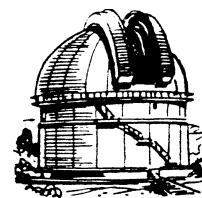

Journal

of the

Nottingham Astronomical Society

May 2020



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Thursday, May 7th

8pm: ONLINE

This evening we welcome

Dr Jeremy Shears

Director of the BAA Variable Star Section



who will be presenting

**An Introduction to
Variable Star Astronomy
and Cataclysmic Variables**

Our May “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](https://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.

A Message from the Chairman

Hello all, hope you are bearing up under the current situation and keeping well. It has really messed up our regular meeting arrangements, but we must be thankful for our amazing communication technologies. Back in the 70's we only had the phone!

Despite the lockdown, April has been a ground-breaking month for NAS, with our first two meetings conducted online, and our first online committee meeting. Julian led the way with a very interesting talk on galaxies. Then we had a mid month meeting with Venus as the theme. For May we have a talk on Variable Star astronomy and Cataclysmic Variables by Dr Jeremy Spears of the BAA. Mid month we will have a medley of short talks by our own members. After the talks there is the opportunity to put questions via the typing in facility in You Tube, a chance to go interactive.

All this is thanks – many thanks, to our 'Production Team', Richard, Leigh, Julian and James, who have put in many hours behind the scenes. Well done chaps!

In June Ian Morison will be giving his talk on Wonders of the Southern Sky, not to be missed! If you haven't been south yet, when this lot is over get yourself down there – it's a wonderful sight!

One advantage of online talks is that you can catch up if you miss them. It was good to see viewers from far and wide signing in to our talks. Just keep an eye on our website and Journal for details of our past and future events. Did you watch the BAA talk on Saturday? This replaced the meeting we were to have had at Radcliffe on Sat April 25th. If you missed it you can catch up at the BAA website or the BAA You Tube page.

I hope you enjoy our meetings, all the best – keep safe.

John

John Hurst
Chairman

This month's speaker, Dr Jeremy Shears, at home with his observatory



Sky Notes

May 2020

Compiled by Roy Gretton

All times given below are in British Summer Time



PHASES OF THE MOON

<i>Phase</i>	<i>Date</i>
Full Moon	May 7 th
Last Quarter	May 14 th
New Moon	May 22 nd
First Quarter	May 30 th

This month the Moon is closest to Earth on the 6th, and furthest on the 18th.

THE PLANETS

Mercury passes through superior conjunction on May 4th and thereafter emerges into the evening sky. It will be 23 degrees from the Sun by the close of the month, when it will be 25 degrees north of the celestial equator, shining at magnitude 0.2, and setting about two hours after the Sun. This will be one of the best evening apparitions of the year for northern hemisphere observers.

Venus, which has provided us with so much delight this spring, will disappear into the sunset glow before the end of this month, as it heads toward inferior conjunction in early June. At the start of the month it will still be setting over three hours after the Sun, and through a telescope will appear as a brilliant thinning crescent as it moves ever closer to the Sun. Venus will be in conjunction with Mercury on May 22nd, but both will be very low down in a bright sky. On the evening of the 24th the two of them will be joined by a thin crescent Moon. If the sky is clear, find a spot with a low NW skyline, and make use of binoculars if you can't spot Mercury with the naked eye.

Mars begins this month in the constellation of Capricornus but soon moves eastward into Aquarius. After spending some months well to the south of the celestial equator it is now progressing steadily northward, and will end May at a declination of -9 degrees. By then it will be rising at 2am, and will have brightened to magnitude zero.



**Looking
southeast
at 3:30am
on May 16th**

Jupiter, still more than 20 degrees south of the celestial equator, spends the whole of May in the constellation of Sagittarius. It brightens from magnitude -2.3 at the start of the month to -2.6 by the close, when it will be rising soon after midnight.

Saturn, in Capricornus, lies a few degrees to the east of Jupiter, and both rise within minutes of each other. Saturn, at magnitude 0.5, is much the dimmer of the two. The northern face of the ring system is visible through a telescope, with Saturn's north pole tilted toward Earth at an angle of 20 degrees.

Uranus, in the constellation of Aries, is virtually unobservable this month.

Neptune is a magnitude 7.9 morning object in the constellation of Aquarius, rising about 3am in mid-May.

METEORS

The **Eta-Aquarids** come to peak activity (perhaps 40 events per hour) on May 6th, just before Full Moon, so conditions for observing these will be unfavourable this year.

COMETS

1. Comet C/2017 T2 (PANSTARRS)

This circumpolar comet begins May a few degrees from Polaris, and continues its journey toward the Plough.



The green dots indicate the approximate position of Comet PANSTARRS on the dates shown. The Plough is near the top of the diagram, Polaris toward the bottom

2. Comet C/2019 Y4 (ATLAS)

There are hopes that this may become a bright naked-eye comet this month, as it passes from Camelopardalis into Perseus, but reports that it underwent a serious fragmentation event in early April imply that previous predictions of its peak brightness should be disregarded.

3. Comet C/2019 Y1 (ATLAS)

This comet passed through perihelion in mid-March, and was closest to Earth (1.33 AU) on April 28th. It is currently in the constellation of Andromeda.

Visit www.heavens-above.com for daily updates on the positions of these comets.

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 below, in the hope that it may be possible to livestream some of these talks. **Members of the Society will receive further updates each month in the form of an email 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, April 2020

The **April** Plumtree Meeting was hosted online and the theme of the evening was the planet Venus.

After a two minute delay to allow people to clap for our carers, the evening kicked off with a talk by me on Venus and its place in our solar system. Gareth's talk was on observing and imaging Venus, and with Venus still high in the sky after sunset it is still a lovely sight to behold, with a telescope or just the naked eye. Richard talked about transits and occultations of Venus, past and future, and the session finished off with Julian talking about the missions we've sent to Venus and the information we've learnt. There were a few questions which had been submitted online and our speakers answered some of these. All of the questions which were asked have been copied out (below) and our speakers have hopefully provided some useful answers and links to address these.

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

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



As was said in the talk, **we desperately need members to submit short videos of what they've been up to in astronomy**; showing off your astronomy set up or observatory, a short talk on a specific piece of kit you use, a video showing your imaging set up, or describing some visual astronomy you've undertaken, or even a review of a book you've read. **Please do contact me** if you have something to share, using the email address below.

James Dawson

NAS Helpdesk & Plumtree Meetings

helpdesk@nottinghamastro.org.uk

Questions following on from the Plumtree online meeting on the planet Venus

A number of questions were posed during and after the talk, and we've summarised them all here and given our speakers the opportunity to reply to them. If you wish to comment further on these, please use the Journal as a medium for this communication so it can be shared with the whole of the membership.

A question was raised about the greatest eastern and western elongations of Venus which James hopefully answered during after the talk; addition information below.

There is an excellent article by Paul G. Abel on the British Astronomical Association (BAA) website on the [phases of Venus](#), and this may add further information on this topic; Wikipedia also has a short, but informative [page](#) on this. **James**

Two questions were asked about Venus' atmosphere and why it hasn't been stripped away from the planet by the solar winds, like we have seen on Mars, especially since Venus is much closer to the Sun and that unlike the Earth it has a minimal magnetic field. The answer to this is that the hydrogen and oxygen in Venus' atmosphere actually is being stripped away by the solar wind but because the atmosphere is so thick this is a very slow process; additionally, carbon dioxide released into the atmosphere through volcanic activity acts to continuously "top-up" the atmosphere. Although Venus doesn't have a magnetic field generated internally as per that of the Earth's, it does create its own induced magnetosphere when the solar wind interacts with the planet's ionosphere. This ionised layer prevents the heavier elements from being stripped away from the planet's atmosphere particularly on the day side of the planet where the slow rotation causes the ionosphere to be at its thickest.

Gareth

A rare occultation of Venus by the Moon will occur in June of this year during daylight was mentioned in Richards talk, and someone asked more about this.

The waxing crescent of Venus is 0.7 degrees south of the 4% waning crescent Moon on the morning of the 19th June 2020. Observers from Nottingham can see a lunar occultation of Venus starting at 08:39 AM. Venus will start to emerge from behind the moon over an hour later at 09:44 AM. Please note the Moon and Venus will be situated close to the Sun. If observing with a telescope great care should be taken if observing this event. Locating and tracking the moon before sunrise is recommended to avoid accidentally pointing the scope at the Sun. **Richard.**

A question was raised asking for more information on the atmosphere and geology of Venus. There is a lot of material online about these aspects of Venus (and the other planets), but in particular there is an excellent review article from 2018 in [Space Science Reviews](#) which is open access and can be viewed and downloaded as a PDF. **James**

Is there still volcanic activity on Venus?

A research article in *Science Advances* from January 2020 suggests there is present-day volcanism on Venus; this article can be downloaded [here](#). Volcanoes and volcanic activity are also discussed in the previous article from [Space Science Reviews](#). The [BAA](#) are also encouraging imagers of Venus to pay particular attention to the night side of Venus as the phase of the planet drops below 30%, particularly in the infra-red, as this may be a way for the amateur to detect active volcanoes. **James**

Someone asked how James' aurora background during the talk was generated.

The software we are using to share the video and audio feeds of the speakers, [Zoom](#), has a function which allows images or video to be displayed in the background, without the need for a green screen. There are some pre-loaded images and videos within the software, and this aurora video was one of them. **James**

Someone commented that they had always wondered why there had been so much importance placed on transits of Venus.

By the early 1600's Johannes Kepler had calculated the relative distances of the planets from the Sun. However, no one knew the value of the Astronomical Unit so the absolute distances were not known. Edmond Halley proposed a method for calculating the astronomical unit using the transit of Venus. Using solar parallax, the shift in position that comes from viewing an object from two different points, allowed the distance to be calculated using trigonometry. Timing the start of the transit at different locations on the globe allows the angle between the two paths measured from Earth to be calculated. Besides the angle we need to know the distance between the two observers on Earth. Using these measurements from the Venus transits in the 1760s, estimates of the Astronomical Unit were made. **Richard**

M3, a globular cluster in the constellation of Canes Venatici

imaged by Brendan Scoular on 11th April
using a Canon 700D attached to a 127mm refractor.
Nine 60-second exposures stacked



Observations of Comet ATLAS (C/2019 Y4)

by Brian Griffin

I tried on at least six occasions to locate this comet with 10x50 binoculars and failed every time. The location in the sky could not have been better (right in the zenith), the sky transparency was also very good and there was no Moon. I could only come to the conclusion that light pollution and the extended size of the comet took its actual brightness to just below the threshold of the binoculars. Reports were suggesting a brightness around 8th magnitude – a value that should have been within the grasp of 10x50 bins.

However, I did manage to image the comet on four nights. I mounted a Canon 450D (fitted with the Pentacon 135mm lens I used with my Praktica LTL SLR camera) on the end of the declination shaft of my 254mm f/5 reflector. The telescope was driven in RA but no guiding was carried out.

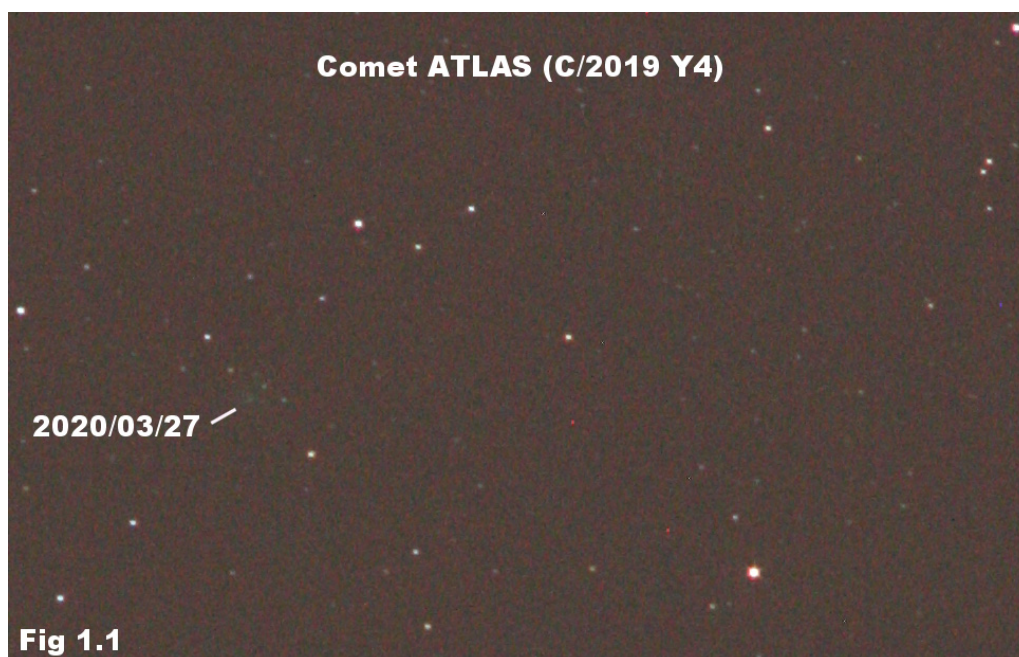
I used this lens because it has a fixed infinity stop so there is no faffing around finding the correct focus point. It does, however, require a special adapter to couple the M42x1mm thread of the lens to the bayonet fitting of the EOS camera body. Fortunately, back in 2010 I purchased such an adapter from SRB Griturn – it cost me £22.95 back then. The adapter is so machined that the focal plane of the lens when set at infinity will be in the plane of the camera sensor.

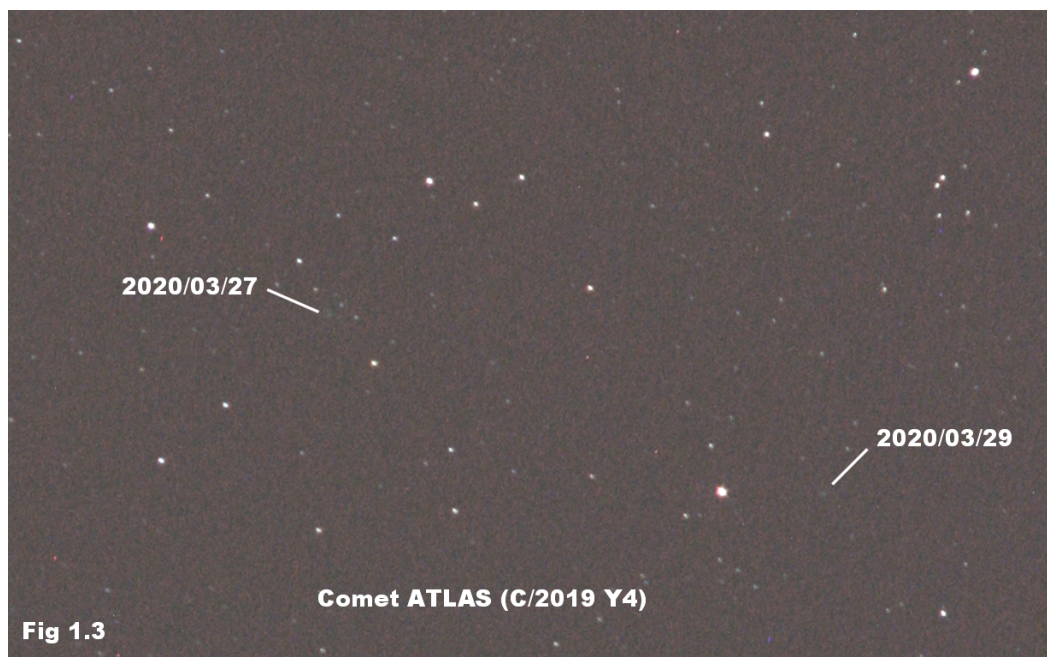
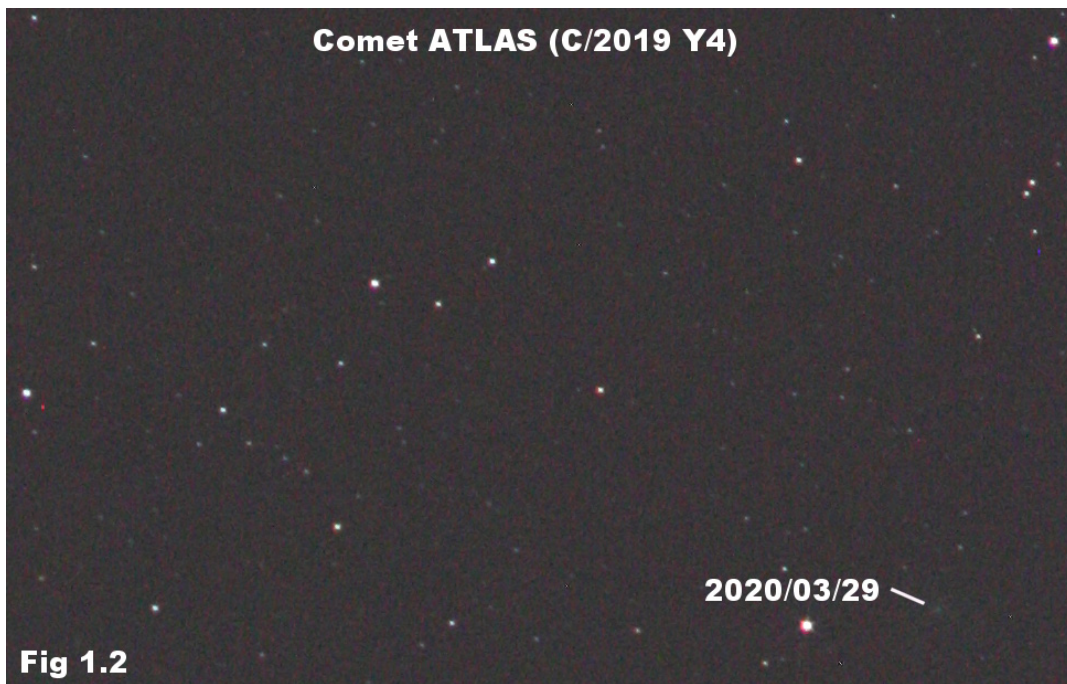
I took images on March 26, 27, 28 and 29 with the camera ISO setting at 1600 and the lens setting at f/8, with exposures of 30s and 60s (the 60s exposures were on March 27 and 29 only). In the 30s exposures the comet barely registered above the noise level of the sensor. However, the 60s exposures did produce (just) sufficient signal.

Fig 1.1 shows the comet on 2020 March 27 at 20h 34m UT and Fig 1.2 on 2020 March 29 at 20h 54m UT.

Fig 1.3 is a composite image of the above two images to show the movement between the two dates.

The images have been cropped to give a field of view of about 3x2degrees with north roughly at the top.





And now to something special...

The following pages are devoted to **observations of Venus carried out by NAS members** in the past few weeks. April was an outstanding month for amateur astronomers in our region: so many clear nights – perhaps more clear nights than we’d had in the previous six months!

It’s great to have so many NAS members actively observing the heavens and sharing their results. Many thanks to all who sent in their reports. Keep them coming!

Conjunction of Venus with the Pleiades

Between March 26 and April 11 I managed to take images on 13 nights, the only misses were on March 30, April 3 (the date of the tightest grouping), April 7 and April 9.

I used the same telescope/ camera set up as that for the comet, but with a variety of different lenses to make better use of the separation between Venus and the Pleiades as the conjunction unfolded. The lenses used were as follows:

- a) Pentacon 135mm lens set at f/8
- b) Pentacon 135mm lens set at f/4, with a x2 converter (thus yielding a f/8 final set up)
- c) A 420mm f/8 lens (this is actually a poor, optically, 60mm refractor which I modified many years ago to accept a 2-in diameter barrel to M42x1mm thread adapter for use with the SRB-Griturn adapter). The focus point was achieved by screwing/unscrewing the objective fitting to the tube of the 60mm refractor and reviewing the resultant image on a distant object. Confirmation was done on a star test, and once determined the objective fitting is not moved again.

Some of the images taken are as follows (Canon 450D, ISO 1600). None of the images have been cropped:

135mm lens at f/8

Fig 2.1 taken on 2020 April 1 at 21h 35m UT, 10s exposure

Fig 2.2 taken on 2020 April 10 at 21h 10m UT, 10s exposure

Fig 2.3 taken on 2020 April 11 at 20h 33m UT, 8s exposure

135mm lens at f/4, with x2 converter

Fig 3.1 taken on 2020 April 6 at 21h 18m UT, 10s exposure

Fig 3.2 taken on 2020 April 8 at 20h 32m UT, 10s exposure

420mm lens at f/8

Fig 4.1 taken on 2020 April 2 at 21h 34m UT, 10s exposure

Fig 4.2 taken on 2020 April 4 at 20h 16m UT, 10s exposure

Next month I will look at the 2020 conjunction as a whole using a variety of composite images.





Brian Griffin

Venus in the Pleiades

This image was captured by **Brendan Scoular** on April 4th using a Canon 750D camera with a RedCat 51 Petzval APO lens.

It is a combination of 36 x 15 second exposures at ISO 200.

Brendan comments that “pesky thin cloud was diffusing the light from Venus”.



The International Space Station streaks past the Moon and Venus and passes between the Hyades and Pleiades

(look carefully and you can see them all)



Image taken by the **Editor** using a Canon 450D camera.
4-second exposure at f/5.6, ISO800 at 21:35 on March 27th

Venus and the Pleiades

Images from John Hurst



Image of Venus in the Pleiades, captured on April 4th, using a Nikon D700 camera attached to a 102mm f7 refractor. 2-second exposure at ISO 1600



Venus, the Hyades and the Pleiades taken on April 8th, using a Nikon D700 camera with a 70mm focal length lens. 1.6 second exposure at f4, ISO 1600

Observation of Venus 22nd April 2020

As we heard in the recent Plumtree talks, Venus is currently approaching the Earth and becoming bigger in angular size as it approaches perigee. With Venus being so high in the sky at present I was prompted, by Richard, to image it.

On the evening of 22nd April 2020 at 19:48 (BST) I had Venus on the sensor of my camera and managed to capture this image of it, through gaps in sometimes turbulent seeing. I often refer to the local seeing conditions (related to the tube currents in the scope, any heat escaping from the surface the mount is set up on (usually worse on slabs, better on grass), and objects in the line of sight of the telescope nearby (such as neighbours houses giving off heat, or chimneys/central heating flues)), as well as the more distant seeing conditions which mostly relates to the jet stream lying between the telescope and the distant celestial target. On this evening, the overall seeing was fair.

This image is the result of the first of several runs and subsequently turned out to be the best. This is with a Celestron C11 on a Skywatcher AZEQ6 mount, using an electronic Crayford focuser and an ASI ZWO 224MC colour CMOS camera (not cooled). No filters or Barlows were used for this image. This setup gives a focal length of just over 2800mm, and a focal ratio of just over f/10, and the field of view on the sensor is about 6 arcminutes by 4.5 arcminutes, and the resolution about 0.28 arcseconds per pixel. The camera allows for the area of interest to be adjusted, but this first run I left it at maximal size as I wanted to see how good my tracking was. At the time the data was captured, Venus was about 32% illuminated (so in the crescent phase), 0.487 AU from the Earth (73 million km), and about 30 degrees in elevation, 276 degrees in azimuth (so nearly due west).

This image was from a 150 second capture at about 30 frames per second, with a relatively high gain (about 75%) and a low exposure time, and default gamma. This resulted in about 4500 frames saved as a *.avi file which I subsequently passed through [Planetary Imaging PreProcessor](#) (PIPP) to align and order the frames into quality, and then selected the best 50% to export (again as a *.avi file). With this exported file I stacked the data in Registax6, and also used [Registax](#) for the wavelet function.

As this image has been taken with a colour camera and without filters, there is a bit of colour fringing, and also there is an absence of any cloud detail. Cloud detail is more likely to be seen when using filters, either at the red end (infra-red let-through filters) or at the blue end (ultra-violet let-through filters). The image clearly shows the two pointed cusps of Venus equally well.



I am quite happy with the image, but I think with more time to cool the telescope, and to adjust the focus a little more the image could have been sharper. But there is always the next time!

James Dawson

Capturing Venus with an iPhone

Leigh Blake captured this image of Venus on April 20th in order to show what can be achieved with basic equipment. He held his phone to the eyepiece (5mm focal length) of a 150mm aperture Newtonian reflector on a manual mounting.



The Editor's attempt at imaging Venus by eyepiece projection



A 1/400th second single image obtained at 10:43pm BST on April 24th by projecting the image from my 30-cm f/5.3 Newtonian reflector through a 10mm focal length eyepiece on to the imaging chip of a Canon 450D camera set at ISO 800

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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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.

The Nottingham Astronomical Society

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