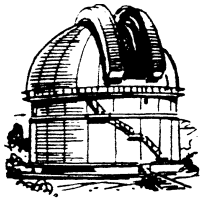
Journal

of the

Nottingham Astronomical Society

June 2020



In this issue

Thursday, June 4th

8pm: ONLINE

This evening we welcome

Prof. Ian Morison

Emeritus Gresham Professor of Astronomy, Manchester University

who will be speaking on the subject of

Wonders of the Southern Sky

Our June "Gotham" meeting will be broadcast live online

The live stream meeting will start at 8pm. The stream can be accessed from 7:30pm onwards. Members will be emailed a link an hour before the meeting is due to begin.

Alternatively the live stream can be viewed directly on our website at https://nottinghamastro.org.uk/ from 7:30pm.

If you are a registered user of YouTube you will be able to ask questions during the live broadcast via the YouTube live chat, alternatively send your questions live via our social media:

Facebook https://www.facebook.com/nas.org.uk
Twitter www.twitter.com/nottinghamastro
email: membership@nottinghamastro.org.uk

We would especially welcome live interaction during the event to keep the meeting as interactive as possible for members, and make it like our normal face-to-face gatherings. Please encourage your family and friends to watch by forwarding them the link.

Sky Notes
June 2020

Compiled by Roy Gretton

All times given below are in British Summer Time

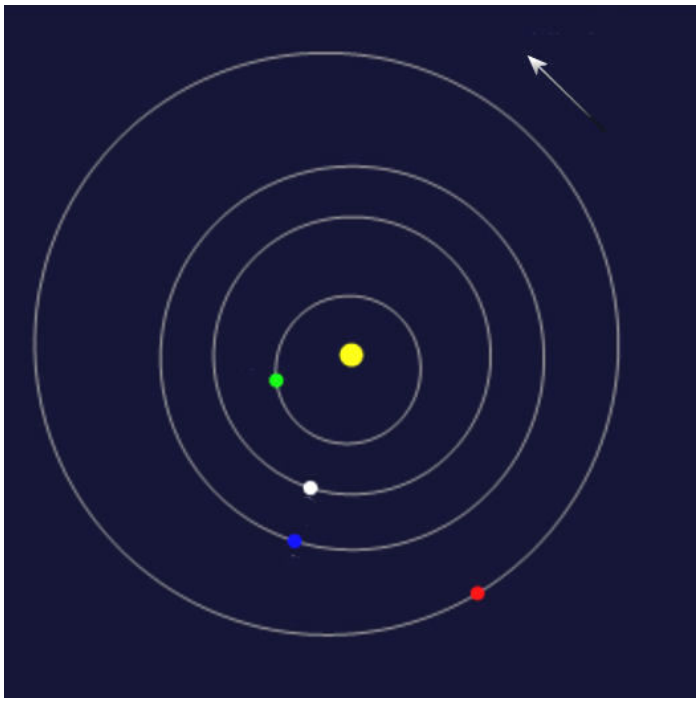
The northern hemisphere **Summer Solstice**, when the Sun reaches its most northerly declination of the year, occurs on the evening of June 20th. Since the inclination of Earth's axis is about **23.5** degrees, at the latitude of Nottingham (approximately **53** degrees north) the altitude of the Sun at 1pm on that date will be about 90 – 53 + 23.5 = **60.5 degrees** above the southern horizon.

PHASES OF THE MOON

Phase	***Date***
Full Moon	June 5th
Last Quarter	June 13th
New Moon	June 21st
First Quarter	June 28th

This month the Moon is closest to Earth on the 3rd, and furthest on the 15th.

THE PLANETS

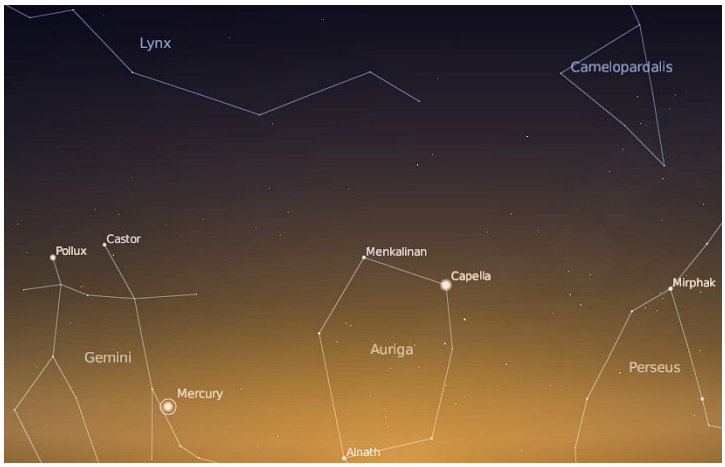


The inner Solar System on June 3rd-4th

Venus *(white dot) is at inferior conjunction, between* ***Earth*** *(blue dot) and the Sun, while* ***Mercury*** *(green dot) is at greatest eastern elongation.* ***Mars*** *(red dot) is now more than 90 degrees from the Sun*

The arrow shows the direction of rotation

Early June will be one of the best times this year to spot **Mercury** in the evening sky, as it will be setting more than 1½ hours after sunset. Greatest eastern elongation will be on June 4th, when the planet will be 24 degrees from the Sun and 25 degrees north of the celestial equator in the constellation of Gemini, and shining at magnitude 0.5. Having said that, it must be noted that Mercury is a challenging object to observe, as it is never seen in a dark sky. After the end of the first week of the month Mercury dives back in toward the Sun as it heads toward inferior conjunction on July 1st.



Looking NW at 10:30pm on June 4th

Venus will be at inferior conjunction on June 3rd, thereafter moving into the morning sky. By the last day of the month it will be rising nearly two hours before the Sun, and shining at magnitude –4.4, making a morning appearance almost as spectacular as the evening one that we've recently witnessed. On the morning of June 19th Venus will be occulted by a slender crescent Moon about 4 hours after sunrise. Observation of this event will require a telescope, which must be handled **with great care** to avoid pointing it directly at the Sun!

Mars, in the constellation of Aquarius, will be rising at 2am at the beginning of June. It will end the month a little more than two degrees south of the celestial equator, and its angular diameter will be greater than 11 arcseconds, so observing conditions will have improved considerably since the beginning of spring.

Jupiter, about 21 degrees south of the equator in the constellation of Sagittarius, will be rising at midnight as June begins, and at magnitude –2.6 will be by far the brightest "star" in this part of the sky. By the close of the month its equatorial diameter will exceed 47 arcseconds, as it heads toward opposition in mid-July.

Looking SSE at 1am on June 16th

If you can spot the brilliant Jupiter, it will be easy to find **Saturn**, a few degrees to the east in the constellation of Capricornus. At magnitude 0.5, Saturn will be much the dimmer of the two. Over the next few weeks, owing to its faster retrograde motion, Jupiter will be easing further away from Saturn, but will return eastward again in September. Eventually the two gas giants will come into conjunction with each other four days before Christmas (a difficult phenomenon to observe as they will be little more than 20 degrees from the Sun).

Uranus, in the constellation of Aries, is a morning object, rising about 3 am in mid-June. Little brighter than magnitude 6, it will be difficult to observe in a brightening pre-dawn sky.

Neptune is a magnitude 7.9 morning object in the constellation of Aquarius, rising about 1:30am in mid-month.

METEORS

With its lack of true darkness, June is not the best time of the year for observing meteors, and there are no major showers during the month.

NOCTILUCENT CLOUDS

Noctilucent clouds are pale blue filamentary clouds, formed about 50 miles above the Earth's surface, far above the normal clouds we associate with the weather. They are best observed in June and July (from the northern hemisphere), becoming visible when illuminated by the Sun when it is well below the horizon. They are still poorly understood, but their "electric blue" appearance is quite distinctive. If you wish to see noctilucent clouds, look toward the north or northwest on a clear evening after 10pm.

A Message from the Chairman

Hello all,

Hope you are well and bearing up - and enjoying our fortnightly virtual meetings. I enjoyed our recent meeting on members' kit and observatories, thanks to all our member contributors. I could convert my shed but it's under a huge Sycamore tree to the south! Thanks again to Richard, Leigh and James who are doing a great job keeping us going. We seem to have been one of the first 'off the mark' societies to set up on-line 'Webinars', they are great for keeping us all interested and in touch.
Our June speaker will be one of our favourites, Professor Ian Morison, who will talk about the Southern Sky, on Thurs June 4th 8pm.
The BAA are doing weekly webinars, the next is on Wed 27th May, see www.britastro.org they have loads of interesting articles and videos.
I've just enjoyed a good You Tube video by Lucie Green, about the sun, in a regular Webinar organised by SPA (Society for Popular Astronomy). You can watch it at:
https://www.youtube.com/watch?v=eoXJTIV58_4
So, there's plenty out there to keep us going!
I looked at the conjunction of Mercury and Venus on Thursday evening – Venus has a lovely crescent, visible in the binoculars. Jupiter and Saturn are getting ever closer now, in the pre dawn sky. They will be rising much earlier the other side of the Solstice, say late July, when they'll be even closer. It will be nice to observe them both without moving the chair! In December they will be about half a degree apart, close enough for a single frame. Will it be clear though . . .?
Clear skies,

John

DIARY DATES 2020

Monthly Meetings of the Nottingham Astronomical Society

There will be no meetings at Gotham or Plumtree until further notice

We nevertheless continue to display our pre-arranged programme of speakers in the hope that it may be possible to livestream some of these talks.

Members of the Society will receive further updates each month from the Chairman

Date	Topic	Speaker
June 4th	**Wonders of the Southern Sky**	**Prof Ian Morison** Emeritus Gresham Professor of Astronomy
July 2nd	**Live Long and Prosper** The search for Vulcan and other hypothetical Solar System objects	**Dr Ann Bonell** Leicester Astronomical Society
August 1st **(Saturday, 5pm)**	**NAS Annual BBQ at the Observatory** **Subject to developments in the Covid-19 pandemic**	
September 3rd	**The Plumes of Enceladus**	**Dr Chris Arridge** Reader, University of Lancaster
October 1st	**FIAT LUX 3 - The LSST Jedi** The Large Synoptic Survey Telescope, the greatest survey yet	**Dr Steve Barrett** Senior Research Fellow, University of Liverpool
November 5th	**Annual General Meeting** followed by a Wine and Cheese Buffet	
December 3rd	**The Vikings at Barsoom - Part 1** Orbital Operations	**Paul Money**

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 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 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

Social and Practical Astronomy, Plumtree, May 2020

The May Plumtree Meeting was hosted online and the theme of the evening was Backyard Astronomy, and consisted of a number of short videos by our members on their home set ups and what they've been up to.

Our Vice Chairman, **Roy Gretton** [1], was the first to give us a guided tour of his home observatory, and to share some of the images he has captured of the night sky. **Herbel Pabla** [2] showed us his telescope and the camera he is currently using on his journey in astrophotography, and we saw some of the images he has been taking. **Brendon Scoular** [3] had his telescope pointing at a crescent Venus and we saw inside his observatory. **David Buxton** [4] gave us a tour of his inconspicuous observatory, and the various trip hazards he's put in place to ensure only invited guests can observe the heavens with his telescope. **Marcus Stone** [5] also shared the kit he uses at home, with yet another lovely home observatory. **Rhiannon Coupe** [6] our budding TV presenter reviewed a number of astronomy documentaries and YouTube channels and we should keep an eye on Rhiannon as I'm sure she'll be famous one day. **Sam Boote** [7] shared the final observatory of the evening, with a lovely low horizon all around; Sam also reinforced the value a home observatory and the need for it to have a sturdy base. I gave the final talk [8] which was a guided tour of the 9 day old Moon at various focal lengths and showed some of the commoner features.

I have been overwhelmed by the quality of the videos our members have submitted and am truly grateful for them all taking the time to record and submit these. It has been so well received I think we will repeat this again another time, and if you've been inspired to just show off your telescope or binoculars, or talk about a book, then please do contact me or one of the NAS Committee.

After the live broadcast there were a number of questions raised in the YouTube chat, many of which I hope we answered live. The questions have raised some topics we will look to cover in future Plumtree events, either online or face to face once meetings resume. I've

listed some of the topics below and a few links to get you going with these topics if you can't wait.

It takes an awful lot of work to edit these videos, and to merge them together into what looked like a very professional production. **Leigh** has done all the hard work editing and standardising the lighting and volume of the videos and I am really grateful to him for this. And also to **Richard** who broadcasts the videos on both Zoom and YouTube and coordinates the meeting when it is live – another task I just couldn't do. Thank you both so much. We've all been learning so much about the process.

The whole session is available on the Nottingham Astronomical Society's YouTube channel, and can be accessed here:

https://www.youtube.com/watch?v=0mPJvXEAzmk&feature=youtu.be

James Dawson, NAS Helpdesk & Plumtree Meetings
helpdesk@nottinghamastro.org.uk

Questions following the Plumtree online meeting on Backyard Astronomy

Stacking software for planetary and lunar images:
https://www.astronomie.be/registax/
https://www.autostakkert.com/

Stacking software for deep sky objects:
http://deepskystacker.free.fr/english/index.html

Filters for astrophotography:
https://astrobackyard.com/filters-for-astrophotography/
https://agenaastro.com/articles/guides/visual-and-imaging-filters/guide-to-imaging-filters.html

There are numerous books on astrophotography which will offer help on the budding astrophotographer and also cover filters. Many of these can be purchased second hand online for under £5. Here are some ISBNs of some in the £5 range which may be useful: 9781933952161; 9781849073141; 9781907781032; 9781852330231 – please do your own research on these before purchasing

Binoculars in astronomy:
https://britastro.org/node/8825
There are a number of second hand books on binocular astronomy online, under £5. Here are some ISBNs: 9780668058322; 9781846283086; 9780830627035 – please do your own research on these before purchasing

Using FITS files:
https://www.spacetelescope.org/projects/fits_liberator/

Memories of April: Lockdown, Sunny Days and Galaxies Galore

April 2020 turned out to be the sunniest April on record, despite the last four days of the month being cloudy and wet. After an autumn and winter that saw a powerful North Atlantic jet stream bring storm after storm across the UK, resulting in widespread flooding in England and Wales, the weather systems were transformed after the spring equinox, with high pressure beginning to dominate northern Europe. The skies were a delight! Day after day Venus became visible in a blue sky well before sunset, and the nights were clearer than normal, possibly due to the drastic reduction in air travel as the coronavirus pandemic took hold across the world. As regards deep sky observing, spring is predominantly the season of galaxies, as the North Galactic Pole passes almost overhead, and our gaze is directed away from the plane of the Milky Way toward the constellations of Leo, Virgo, Coma Berenices, Canes Venatici and Ursa Major, where an abundance of distant galaxies is to be found. So, with all social events cancelled, I found myself at home with free time in the evenings, and decided to return to imaging some of these galaxies, all of which I'd seen before.

I must note that light pollution in the Vale of Belvoir, where I've lived for the past 12 years, has multiplied relentlessly. The sky used to be faint orange due to sodium lighting, but now because of LEDs it's white and much more intrusive – and of course most of it totally unnecessary and wasteful! I find that the best plan is to abandon trying to image faint objects in the lowest quarter of the sky and instead concentrate on targets that are much higher in elevation. So here are some galaxy images that I obtained in mid-to-late April, after the Easter Full Moon that occurred on the 8th. They were all captured on a Canon 450D camera mounted at the prime focus of my 30-cm f/5.3 Newtonian reflector, with multiple 30-second exposures at ISO 800 combined using Deep Sky Stacker, and processed using Paint Shop Pro.

M66 (left) and M65 in Leo

M81 in Ursa Major

M51 in Canes Venatici

M63 and a fainter galaxy in Canes Venatici

M90 and companion galaxy in Virgo

A quick note on data from space probes and telescopes...

Mostly this is pointing to a *Sky at Night* article written by a friend, **Pete Williamson**.
You may not know, but you can get hold of a variety of space telescope and planetary probe raw data that you can try processing at home. It is all freely available, as are a variety of tools to process images.
If you would like to have a play with some of the Saturn images, then you can download Cassini data from here.
https://solarsystem.nasa.gov/raw-images/raw-image-viewer/?order=earth_date+desc&per_page=50&page=0

Fancy doing some solar work, here is data recorded by the WISPR instrument during the first two solar encounters by Parker Solar Probe (PSP) which were publicly released as of November 12, 2019. Data for the third (September 2019) encounter will be available early 2020.
https://wispr.nrl.navy.mil/wisprdata

And of course there are the Hubble images that you can find here at the Hubble Legacy Archive
https://hla.stsci.edu/

This is all summarised here by a friend of mine who wrote an article for the ***Sky at Night*** magazine on just this topic - with links to free tools to try processing your own images at home!
It walks you through how to download the image, and then how to process it to bring out the features.
https://www.skyatnightmagazine.com/astrophotography/astrophoto-tips/how-process-images-raw-space-mission-data/

Another useful site is here - to show you how to process Cassini images of Saturn and it's moons
https://benbackyardastro.com/2017/01/19/processing-raw-cassini-spacecraft-images

Happy processing!

Julian Onions

Looking forward to Mars!

This spring we've enjoyed a memorable apparition of ***Venus*** in the evening sky, and this month she emerges into the morning sky to give, for early risers, almost as spectacular an appearance throughout July, August and September. But come October, our eyes will be attracted to a redder target, as ***Mars*** comes to opposition on the 13th.

Oppositions of Mars are fascinating for a number of reasons, one of which is the rapid rise and fall in brightness either side of the opposition date. This is much more pronounced than with any of the other superior planets. The quick variation in brightness goes along with the equally rapid change in angular size, so that telescopic observers have only a very few weeks either side of opposition to get the best view of the planet – which can be frustrating if those weeks happen to be predominantly cloudy!

For UK observers, this year's opposition of Mars will be the best in well over a decade. In making that statement I'm judging how "good" an opposition will be from a consideration of two factors:

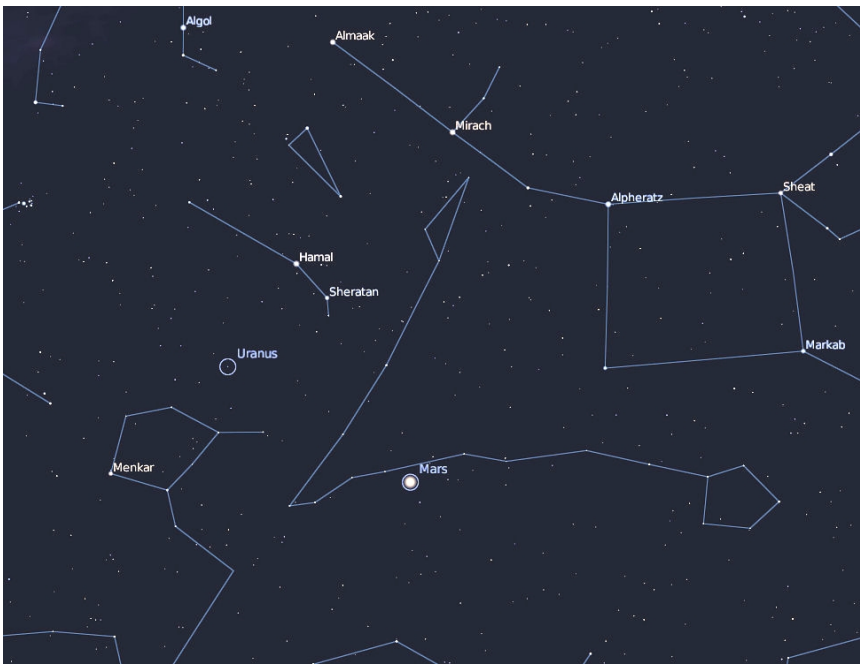
1) how close Mars is to Earth, and
2) how far north he is at that time.

Oppositions of Mars, 2016 – 2027

Date	Declination	Angular Diameter
2016 May 22	-21^0 39'	18.4"
2018 July 27	-25^0 03'	24.1"
2020 Oct 13	$+5^0$ 26'	22.3"
2022 Dec 8	$+25^0$00'	16.9"
2025 Jan 16	$+25^0$07'	14.4"
2027 Feb 19	$+15^0$23'	13.8"

In terms of distance from Earth, the opposition of 28th August, 2003 – which brought Mars as close to us as 34.65 million miles – was probably the best in my lifetime, and it is predicted that Mars won't be as close again until 29th August, 2287! More recently, the 2018 opposition was great for southern hemisphere observers, with Mars' angular diameter exceeding 24 arcseconds, but poor for UK observers, with the Red Planet more than 25 degrees south of the celestial equator, and many extra miles of atmosphere between us and our target. However, the 2020 opposition will be much better for us. Mars' angular diameter will be about 10 percent smaller than in 2018, but at least the planet will be north of the equator, in the constellation of Pisces.

At the start of this month Mars is in Aquarius, but it will cross over into Aries on June 24th. In mid-July it will make a brief incursion into the constellation of Cetus, but before the beginning of August will have returned to Aries, where it will remain for the rest of 2020. Until September 9th, as viewed from Earth, Mars will be moving as normal from west to east, but on that date it begins to move westward, in its so-called **retrograde motion**, which will continue until November 13th, when it will resume **direct motion**. These changes are the result of Earth, in the "fast line", overtaking Mars as the two planets move around the Sun. So there will be plenty to interest naked-eye observers this autumn, in terms of changes in the brightness and position of the Red Planet.



Looking south at midnight on October 13th 2020

Mars at opposition in Pisces

The 2020 Venus and Pleiades Conjunction

Every eight years Venus makes a close pass of the Pleiades open cluster - the last one has just taken place. Conjunction was on April 3 when Venus passed amongst the stars in the outer region of this cluster.

These are my observations on the days before, during and after this event.

From late March to early April we were blessed with sunny days, and more importantly clear (or nearly clear) evenings. April this year was the sunniest on record. From March 26 to April 11, inclusive, I managed thirteen evenings when the sky was clear, or partially clear, where I could take images of the event using lenses of different focal length. Some images had to contend with either thin high cloud or even thicker cloud. Also, on March 28 and 29 a crescent Moon was in close attendance. The Moon was close to 1st quarter on March 31 and was just past Full on April 8.

A Canon 450D camera was mounted on the end of the declination shaft of my 254mm f/5 Newtonian reflector. To better use the available field of view available as Venus first approached, and then moved away, from the Pleiades the lenses used were as follows:
135mm lens set at f/8
135mm lens set at f/4, with a x2 converter, (thus yielding an effective focal length of 270mm at f/8)
420mm lens at f/8, (this was a 60mm f/7 refractor, modified to accept a 2-in dia adapter for coupling either a SLR or DSLR camera with the appropriate additional adapters for a M42x1mm thread or a bayonet fitting).

The images I took are presented in a number of composite illustrations to better convey the conjunction that took place. Details of the images in each figure are as follows:

Fig 1 - 135mm lens at f/8

26/03/20	30s exposure	19h 55m UT	very good sky transparency
27/03/20	30s	20h 16m	very good sky transparency
28/03/20	30s	20h 01m	very good sky transparency, thick crescent Moon nearby (waxing)
29/03/20	30s	20h 27m	very good sky transparency, thick crescent Moon nearby (waxing)
31/03/20	4s	19h 49m	good sky transparency, Moon nearby and nearly at 1st quarter (waxing)
01/04/20	10s	21h 35m	good sky transparency (persistent cloud at times), Moon just after 1st quarter (waxing)
02/04/20	30s	20h 47m	good sky transparency, gibbous Moon (waxing)
04/04/20	30s	20h 36m	very good sky transparency, gibbous Moon (waxing)

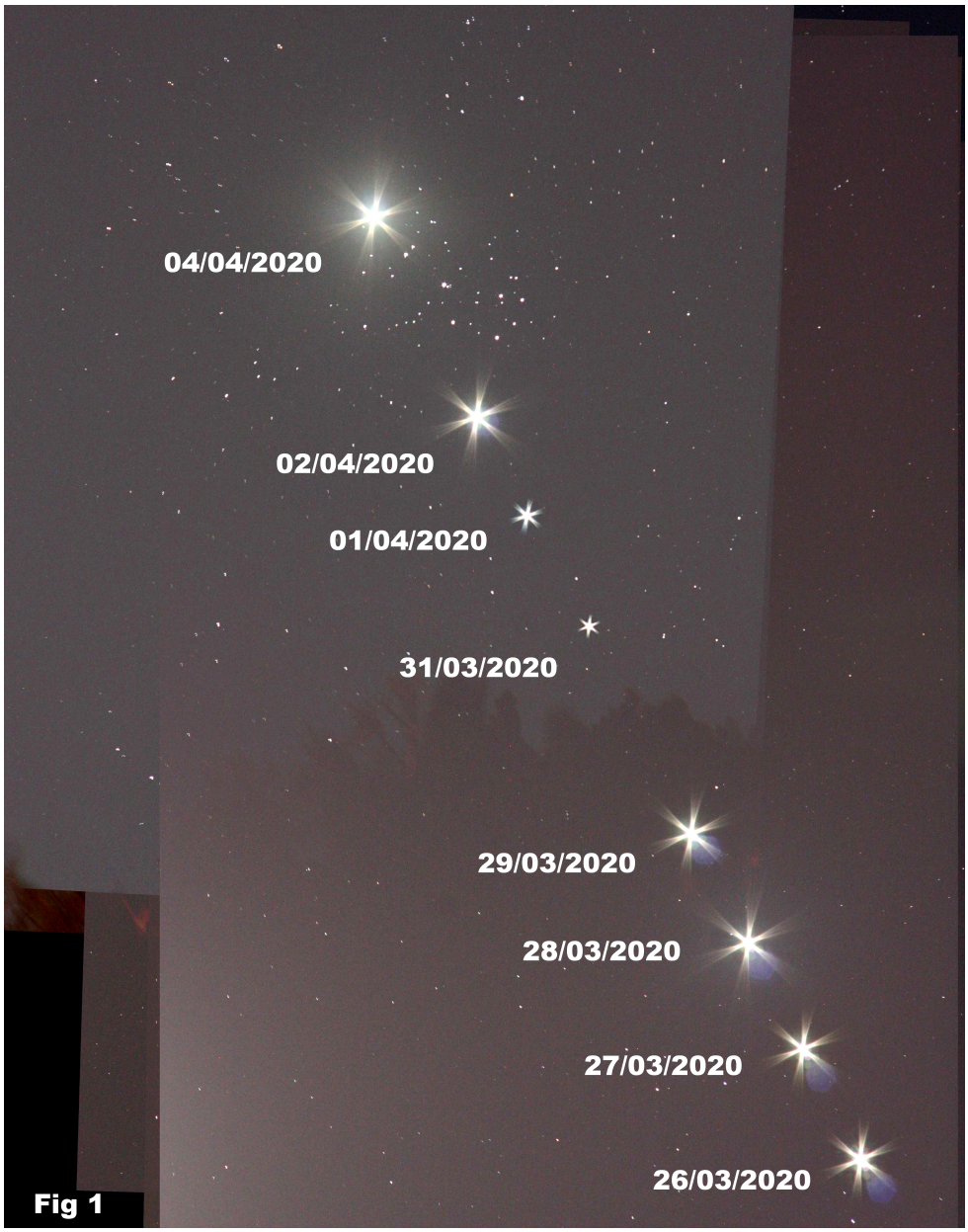


Fig 2 - 135mm lens at f/8

02/04/20	30s	20h 47m	good sky transparency, gibbous Moon (waxing)
04/04/20	30s	20h 36m	very good sky transparency, gibbous Moon (waxing)
06/04/20	15s	20h 22m	very good sky transparency, fat gibbous Moon (waxing)
08/04/20	10s	20h 17m	good sky transparency, just after Full Moon
10/04/20	10s	20h 11m	good sky transparency (very thin high cloud), fat gibbous Moon just rising (waning)
11/04/20	10s	20h 19m	very good sky transparency, fat gibbous Moon just rising (waning)

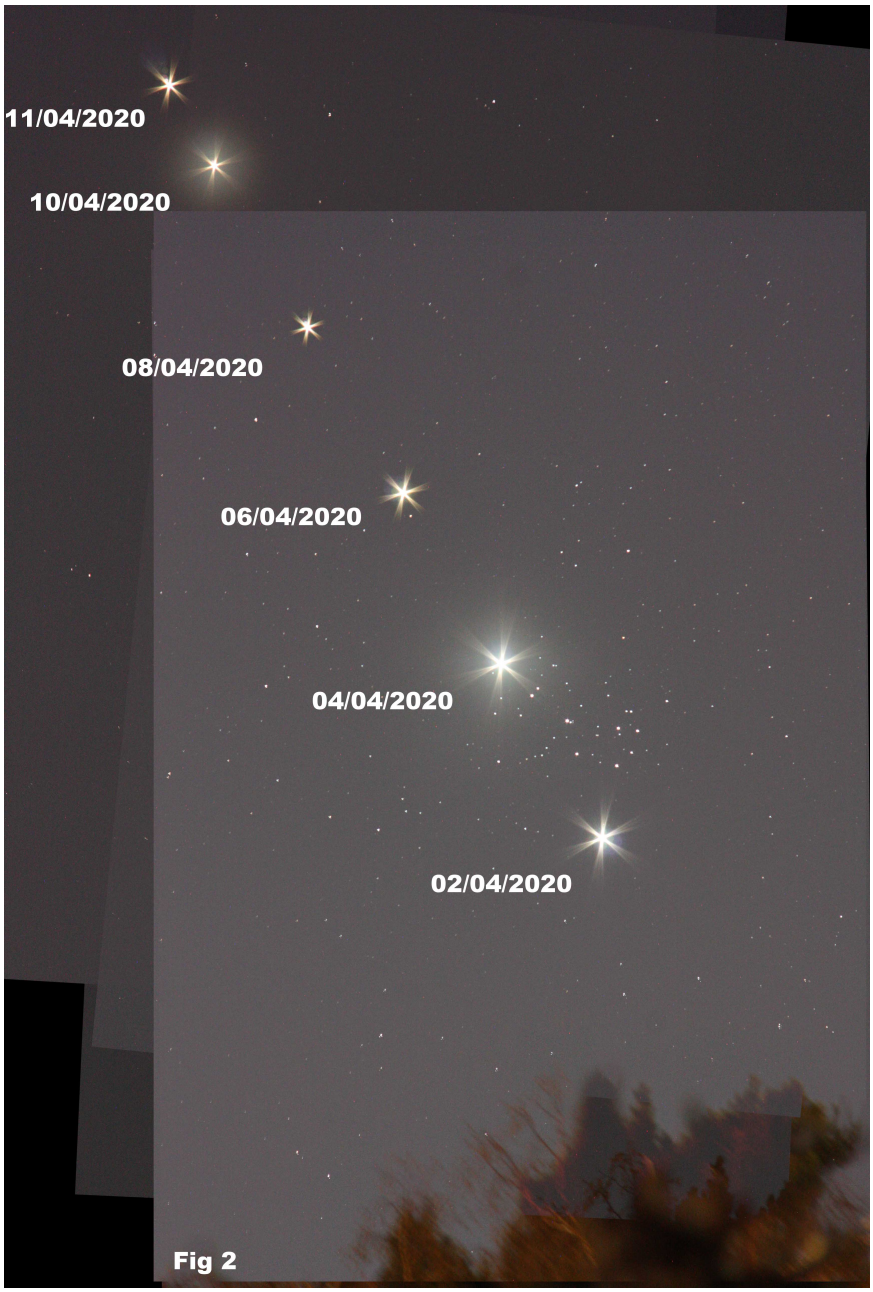


Fig 3 - 135mm lens at f/4, with x2 converter

06/04/20	10s	20h 40m	very good sky transparency, fat gibbous Moon (waxing)
08/04/20	10s	20h 32m	good sky transparency, just after Full Moon

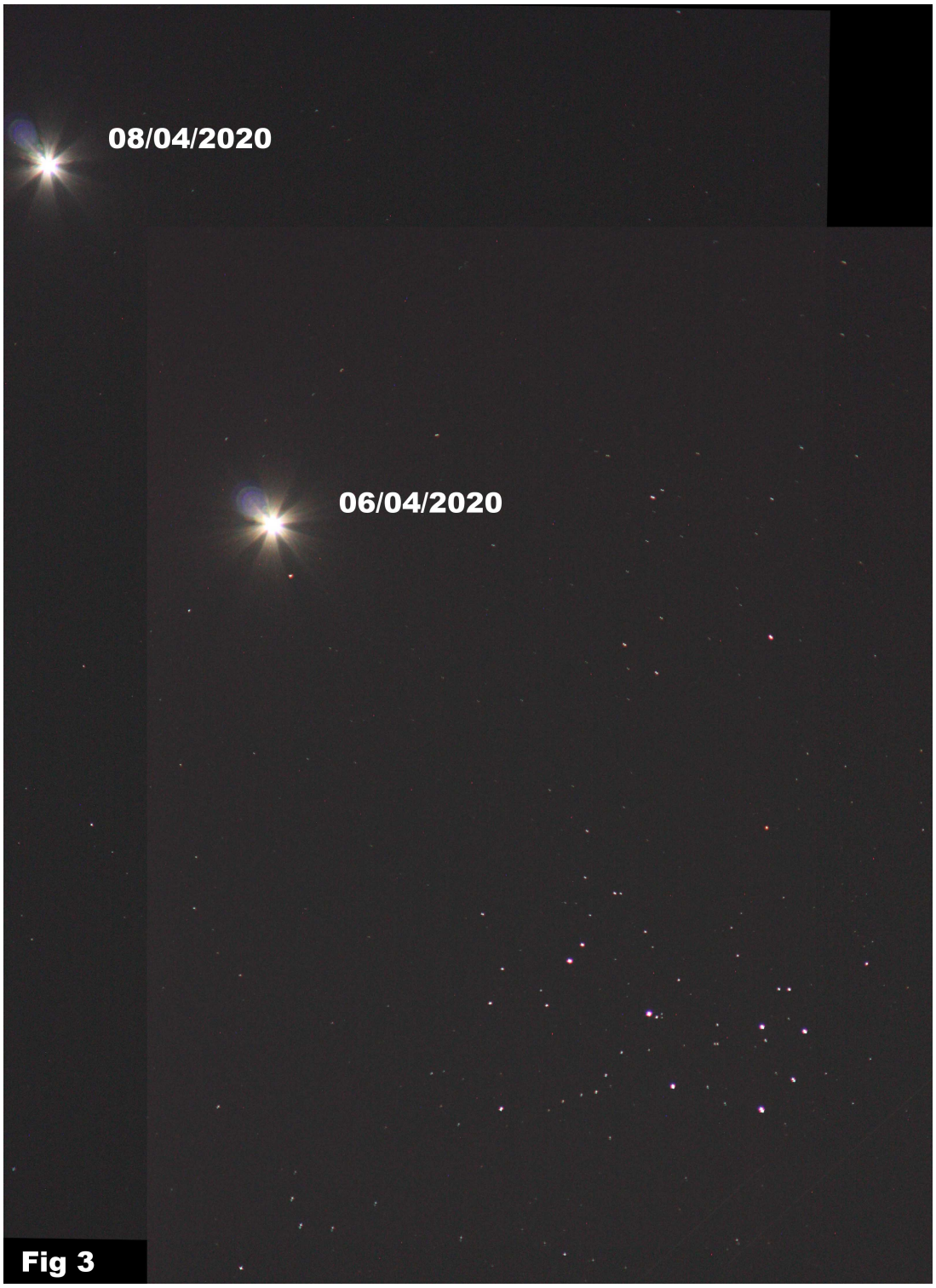


Fig 4 - 420mm lens, f/8

02/04/20	10s	21h 45m	good sky transparency, gibbous Moon (waxing)
04/04/20	30s	21h 31m	very good sky transparency, gibbous Moon (waxing)
05/04/20	4s	20h 47m	poor sky transparency (very thick high cloud), fat gibbous Moon (waxing)

Fig 5 - 420mm lens, f/8 (shows motion of Venus over 2hr period)

04/04/20	4s	19h 42m	very good sky transparency, gibbous Moon (waxing) – taken in twilight
04/04/20	10s	21h 42m	very good sky transparency, gibbous Moon (waxing)

All images were taken at ISO 1600.

PhotoShop was used to produce the composite images. Although the same lens configuration was used for each individual image in any of the figures to produce the final composite, only rotation of each image should have been necessary to achieve perfect registration of the stars. Unfortunately, registration of the individual stars is not perfect if the composites are greatly enlarged. I have a suspicion that it may be the lens slightly distorting the image due to barrel or pincushion distortion.

Unfortunately, on the evening of the tightest grouping (April 3) it was cloudy, although some stars were visible for short periods. I am sure that someone not too far from Nottingham had a clear view!

Next month I will put this conjunction into context with previous conjunctions

Brian Griffin

The NAS in Soar Valley Life

The Society has a page in a local south Notts/north Leics free magazine, Soar Valley Life, which is normally delivered to households in the region, but during the lockdown is available online only. You can access it by going to

https://soarvalleylife.co.uk/magazine

The NAS contribution is to be found on Page 58 of the current edition.

Nottingham Astronomical Society

Affiliated to the **B**ritish **A**stronomical **A**ssociation
Member of the **F**ederation of **A**stronomical **S**ocieties
Supporters of the **C**ommission **f**or **D**ark **S**kies

CHAIRMAN:
John Hurst
e-mail: president@nottinghamastro.org.uk

VICE CHAIRMAN:
Roy Gretton
e-mail: vicepresident@nottinghamastro.org.uk

SECRETARY:
David Buxton
e-mail: secretary@nottinghamastro.org.uk

TREASURER:
Mike Provost
e-mail: treasurer@nottinghamastro.org.uk

JOURNAL EDITOR:
Roy Gretton
e-mail: journal@nottinghamastro.org.uk

MEMBERSHIP SECRETARY
Richard Severn
email: membership@nottinghamastro.org.uk

CURATOR OF INSTRUMENTS:
Leigh Blake
e-mail: curator@nottinghamastro.org.uk

DIRECTOR OF OBSERVING:
(vacant post)
email: observatory@nottinghamastro.org.uk

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

Meetings
Under normal circumstances 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 2020

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

Subscriptions become due on 1st January. Half-price subscription is charged if joining after 30th 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 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.