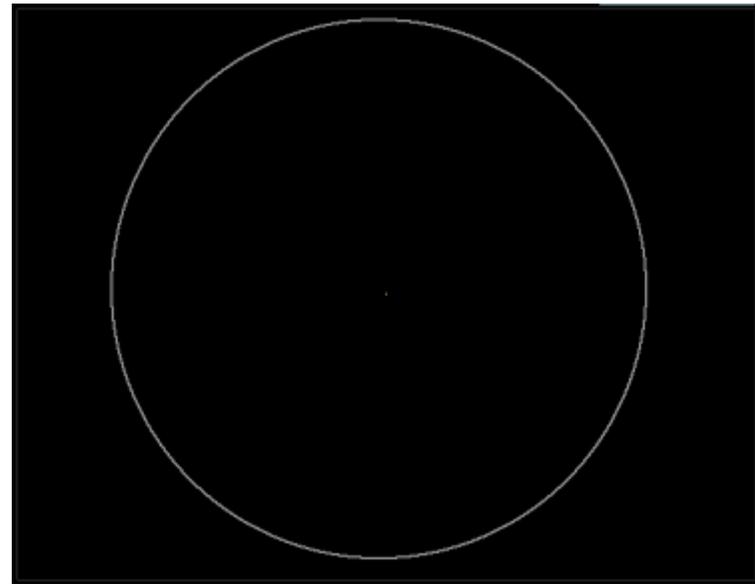


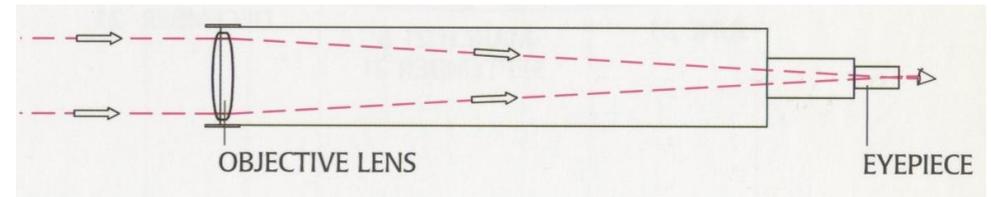
Telescope	Focal length	Aperture	Focal Ratio	Field of view	Magnification
Helios Naturesport; 10x50 porro prism binoculars	?	50mm	?	6.5° (390 arcminutes)	10x

The Moon



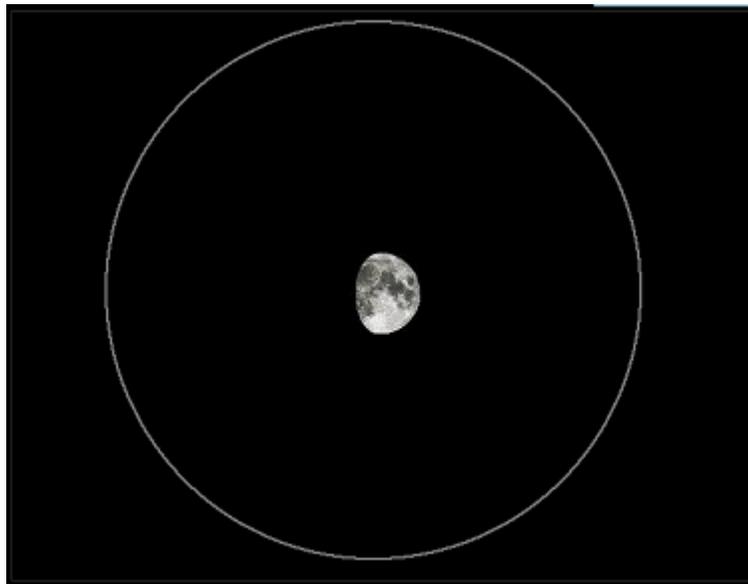
M57



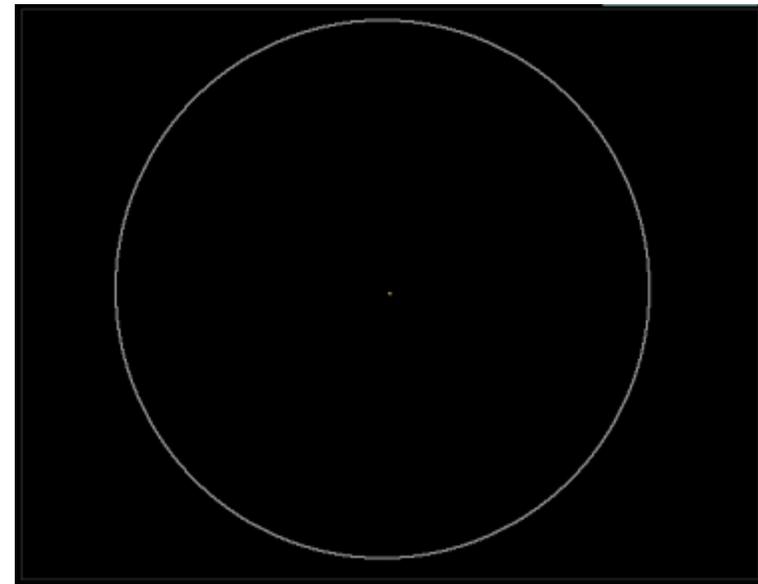


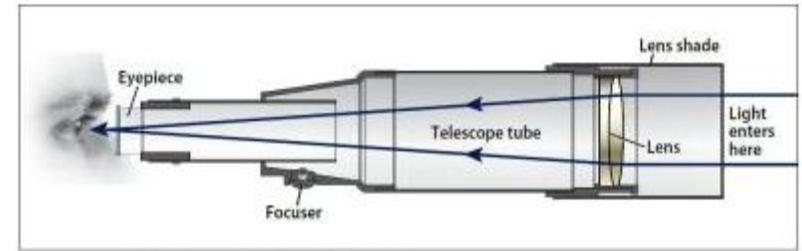
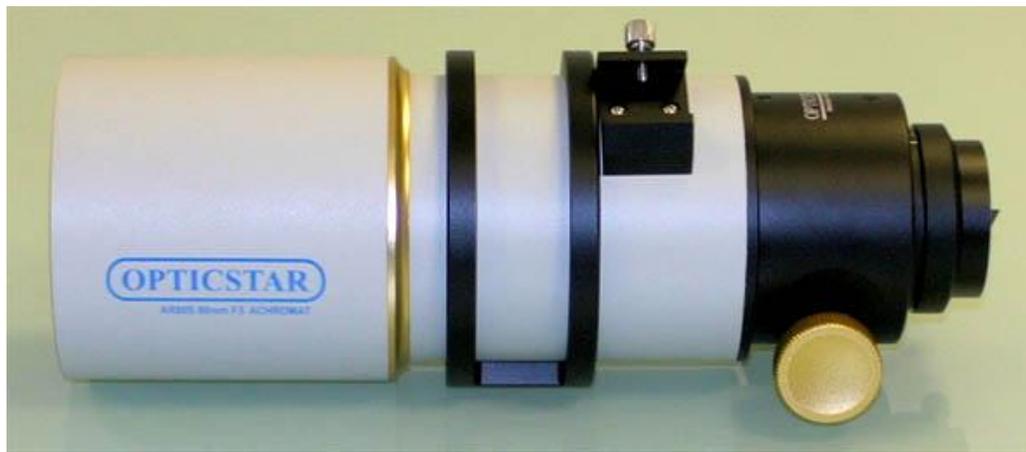
Telescope	Focal length	Aperture	Focal Ratio	Field of view	Magnification
Unbranded; achromatic refractor	300mm	30mm	f/10	3.5° (208 arcminutes)	10x

The Moon



M57





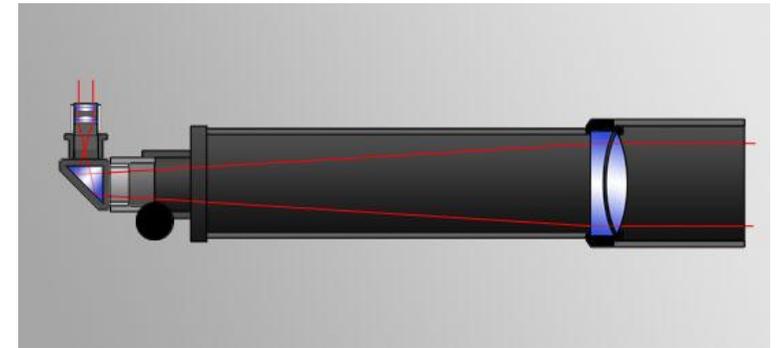
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Opticstar AR80S; achromatic refractor	400mm	80mm	f/5	156 arcminutes (2.6°)	20x

The Moon



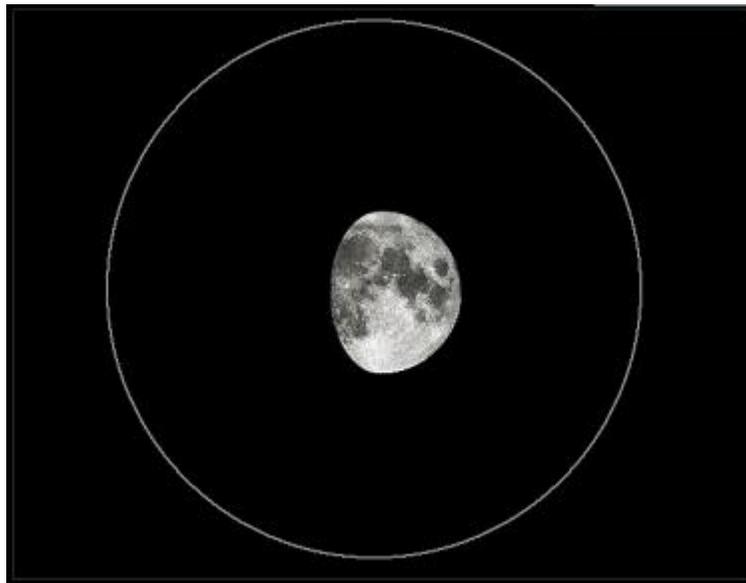
M57



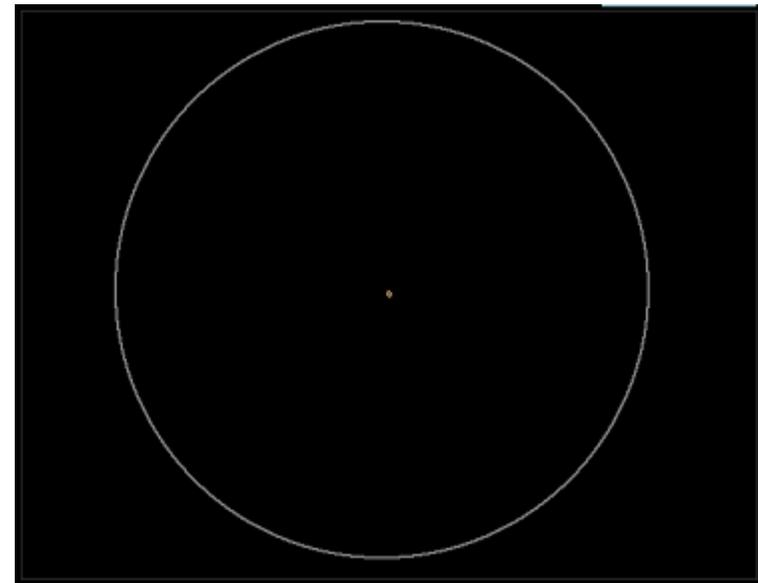


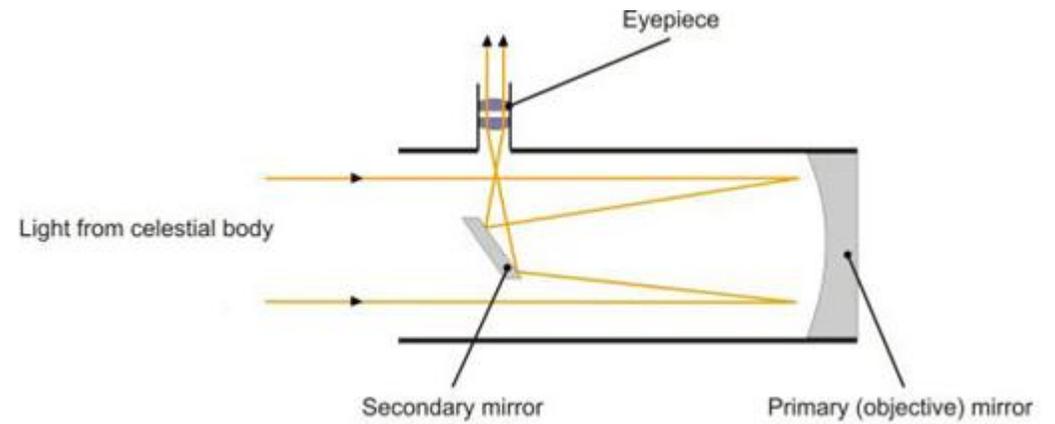
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Skywatcher Evostar ED80 Pro; apochromatic refractor	600mm	80mm	f/7.5	104 arcminutes (1.7°)	30x

The Moon



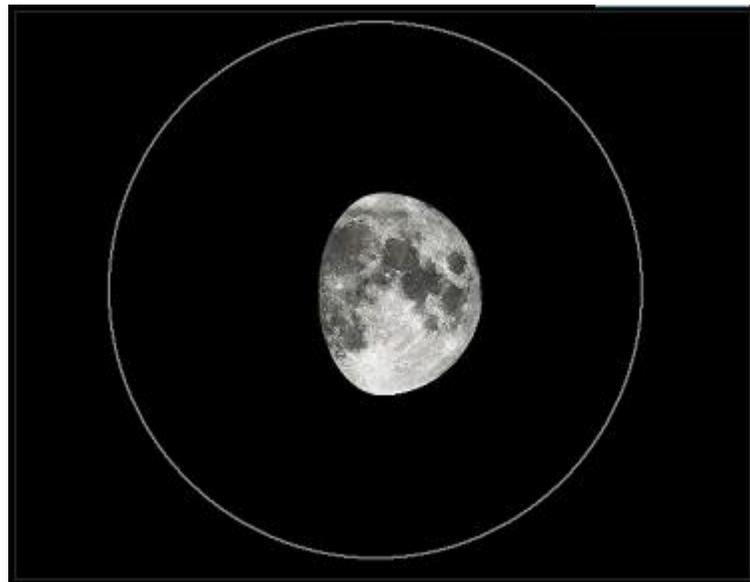
M57





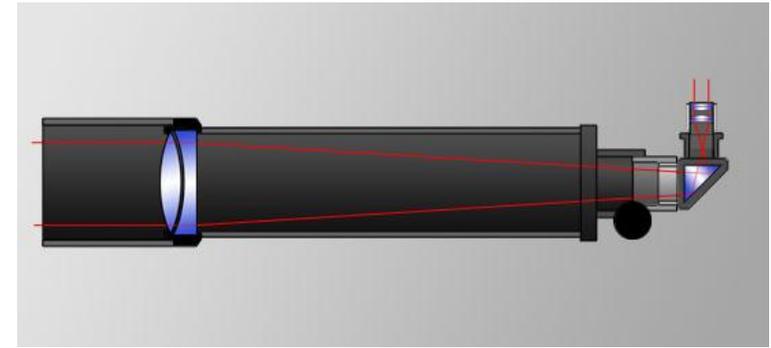
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Skywatcher Explorer 150P;reflector	750mm	150mm	f/5	83 arcminutes (1.4°)	37.5x

The Moon



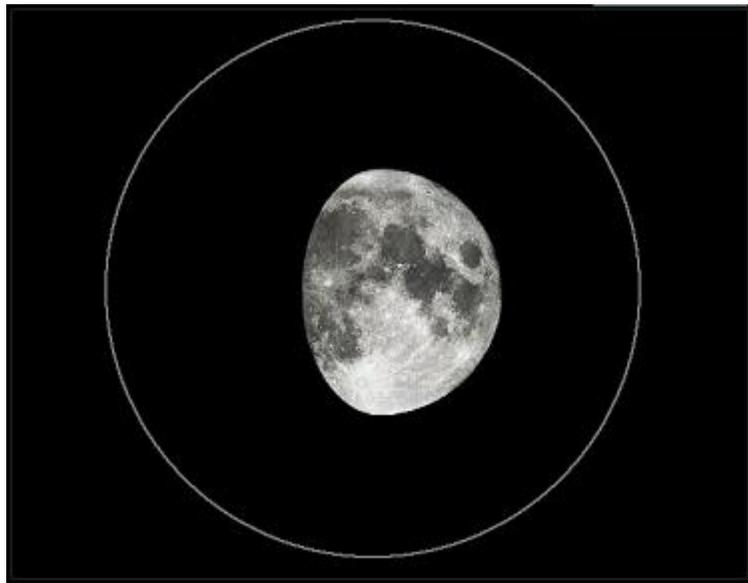
M57





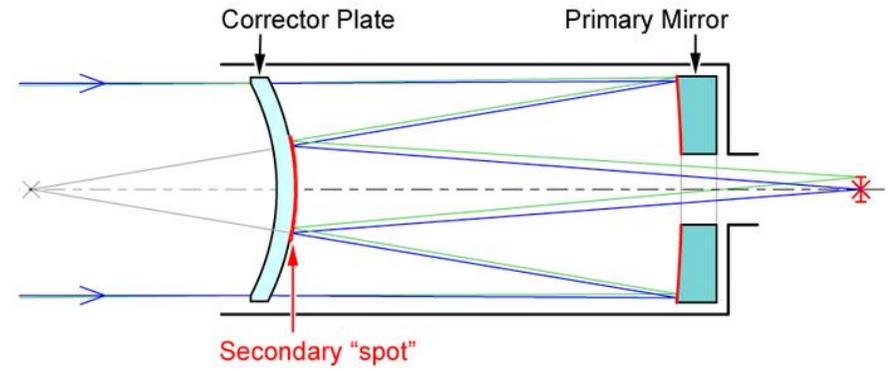
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Vixen A80Mf; achromatic refractor	910mm	80mm	f/11.4	69 arcminutes (1.2°)	45.5x

The Moon



M57





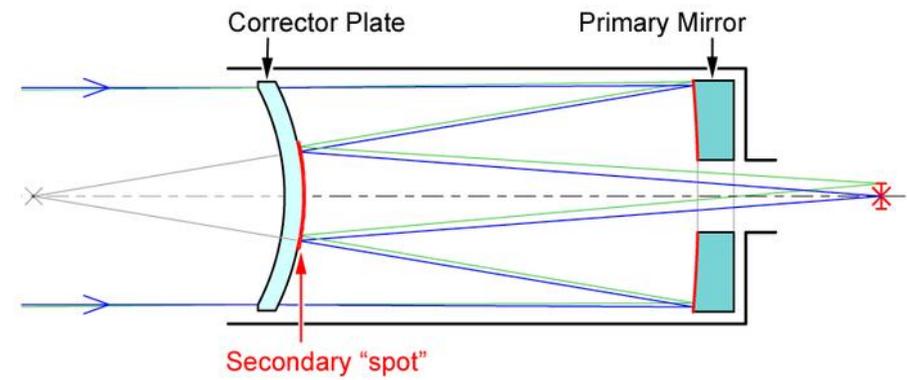
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Skywatcher Skymax-90; Maksutov-Cassegrain	1250mm	90mm	f/13.88	50 arcminutes (0.8°)	62.5x

The Moon



M57



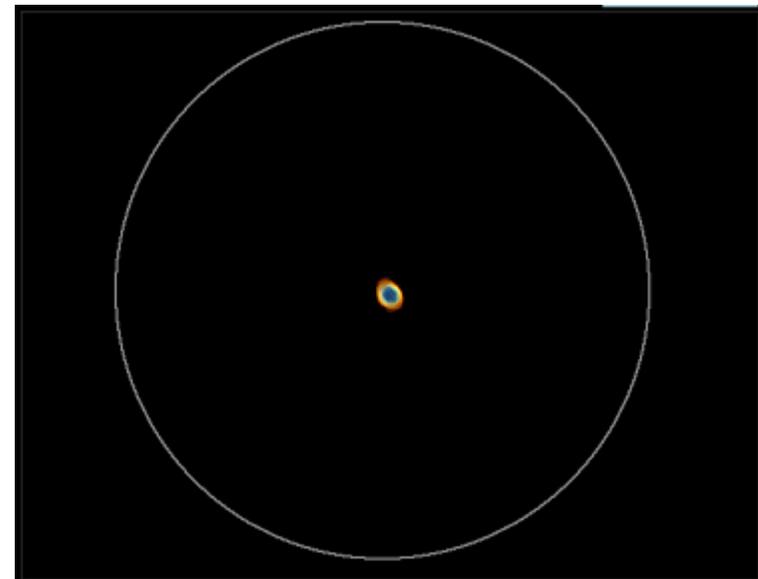


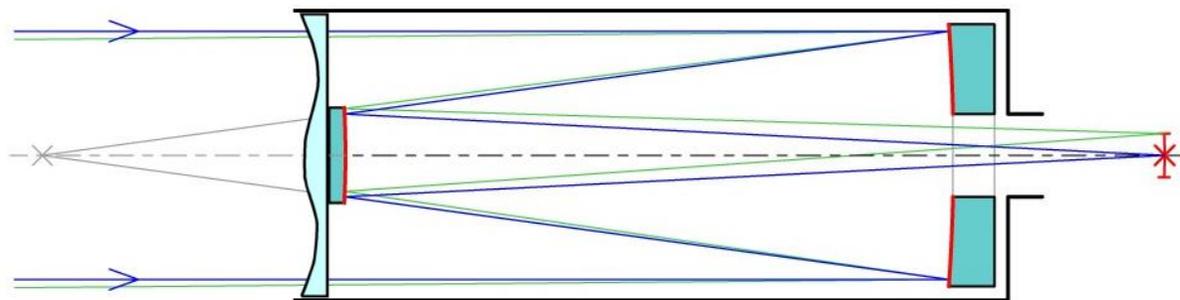
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Skywatcher Skymax-180; Maksutov-Cassegrain	2700mm	180mm	f/15	23 arcminutes (0.4°)	135x

The Moon



M57



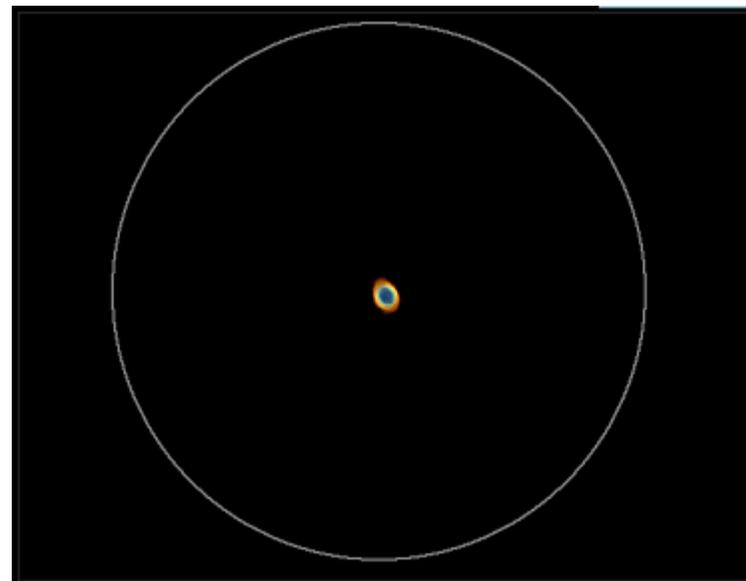


Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
Celestron C11; Schmidt-Cassegrain	2800mm	280mm	f/10	22 arcminutes (0.4°)	140x

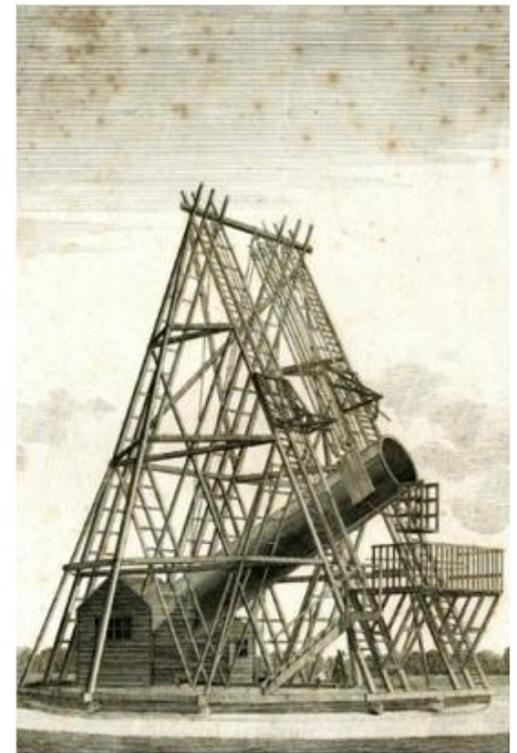
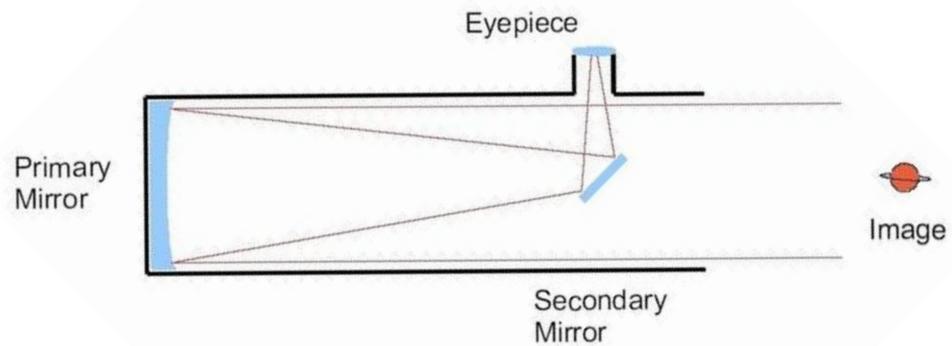
The Moon



M57



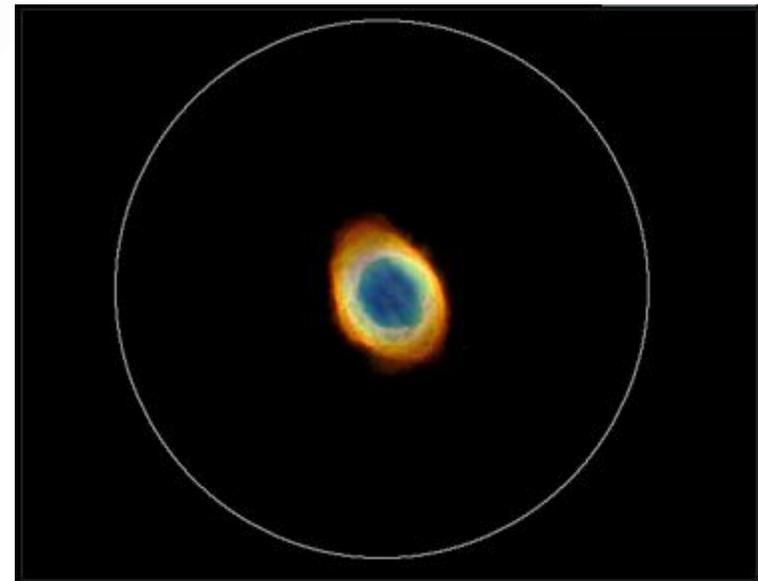
Telescope	Focal length	Aperture	Focal Ratio	Field of view with 20mm EP	Magnification with 20mm EP
William Herschel 40-foot; reflector, completed in 1789	12000mm 144"	1200mm 47"	f/10	5 arcminutes (0.08°)	600x



The Moon



M57



NAS Library

The full catalogue of books we have for loan can be found [here](#).



Featured book:

[Observing the Moon: The Modern Astronomer's Guide](#), by Gerald North

Whether you are a selenographer or not, I think most people must agree that the moon is one of nature's most beautiful sights and Gerald North, a former teacher, amateur astronomer and freelance author has compiled this comprehensive guide on how to observe, sketch and image our heavenly neighbour.

This is not a flimsy text consisting of a few dozen pages; this hardback is nearly 400 pages long but by no means seems overly lengthy. The book has a very clear narrative – a fluent, non-technical style, making it feel as though the author is reading aloud to you. As expected, the book covers the basics: the phases of the moon; eclipses; gravity and tides; occultations; some history of early figures who studied and mapped the Moon and basics on the equipment needed to observe and image it. This first edition (2000) describes the principles of CCD imaging and I'm sure the 2nd edition published in 2007 would address this in greater detail and also describe how to use a DSLR to best capture photons reflected off the Moon.

North has devoted a chapter to the manned and unmanned missions to our moon and describes the modern theories on how the moon was formed - all absorbing reading. For me, the real clincher which makes this book stand above rivals is the description (photographic, sketches and narrative) of the 50 or so most interesting surface features on the Moon; not only does North describe the morphology of the features, he explains how academics believe these features were formed and how the passing of time has caused them to change and take on the appearance that we see today. North does not only rely on academic opinion, he adds his own considered view and shares his life-time of lunar observations with the reader which makes the text even more charismatic.

This isn't a book to have with you at the telescope to accompany your observing session, this is a text to be dipped into or even read from cover to cover to learn more about the Moon and the physical processes which have shaped the way this celestial wonder looks today. A most appealing and non-presumptuous book, highly informative yet readily accessible.

James Dawson

[If you want to borrow this book, contact Lorraine the [Librarian](#)]

When borrowing a book, it would be expected to be returned at the next meeting, unless no one else had requested it; please discuss with Lorraine the Librarian.

To email Lorraine, please use the email address: NASlibrarian@hotmail.com

Nottingham Astronomical Society

Affiliated to the **British Astronomical Association**
Member of the **Federation of Astronomical Societies**
Member of the **Society for Popular Astronomy**
Supporters of the **Campaign for Dark Skies**
Registered Charity No: 1066645

ACTING PRESIDENT:

Roy Gretton

e-mail: president@nottinghamastro.org.uk

VICE PRESIDENT:

Roy Gretton

e-mail: vicepresident@nottinghamastro.org.uk

ACTING SECRETARY:

Richard Myrie

e-mail: secretary@nottinghamastro.org.uk

TREASURER:

David Anderson

e-mail: treasurer@nottinghamastro.org.uk

JOURNAL EDITOR:

Roy Gretton

e-mail: journal@nottinghamastro.org.uk

CURATOR OF INSTRUMENTS:

John Hurst

e-mail: curator@nottinghamastro.org.uk

DIRECTOR OF OBSERVING:

John Hurst

email: observatory@nottinghamastro.org.uk

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

ORDINARY COMMITTEE MEMBERS:

Kevin Greally

Meetings

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

**The British Geological Survey
Nicker Hill
Keyworth
Nottingham NG12 5GG**

Doors open 7.30pm
Meetings start 8.00pm
Meetings end 10.00pm

Meetings are open to the public, and visitors are always welcome to attend.

Annual subscriptions 2015

Full	£30
Concessions	£15
Joint rate for partners living at the same address	£45

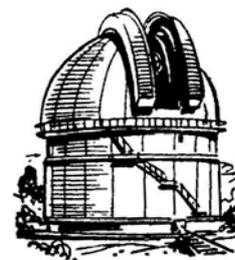
Subscriptions become due on 1st January. Half-price subscription is charged if joining after 1st July. Please make cheques payable to: Nottingham Astronomical Society.

If you would like more information about the **Nottingham Astronomical Society**, or would like to become a member, please contact the Secretary 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.

The Nottingham Astronomical Society

The Nottingham Astronomical Society, and/or the Editor accept no responsibility for any errors that may occur within this publication. Any views expressed in the **NAS Journal** are those of the individual authors and not necessarily endorsed by the Nottingham Astronomical Society, its Committee or Members.

NOTTINGHAM ASTRONOMICAL SOCIETY



Founded in 1946 for all interested in astronomy
Affiliated to the British Astronomical Association
Member of the Federation of Astronomical Societies

Registered Charity No. 1066645
Member of the Society for Popular Astronomy
Supporter of the Campaign for Dark Skies

Membership application and Gift Aid declaration

Title:

Full name:

Full home address:

Postcode:

Telephone:

e-mail address:

Subscription rate:	Full	£30.00	(year)	£15.00	(half year)
	Concession	£15.00		£7.50	
	Partnership	£45.00		£22.50	

Concession = under-18 / full-time student / unemployed and receiving benefits

Partnership = two members living together as a couple at the same address

I wish my subscriptions to be eligible for Gift Aid

Yes / No

Gift Aid declaration

(HMRC reference XR32048)

I want Nottingham Astronomical Society to treat all subscriptions and donations that I make from the date of this declaration as Gift Aid donations, until I notify you otherwise.

I pay an amount of UK Income Tax and/or Capital Gains Tax at least equal to the tax that Nottingham Astronomical Society reclaims on my donations in the appropriate tax year.

Signature: