No. 561 Registered Charity 271313 January 2020

OASI News

The newsletter of the Orwell Astronomical Society

Local Lunar Graze events for 2020 (see page 15)

James Appleton

Trustees: **Mr Roy Adams** **Mr Neil Morley** **Mr David Payne**

Honorary President: **Dr Allan Chapman D.Phil MA FRAS**

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Society Notices

Society Contact details

Observatory (meeting nights only)	07960 083714
Email queries:	info@oasi.org.uk
Facebook:	Orwell Astronomical
Twitter:	@OASIpswich
https://groups.io/g/OASI	Members-only message board

Please send material for the OASI web site and newsletter e.g. observations, notices of events, general interest articles, to

news@oasi.org.uk

Other contact details will be issued to members on a separate printed list.

Access into the School Grounds and Observatory Tower

Please use the third gate into the school grounds by the gym.

Areas out of Bounds

Access to the Observatory is **only via the black door** at the foot of the Observatory tower, which leads to the staircase and thence to the spiral staircase up to the Observatory. If the black door is locked, please phone the observatory mobile, **07960 083714** during meeting hours.

Please do NOT explore other routes. When in doubt, ask or call the Observatory mobile.

Remember this is a school and straying into the main part of the school where the pupils reside would cause the society big problems and could see us losing the use of the observatory. Any member found to be anywhere other than the approved access route or the observatory area will face serious sanctions up to and including expulsion from OASI.

Please note that access time for all observatory member nights is after 20:15

Articles for OASI News

News, pictures and articles for this newsletter are always welcome. Please send them to

news@oasi.org.uk

The CLOSING date is the 15th day of the month

Please submit your articles in any of the following formats:–

Text: txt, rtf, rtfd, doc, docx, odt, Pages, pdf
Spreadsheets: xls, xlsx, OpenOffice/LibreOffice, Numbers
Images: tiff, png, jpg
Please send tables as separate files in one of the above formats.

If you don't feel up to writing a major article, perhaps you might write a short note for OASI News along the lines of *"This month I have mostly been observing/constructing/mending/reading/etc."*?

Newsletter archive www.oasi.org.uk/NL/NL_form.shtml

Authors, please note that your articles will now be publicly available worldwide!

Reproducing articles from OASI News

If you plan to reproduce an article exactly as per OASI News then please contact the Editor – otherwise, as a matter of courtesy, please seek permission from and credit the original source/ author. You may not reproduce articles for profit or other commercial purpose.

Committee 2019

Chairman	Andy Gibbs	Set overall agenda for OASI, Chair committee meetings, Press and publicity,
Secretary	Roy Gooding	Outreach meetings (jointly with Chairman), observatory decoration.
Treasurer	Paul Whiting FRAS	Finance, Supervision of applications for grants.
		Visits by outside groups, Observatory tours, Public appreciation of astronomy, Outreach activities.
Committee	James Appleton	Committee meeting minutes, Web site
	Martin Cook	Membership, Tomline refractor maintenance & user testing
	Matt Leeks	Safety & security
	Peter Richards	Lecture meetings, Email distribution lists
	Martin Richmond-Hardy	Newsletter, OASI @ Newbourne
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club.
	Andy Wilshere	Librarian

Signing in and out

Please ensure you sign in and out when visiting the Observatory and/or Newbourne. This is for fire safety precautions and also provides an historic record.

Annual General Meeting

Friday 17 January 2020, 8pm at Horley Spiritualist Church, 345 London Rd, Ipswich IP2 0BG

All members are invited to attend the AGM. A nomination form follows.

Please see map and location details on page 28.

OASI Officers & Committee – Nomination form

Nomination for 2020 committee

Name of Nominee .....

Post .....E.g. Chairman/Treasurer/Secretary/Committee.

Proposer .....

Seconded by .....

Any members who are nominated must have given their consent.

Forms must be returned to the secretary (Roy Gooding secretary@oasi.co.uk) before the AGM.

Members who are elected to the 2020 committee. will be expected to attend as many committee meetings as possible.

Committee meetings are usually held about every six to eight weeks.
Every committee member is given an area of responsibility to help with the running of the society.

OASI and BAA Events

For the latest event details, please see www.oasi.org.uk/Events/Events.php

There's a Google Calendar on the OASI web site with the latest dates (and corrections!). If you want to easily add OASI Events to your own computer/ phone/tablet calendar application click this button on the website Events page (bottom right of the calendar) or use this address to access this calendar from other calendar applications.

https://calendar.google.com/calendar/ical/1jhs9db71ncki4sojo7092vfvc%40group.calendar.google.com/public/basic.ics

For other astronomy news and astro pictures try our

Twitter feed https://twitter.com/OASIpswich

Facebook page https://www.facebook.com/pages/Orwell-Astronomical/158256464287623

Subscribe to the OASI Yahoo group by emailing oasi-subscribe@yahoogroups.com

Key:

OASI public events *BAA & SPA events* *Other events*

Date, Time & Location	Contact	Event
Weekly, every Wednesday, 20:15–22:00 Orwell Park Observatory	Martin Cook, Roy Gooding	General observation (weather permitting) using a variety of telescopes. Entry via the third gate left. NOT the main gate
Monday 6 Jan 19:30 Otley College	Roy Gooding	**Star Party at Otley College** See page 8.
Friday 17 Jan 20:00	Roy Gooding	OASI Annual General Meeting
Sat 25 Jan 14:00 – 18:00 Institute of Physics, 37 Caledonian Road, London, N1 9BU.	https://britastro.org/meetings/2020	*BAA Meeting* Fred Nye "Latitude movements of solar prominences 2010–2017". Dr Julian Onions "A universe from scratch" Sky Notes: Philip Jennings.
Sat 25 Jan 14:00–17:00 Gustave Tuck Lecture Theatre, University College, London	https://www.popastro.com/main_spa1/	*SPA Meeting* Prof Stephen Serjeant: Presidential address on "Citizen science and the Data Avalanche".
27 Jan (S+B) 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.19:30 Sky Notes
10 Feb 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.

Date, Time & Location	Contact	Event
24 Feb 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.19:30 Sky Notes + talk at 19:45 by Paul Whiting “3000 years of eclipses”.
Sat 29 Feb. 19.30 to 22.00, set-up from 19.00 Kirton Recreation Ground	Andy Gibbs chairman@oasi.org.uk Martin Richmond-Hardy newbourne@oasi.org.uk	**Star Party** on Kirton Recreation Ground in support of KATCAG https://www.kirtontrimleycag.com/blog
7 March 10:00–17:30 Cottingham, near Hull	https://britastro.org/meetings/2020	*BAA Back to Basics Workshop.*
9 March	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.
14 March Sheffield, The Diamond	https://britastro.org/meetings/2020	*BAA Deep Sky Section Meeting,*
23 March	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.19:30 Sky Notes + talk at 19:45 by Andy Gibbs on “Poppy” Northcott (former NASA flight cntroller.
25 March 17:00–20:00 Institute of Physics, 37 Caledonian Road, London, N1 9BU	https://britastro.org/meetings/2020	*BAA Special General Meeting,.* Grant Privett “Monitoring Variable Nebulae” Dr Andreu Font Ribera “Studying the expansion of the Universe across time” Sky Notes: Richard McKim

OASI @ Newbourne

Martin Richmond-Hardy newbourne@oasi.org.uk

We normally meet at Newbourne Village Hall, Mill Lane, IP12 4NP on the 2nd and 4th Mondays (with a few exceptions).

OASI @ Newbourne is a good place to start for beginners. If you are thinking of buying a scope or binoculars, come and try before you buy and talk to owners about the strengths and weaknesses of particular models. If you’ve already splashed the cash, bring your new scope along to use or for advice on setting-up and adjustment. All welcome, with or without telescopes. We would like visitors to join OASI to enjoy the full benefits of membership.

There are also **Stargazers’ Guide (Sky Notes), Astronomy Workshops and the Book Swap.**

OASI@Newbourne Meetings

13 Jan	27 Jan (S+B)	10 Feb	24 Feb (T+S+B)
9 March	23 March (T+S+B)	13 April	27 April (S+B)
4 May[*]	25 May (B/H) (S+B)	8 Jun	22 Jun (S+B)

We open up for all meetings at 7pm. Star Guide (S) at 7:30pm and Workshops (W) at 7:45pm. B = Book Swap night (see below).

* 1st Monday due to Parish Council meeting on 2nd Monday

Stargazer's Guide

On the last meeting each month Bill Barton FRAS will give a short presentation of what can be viewed in the following 4 weeks plus a reminder of OASI events.

Astronomy Workshops/Informal talks

Contact Mike Whybray **Location: Newbourne Village Hall IP12 4NP**

Doors open at 7:00pm. **Workshops start at 7:45pm**

If you are a new OASI member, or haven't been to one of these informal workshops before, they are a mixture of events of different characters including beginners talks, interactive workshops, films, etc., suitable for all. They are also a chance to chat with other members over a cup of tea and a biscuit, in a venue rather warmer than the observatory dome on a winter's night!

Given a clear night, we can make use of the field for a workshop or continue afterwards with some observing.

- 24 Feb: Paul: *3000 Years of Eclipses Visible from Orwell Park Observatory*.
- 23 March: Andy: *Frances "Poppy" Northcutt (former NASA flight controller)*.
- Paul: *Wartime Astronomy*, date 13 July TBC.

Paul Whiting, Bill Barton and James Appleton have offered to lead workshops as follows:

- Paul: *Galaxy Collisions*, date TBA.
- Bill: *Celestial Coordinates*, date TBA. New members at Newbourne have requested this workshop; Bill is willing to lead it but will defer if anyone else would rather do so.
- James: *Update on OASI All-Sky Meteor Cameras*, date TBA.

Do you have a subject you could workshop? You could do a short one, or share the effort with a partner. Drop Mike Whybray a line! workshops@oasi.org.uk

Lecture Meetings

Contact: Peter Richards lectures@oasi.org.uk

We have an exciting and interesting set of lectures by guest speakers for the Autumn.

There is a new venue for lectures this year which is:

St Augustine's Church Hall
Bucklesham Road
Ipswich IP3 8TH.

The start time for all talks will be 8pm and, as usual, the talks will be held on Friday evenings.

OASI Guest Speaker Lectures

TBA

OASI Outreach

Otley College Star Party

Venue: Otley College Charity Lane Date: Monday 6th January 2020 Setup time: 19:00
Event time: 19:30 to 21:00

Directions

- Travel to Otley College on the B1078, either via Henley or through Witnesham and Swilland.
- Turn right at Charity Lane. The lane is signposted to Grundisburgh
- Meet outside the College block as shown on the map. The red X marks the location.
- Do not go to the main college car park

A decision on the weather will be made on the preceding Friday or Saturday about a go or no go. If it is cancelled an alternative date will arranged in March or April.

The College block should screen out most of the sites lights. However there are some additional lights on the side of this building, enquires will be made to turn these off. There is a large concrete area here.

Refreshments should be available afterwards if required.

OASI members: Please can you let us know, if you are willing to help out, with or without a telescope.

Kirton Star Party

OASI – Orwell Astronomical Society (Ipswich) – will be holding a Star Party on Kirton Recreation Ground on 29 February from 7:30pm. This is in support of KATCAG and the concern over light pollution from planned industrial development in adjacent Trimley.

If the evening is cloudy there will be talks and demonstrations of astronomy kit in the Pavilion.

Given a clear sky you can view the Moon, Venus, the Dog star (Sirius), a lion (Leo), a red giant, double stars, nebulae and galaxies through our telescopes.

If you have binoculars or a telescope, please bring them along.

Remember to wrap up warm!

OASI members: Please can you let us know, if you are willing to help out, with or without a telescope.

Other local astronomy society meetings

Athaneum Astro Society

www.3a.org.uk/index.htm

We meet fortnightly on Thursdays, from 7.30pm, at our dark-sky site in the Walled Garden at Nowton Park, just outside Bury St Edmunds. If you're planning on joining us for the first time, please contact us in advance, just to make sure the meeting is going ahead. We recommend that you wear warm clothing (even summer nights can be chilly, especially when the skies are clear!) and bring a flask, or insulated mug, for a warm drink. We have tea and coffee-making facilities on-site. Events are listed here http://www.3a.org.uk/events.htm

LYRA Lowestoft & Yarmouth Regional Astronomers

www.lyra-astro.co.uk

LYRA Programme and Local Events 2019 – All talks (unless other wise stated) will commence at 7.30pm in the Coach House Room at Parkhill Hotel, just outside Oulton Village on the B1375 (Oulton Broad to Gt. Yarmouth Road) NR32 5DQ

All Talks £2.50 For Non Members

DASH Astro

Darsham And Surrounding Hamlets http://dash-astro.co.uk

Meetings are held at New Darsham Village Hall and all DASH Astro observing sessions will take place at WESTLETON COMMON. ASOG observing sessions and locations may be arranged at the time of observation.

Unless stated all group meetings will take place from 7:30 pm. on Sundays

Note * Guest Speaker Evenings - Admission Fees:- Members Free, Non Members £ 2:00

Meetings are now on Sundays.

12 Jan*	**Meeting:- Mike Poxon – Variable Stars**
18 Jan	Outreach:- Family Stargazing Evening at Dunwich Heath N.T. Site 6-9pm
26 Jan	Dash Observing Session (Sunset 16:27 Moonset 18:04 2.8% Moon)
09 Feb	**Meeting:- Prof. Michael Rowan-Robinson – Lost Time – When giants roamed the Earth.**
15 Feb	Outreach:- Suffolk Science Festival – Bury St. Edmunds.
23 Feb	Dash Observing Session (Sunset 17:19 Moonset 17:01 0.2% Moon)
08 March*	**Meeting:- Dr. Paul Whiting – Galaxy Collisions**
22 March	Dash Observing Session (Sunset 18:10 Moonset 15.59 3.5% Moon)
05 April	Meeting:- Talk T.B.C.
26 April	Dash Observing Session (Sunset 20:11 Moonset 23:57 11.3% Moon) Late one?
10 May*	**Meeting:- AGM plus talk by Amy Rankine from I of A, Active Galactic Nuclei**
24 May	Solar Observing - Location TBA
14 June	Outreach:- International SUNday - Location Dunwich Heath
25- July	(Saturday) DASH Summer Social (Members and Guests only)
06 Sept	**Meeting:- Ian Lomas - Quantum Mechanics for Beginners**
13 Sept	Dash Observing Session (Sunset 19:14 Moonset 17:46 21.5% Moon)
19&20 Sept	Outreach:- Henham Steam Rally. Solar Observing and Displays
04 Oct*	**Meeting:- Stewart Moore – Globular Clusters**
18 Oct	Dash Observing Session (Sunset 17:50 Moonset 18:57 4.7% Moon)
01 Nov	Meeting:- Talk T.B.C.
15 Nov	Dash Observing Session (Sunset 15:59 Moonset 16.21 0.2% Moon)
29 Nov	Meeting:- Talk T.B.C.
12- Dec	(Saturday) DASH Christmas Social (Members and Guests only)

Additional Dates for your diary.

15th -23rd February 2020	Haw Wood Spring Star Party (T.B.C.)
25th & 26th April 2020	Kelling Heath Spring Star Party
September 2020	Kelling Heath Autumn Star Party
Oct-Nov 2020	Haw Wood Autumn Star Party

BAA news

The BAA Christmas Lecture and meeting is available on YouTube. The session gets under way 8.5 minutes in at https://www.youtube.com/watch?v=A8a_BsPN5uw

BAA meetings in January – April

25 January	14:00 – 18:00 BAA Meeting, London – Institute of Physics, 37 Caledonian Road, London, N1 9BU. Fred Nye "Latitude movements of solar prominences 2010–2017". Dr Julian Onions "A universe from scratch" Sky Notes: Philip Jennings.
7 March	10:00–17:30 Back to Basics Workshop, Cottingham, near Hull
14 March	Deep Sky Section Meeting, Sheffield, The Diamond.
25 March	17:00–20:00 Special General Meeting, Institute of Physics, 37 Caledonian Road, London, N1 9BU. Grant Privett "Monitoring Variable Nebulae" Dr Andreu Font Ribera "Studying the expansion of the Universe across time" Sky Notes: Richard McKim
3 April	19:00 The 2020 Winchester weekend at Sparsholt College, Winchester
25 April	One Day Spring Meeting - Nottingham

For full details of all meetings please go to https://britastro.org/meetings

SPA Meeting

Saturday 25 January 2020, 2-5 pm. Gustave Tuck Lecture Theatre, University College, London. (details here)

Prof Stephen Serjeant (Open University)

Stephen will give his Presidential address on Citizen science and the Data Avalanche. Astronomy and particle physics have begun a new data-rich era of discovery, from finding warps in space and time to new particles in accelerators. But the data avalanche is so fast, so large and so complex that it's a challenge for computing. Humans are still often much better than artificial intelligence (AI) at classification tasks.

Stephen will show us how SPA members and Young Stargazers can join in with such projects. Our members have a genuine and valuable participation to make in scientific discovery.

Following this, Robin Scagell will give his guide to What's Up in the sky in the next three months, and will then speak about Tycho Brahe and his legacy. Tycho is well known for his observations, made before the invention of the telescope, which were used by Kepler to formulate his planetary laws. His story is a fascinating one, and he was one of the most colourful personalities in astronomy. Robin's talk shows how Tycho achieved such accuracy, and what spurred him on to carry them out.

The Night Sky in January 2020

Martin RH

All event times (**UTC**) are for the location of Orwell Park Observatory 52.0096°N, 1.2305°E

Moon

Source: http://heavens-above.com/moon.aspx

New Moon	1st Quarter	Full Moon	Last Quarter
	03 January 04:45	10 January 19:21	17 January 12:5
24 January 21:42			

Sun, Moon and planets

Source: http://heavens-above.com/PlanetSummary.aspx **Times for 31 Oct are GMT (UTC)**.

Object	Date	Rise	Set	Mag.	Notes
Sun	1	08:03	15:54		
	31	07:38	16:40		
Moon	1	11:32	22:39		Apogee 02 Jan 01:31 and 29 Jan 21:28 Perigee 13 Jan 20:22
	31	10:26	23:44		
Mercury	1	07:58	15:11	-0.8	Superior conjunction 10 Jan
	31	08:22	17:49	-1	
Venus	1	10:03	18:45	-3.9	
	31	09:06	20:21	-4	
Mars	1	04:45	13:10	1.6	
	31	04:37	12:14	1.4	
Jupiter	1	07:55	15:28	-1.7	
	31	06:23	14:02	-1.7	
Saturn	1	08:47	16:41	0.5	
	31	07:01	15:02	0.6	
Uranus	1	12:12	02:18	5.7	
	31	10:14	00:21	5.8	
Neptune	1	10:56	21:48	7.9	
	31	09:00	19:54	7.9	

Paul's Astronomy Podcast for January

Paul Whiting FRAS Podcast, January 2020 www.oasi.org.uk/2020_01_pod.mp3

Occultations during January 2020

James Appleton

The table lists occultations during the month under favourable circumstances. The data relates to Orwell Park Observatory, but will be similar at nearby locations.

The events should be readily visible in small telescopes or binoculars. The first two columns list the date and time (UT) of the occultation. Column three gives the phenomenon: 'D' denotes a disappearance and 'R' a reappearance. The table lists circumstances of disappearances and reappearances as dictated by the visibility of each phenomenon (determined by altitude, lunar phase, etc). Column four details the lunar phase ('+' for waxing and '-' for waning). Columns five and six give the altitude of the Sun and the star, both in degrees. (A negative solar altitude means that the Sun is below the horizon.) Columns seven and eight provide the star's magnitude and catalogue number.

The data relates to Orwell Park Observatory, but will be similar at nearby locations.

Please note that **times are shown in UTC**.

Date	Time (UT)	D/R	Lunar Phase	Sun Alt(º)	Star Alt(º)	Mag	Star
03 Jan	17:50:44	D	0.55+	-17	40	7.5	Hip 6013
03 Jan	18:06:06	D	0.55+	-19	40	7.3	Hip 6000
04 Jan	20:35:12	D	0.65+	-41	42	6.8	ZC 306
06 Jan	18:09:32	D	0.82+	-19	44	7.3	Hip 16985
09 Jan	17:06:11	R	0.99+	-9	18	2.9	13 Gem, μ Gem
	17:51:22	R		-16	25		

See page 14 for James' Lunar Occultation Report for 2020.

Meteor showers

Source: BAA Handbook 2020 p100-101

Shower	Normal limits	Maximum	ZHR at Max	Notes
Quadrantids	Dec. 28 – Jan. 12	Jan. 4d 09h	80+	High activity, but with a rather narrow peak. Good in 2014. Bright events leave persistent trains. Quite favourable.

For radio observation, use reflections from Graves radar on 143.050MHz or the Brams transmitter in Belgium on 49.97MHz.

Astronomy on the radio

Bill Barton's Radio Broadcast

ICRFM (Ipswich Community Radio) 105.7 MHz at about 08:25 in the morning of the first Wednesday of each month. I aim to cover what there is to see in the sky and then a little bit on something topical. ICRFM is also available to listen to over the Internet and there is a listen again option on their website. http://www.icrfm.com

David Murton's Radio Broadcast

On 1st Tuesday of the month, 1.40pm on the Lesley Dolphin show on BBC Radio Suffolk – now digital (channel 10c) and FM 103.9 (Ipswich), 104.6 (west Suffolk), 95.5 (Lowestoft), 95.9 (Aldeburgh) and the internet. https://www.bbc.co.uk/radiosuffolk

Visible ISS passes ≥15º max altitude

Martin RH

Source: http://heavens-above.com/PassSummary.aspx?satid=25544

Times are UTC. Predictions are approximate (19 Dec) due to craft adjustments. Check the day before.

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Jan	-3.9	06:05:59	46°	W	06:06:51	85°	S	06:10:11	10°	E
02 Jan	-2.5	05:19:16	40°	E	05:19:16	40°	E	05:21:33	10°	E
02 Jan	-3.4	06:52:09	14°	W	06:54:53	57°	SSW	06:58:09	10°	ESE
03 Jan	-3.7	06:05:26	46°	W	06:06:15	70°	SSW	06:09:35	10°	ESE
04 Jan	-2.4	05:18:42	40°	ESE	05:18:42	40°	ESE	05:20:57	10°	E
04 Jan	-2.7	06:51:35	13°	W	06:54:08	34°	SSW	06:57:11	10°	SE
05 Jan	-3.2	06:04:51	39°	WSW	06:05:33	46°	SSW	06:08:44	10°	SE
06 Jan	-2.2	05:18:08	34°	SE	05:18:08	34°	SE	05:20:12	10°	ESE
06 Jan	-1.8	06:51:01	11°	W	06:53:12	19°	SW	06:55:37	10°	S
07 Jan	-2.5	06:04:20	26°	SW	06:04:41	26°	SSW	06:07:31	10°	SSE
08 Jan	-1.7	05:17:41	22°	SSE	05:17:41	22°	SSE	05:19:10	10°	SE
09 Jan	-1.5	06:03:58	14°	SSW	06:03:58	14°	SSW	06:05:24	10°	S
22 Jan	-2	18:38:30	10°	SSW	18:40:26	23°	S	18:40:26	23°	S
23 Jan	-1.9	17:50	10°	S	17:52	19°	SE	17:53:43	16°	ESE
23 Jan	-1.1	19:25:36	10°	WSW	19:26:37	18°	WSW	19:26:37	18°	WSW
24 Jan	-3.1	18:36:51	10°	SW	18:39:50	44°	S	18:39:50	44°	S
25 Jan	-2.7	17:48:12	10°	SW	17:51:16	33°	SSE	17:53:00	20°	E
25 Jan	-1.4	19:24:24	10°	WSW	19:25:52	24°	WSW	19:25:52	24°	WSW
26 Jan	-3.8	18:35:31	10°	WSW	18:38:52	69°	SSE	18:38:59	68°	SSE
27 Jan	-3.4	17:46:41	10°	WSW	17:49:59	56°	SSE	17:52:05	20°	E
27 Jan	-1.6	19:23:15	10°	W	19:24:57	27°	W	19:24:57	27°	W
28 Jan	-3.9	18:34:19	10°	W	18:37:41	85°	S	18:38:01	71°	E
29 Jan	-3.7	17:45:23	10°	WSW	17:48:45	78°	SSE	17:51:04	18°	E
29 Jan	-1.8	19:22:04	10°	W	19:23:57	30°	W	19:23:57	30°	W
30 Jan	-3.8	18:33:06	10°	W	18:36:29	83°	S	18:37:00	61°	ESE
31 Jan	-3.8	17:44:08	10°	W	17:47:31	87°	S	17:50:05	16°	E
31 Jan	-2	19:20:51	10°	W	19:22:58	33°	WSW	19:22:58	33°	WSW

Starlink passes

https://heavens-above.com/AllPassesFromLaunch.aspx

Lunar Occultations During 2020

James Appleton

Introduction

During 2020, there are more than 500 lunar occultations potentially visible from East Anglia, although many involve faint stars. The tracks of four grazing occultations cross the region during the year. No lunar occultations of planets are visible from the region during the year.

This article summarises circumstances of the best occultations during the year. It provides details for the location of Orwell Park Observatory; differences will in general be negligible for locations throughout East Anglia.

Predictions below are calculated as follows:

- Details of total occultations are calculated from software based on algorithms in Astronomy on the Personal Computer by O. Montenbruck and T Pfleger, Springer-Verlag, 1994.
- Circumstances of grazes are calculated from the package Occult (version 4.8.0.0), created by Australian amateur David Herald.

Occultations of bright stars

Table 1 lists occultations during the year, of stars brighter than magnitude 6.0, where circumstances are favourable. The events should be readily visible in small telescopes or binoculars. The first two columns of the table list the date and time (UT) of the occultation. Column three specifies the phenomenon: 'D' denotes a disappearance and 'R' a reappearance. The table lists circumstances of D and/or R as dictated by the visibility of each phenomenon (determined by altitude, lunar phase, etc). Column four details the lunar phase (positive for waxing and negative for waning). Columns five and six give the altitude of the Sun and the star, both in degrees. (A negative solar altitude means that the Sun is below the horizon.) Columns seven and eight provide the star's magnitude and catalogue number.

Date	UT	D/R	Lunar Phase	Sun Alt (°)	Star Alt (°)	Mag	Star
09 Jan	17:06:11	D	0.99+	-9	18	2.9	13 Gem, μ Gem
	17:51:22	R		-16	25		
04 Feb	21:41:19	D	0.77+	-44	53	5.3	106 Tau
05 Feb	23:55:10	D	0.86+	-54	46	5.9	ZC 928
06 Feb	02:14:15	D	0.86+	-46	26	3.3	7 Gem, η Gem
	03:04:34	R		-40	18		
07 Feb	21:19:28	D	0.97+	-40	54	5.3	10 Cnc, μ^2 Cnc
08 Feb	03:53:44	D	0.98+	-32	27	5.8	ZC 1250
29 Feb	20:47:15	D	0.31+	-30	26	5.6	ZC 454
	21:50:52	R		-37	16		
29 Mar	19:22:55	D	0.24+	-10	38	3.5	74 Tau, ε Tau
	20:31:10	R		-19	28		
30 Mar	22:50:32	D	0.34+	-32	17	4.9	114 Tau
	23:26:32	R		-33	12		
03 May	21:29:02	D	0.82+	-15	44	4.0	3 Vir, v Vir
	22:16:04	R		-19	41		
05 May	21:06:27	D	0.96+	-13	29	5.7	80 Vir
15 Aug	02:41:41	D	0.18-	-15	20	5.8	3 Gem, PU Gem
	03:39:56	R		-9	29		

Date	UT	D/R	Lunar Phase	Sun Alt (°)	Star Alt (°)	Mag	Star
13 Sep	02:07:49 02:47:45	D R	0.23-	-27 -23	18 24	5.9	ZC 1161
27 Sep	21:14:22	D	0.85+	-31	19	4.5	39 Cap, ε Cap
30 Sep	23:42:42	D	0.99+	-41	32	4.4	30 Psc, YY Psc
21 Oct	18:23:12	D	0.31+	-15	8	2.8	22 Sgr, λ Sgr
11 Nov	05:29:15 06:33:08	D R	0.21-	-15 -6	33 40	4.0	3 Vir, v Vir
22 Nov	20:52:52	D	0.56+	-45	18	5.7	69 Aqr, τ^1 Aqr
22 Nov	22:12:39	D	0.57+	-54	10	4.1	71 Aqr, τ^2 Aqr
29 Nov	19:14:20	D	1.00+	-31	32	5.9	ZC 593
11 Dec	05:14:38 06:17:31	D R	0.16-	-23 -14	14 21	5.5	95 Vir
18 Dec	18:33:04	D	0.20+	-24	9	5.7	37 Cap
21 Dec	19:54:43 21:05:44	D R	0.48+	-37 -47	27 19	4.4	30 Psc, YY Psc
21 Dec	22:02:12	D	0.49+	-54	13	4.6	33 Psc, BC Psc
24 Dec	18:16:40	D	0.75+	-21	42	5.6	64 Cet
24 Dec	19:36:13	D	0.75+	-34	47	4.4	65 Cet, ξ^1 Cet
27 Dec	21:17:16	D	0.95+	-48	57	5.8	HU Tau

Table 1. Occultations of stars brighter than magnitude 6.0.

Nights with many occultation events

During the year, the Moon traverses some rich star fields. When this happens, many occultations can occur during a short period. Table 2 lists the evenings throughout the year when the Moon occults 10 or more stars. (Figures for early morning events are included with those of the previous evening, if any.) The large numbers of occultations during late April are associated with the passage of the Moon through the rich star fields of Gemini.

Date, no of occs	Date, no of occs	Date, no of occs	Date, no of occs
27 Feb, 12	03 Mar, 10	29 Mar, 13	30 Mar, 10
01 Apr, 19	26 Apr, 12	27 Apr, 40	28 Apr, 13
27 May, 13	---	---	---

Table 2. Nights with many occultations.

Grazing occultations

The tracks of four grazing occultations cross East Anglia during the year. Table 3 summarises the circumstances. Columns one and two give the date and time of the graze and column three specifies the lunar limb involved. Column four indicates the distance between Orwell Park Observatory and the closest point on the track, on land. Column five details the lunar phase (positive for waxing, negative for waning); column six the altitude of the Sun (a negative solar altitude means that it is below the horizon); and columns seven and eight the altitude and azimuth of the star. (Azimuth is taken in the order N → E → S → W). Columns nine and ten specify the star and its magnitude.

Date	Time (UT)	Limb	Dist OPO (km)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Star Azi (°)	Mag	Star
14 Feb	01:19	S	16	0.70-	-49	18	132	6.6	ZC2008
27 Feb	18:37	S	22	0.14+	-11	24	243	7.4	H7156
15 Aug	02:43	N	2	0.18-	-15	20	78	8.2	T1877-1004-1
07 Nov	02:30	N	5	0.65-	-41	51	123	6.3	ZC1208

Table 3. Grazing lunar occultations.

Note: on 15 August and 07 November the graze track pass within a few km on Orwell Park Observatory. Unfortunately, in both cases, the tracks pass south of the Observatory, and there is no convenient observing location in the immediate vicinity of the latter.

Figure 1 illustrates the tracks of the grazing occultations through East Anglia. Further information, including plots of the tracks in Google Earth, is on the OASI web site: http://www.oasi.org.uk/Occs/Occs.php.

Figure 1. Graze tracks, colour coding as follows:

14 February: green 27 February: red 15 August: blue 07 November: white.

James Appleton

Two comets in 2020

Mike Harlow

There are dozens of comets moving around the solar system at any one time but most are too faint to be of interest to amateur astronomers. Of those that are bright enough to be within amateur range in 2020, two are of particular interest to me.

Comet C/2017 T2 (PanSTARRS) is very well placed high in the northern sky for the first half of the year. Comet 29P/Schwassmann-Wachmann is a very different type of comet that shows frequent outbursts and is well worth monitoring.

C/2017 T2 (PanSTARRS)

Discovered in October 2017 when a long way from the Sun, over 9AU, it was thought this comet could be the next really bright one. Unfortunately, that didn't turn out to be the case but it is still a nice object for imaging. It is also very well placed for Northern hemisphere observers.

My first image of the comet was on 29th November 2019 when it was just 3 degrees west of Capella in Auriga. Figure 1 shows the comet and a foreground Apollo asteroid, number 99248, which just happened to be passing at the time!

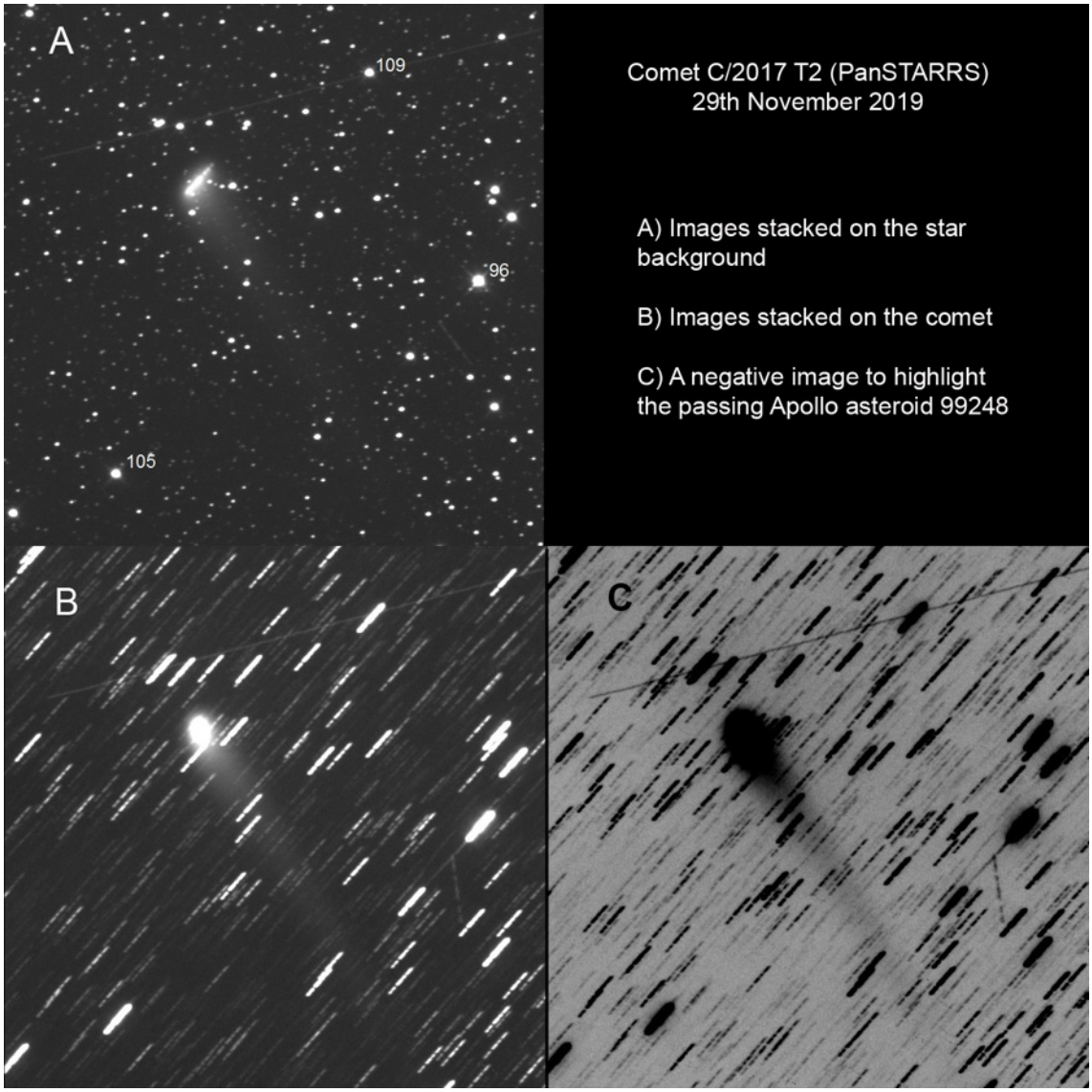


Figure 1. Comet 2017 T2 (PanSTARRS) on 29th November 2019. Field of view 16 x 16 arc minutes for each pane. 12 inch F/3.6 astrograph, 47 x 30 seconds with CCD and luminance filter.

In January, the comet is high up in northern Perseus and heading to meet the famous 'Double Cluster' on 26-27th January. From there, it starts to loop back and head towards Ursa Major where it encounters M81 and M82 on 24th May. Figure 2 shows a screen shot from Guide 7.0 planetarium program showing the comet and the galaxies. The circle is 3 degrees across matching the view in my finderscope.

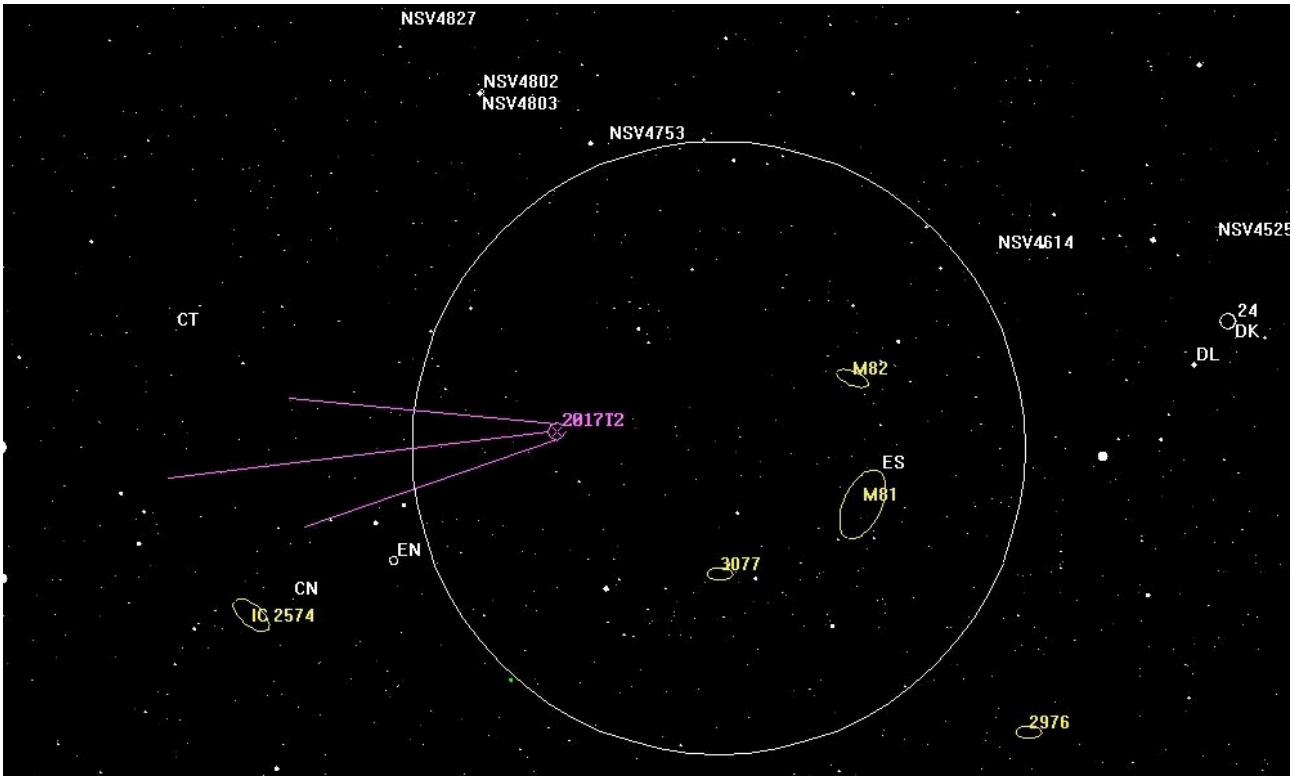


Figure 2. Simulated view of comet 2017 T2 (PanSTARRS) near M81 and M82 on 24th May 2020

The comet then moves south during June, July and August before becoming too low to view. A map of its path and the orbital elements of the comet are given in reference **[1]**.

The comet reaches perihelion on 4th May at a distance of 1.6AU from the Sun and 1.7AU from the Earth when it should be almost 10 times brighter than in figure 1 above.

Comet 29P/Schwassmann-Wachmann

An unusual comet in that the orbit is only slightly elliptical and with a period of 14.8 years is always further away from the Sun than Jupiter. This means it is usually quite faint, near magnitude 14, but it does undergo quite frequent outbursts when it can brighten significantly to nearer magnitude 10. I did image it some years ago but it gradually moved into the southern sky out of range of my telescope. Now however, it has moved north again and will be well placed for many years. Again, reference **[1]** has maps of its track (from 2012 to 2027) and the orbital elements for planetarium programs.

Figure 3 is an image I took back in 2008 and shows the typical, almost circular form of the coma, with a bright nucleus.

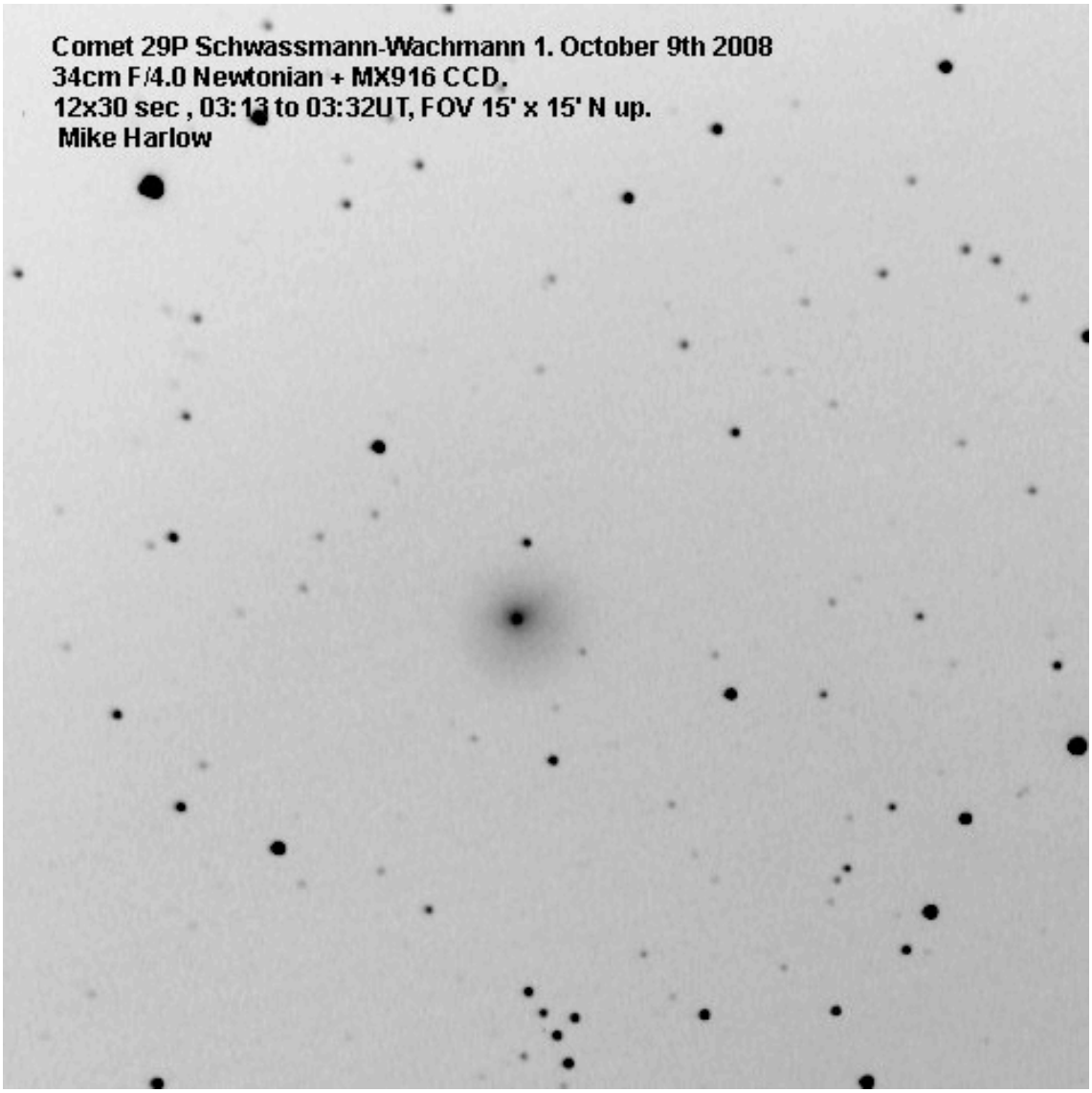


Figure 3. Negative image of comet 29P on October 9th 2008. Field of view 15 x 15 arc minutes.

Richard Miles of the BAA has studied 29P extensively over many years and regularly takes images with the Las Cumbres Observatory (LCO) network **[2]**. All images from the network are freely available to download and process as long as LCO is credited if the results are used in any publications.

Comet 29P is currently in Pisces just 4.5 degrees south-east of gamma Pegasi, so it is well placed in the south as darkness falls.

For details on other comets visible in 2020, Jonathan Shanklin has written a summary of those of interest to amateurs in the December 2019 British Astronomical Association Journal **[3]**. The article also shows a nice sequence of images by Damian Peach of 29P in outburst.

References

1. Seiichi Yoshida's comet web site has orbital elements and maps for all observable comets.
   2017 T2 page at: http://www.aerith.net/comet/catalog/2017T2/2017T2.html
   29P page at: http://www.aerith.net/comet/catalog/0029P/2019.html
2. Las Cumbres Observatory web page: https://observe.lco.global/
   To search for images of the comet use the “filter list” option with the “username” as “richard_miles” or put “29P” in the “Name Contains” field.
3. “*Comet prospects for 2020*”, J. Shanklin, BAAJ volume 129, number 6 pages 362-363.

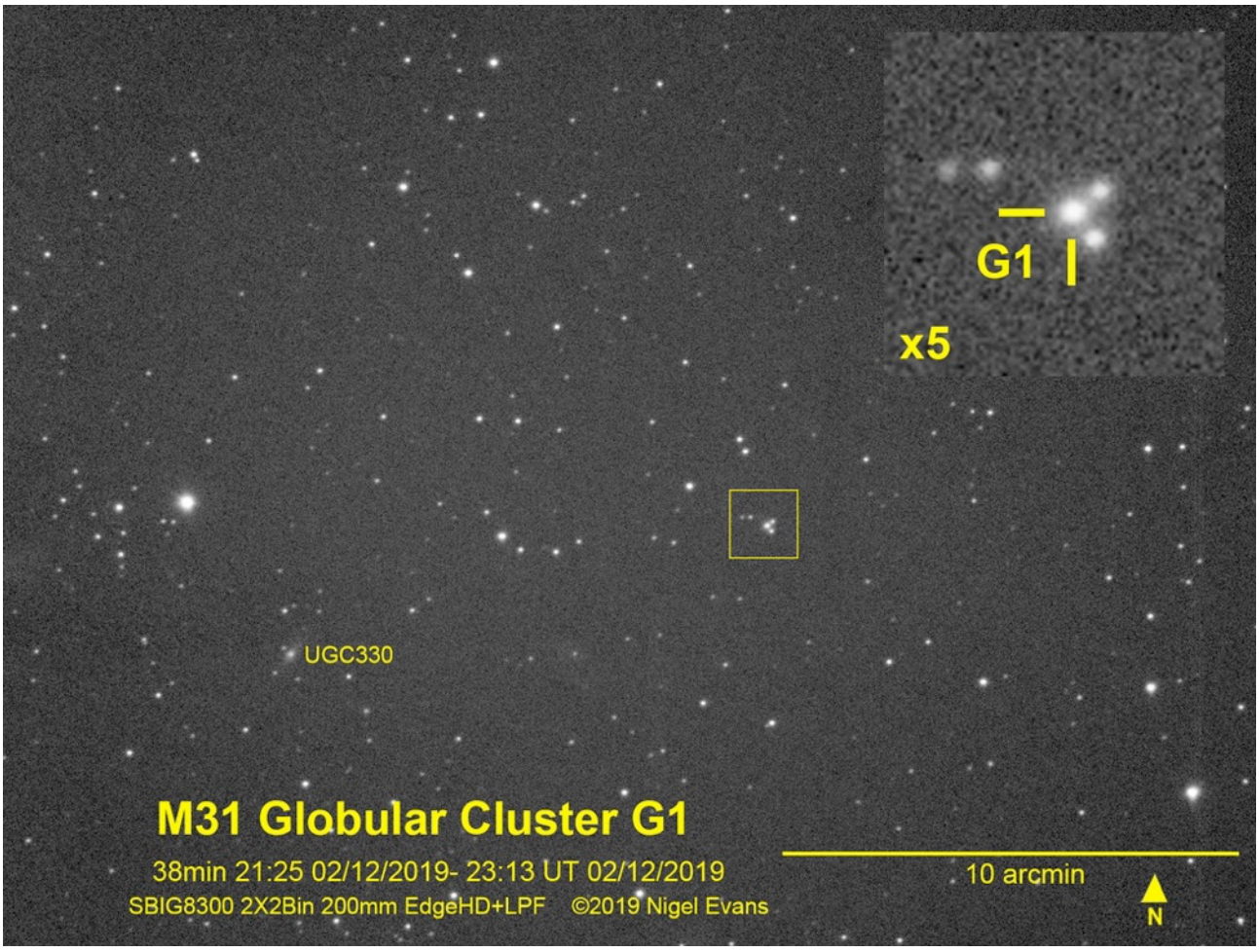
The weather has been pretty grim recently but I did manage to records some things.

Nigel Evans

While we are familiar with globular clusters around our own galaxy, Omega Centauri, M13 etc, what about other galaxies?

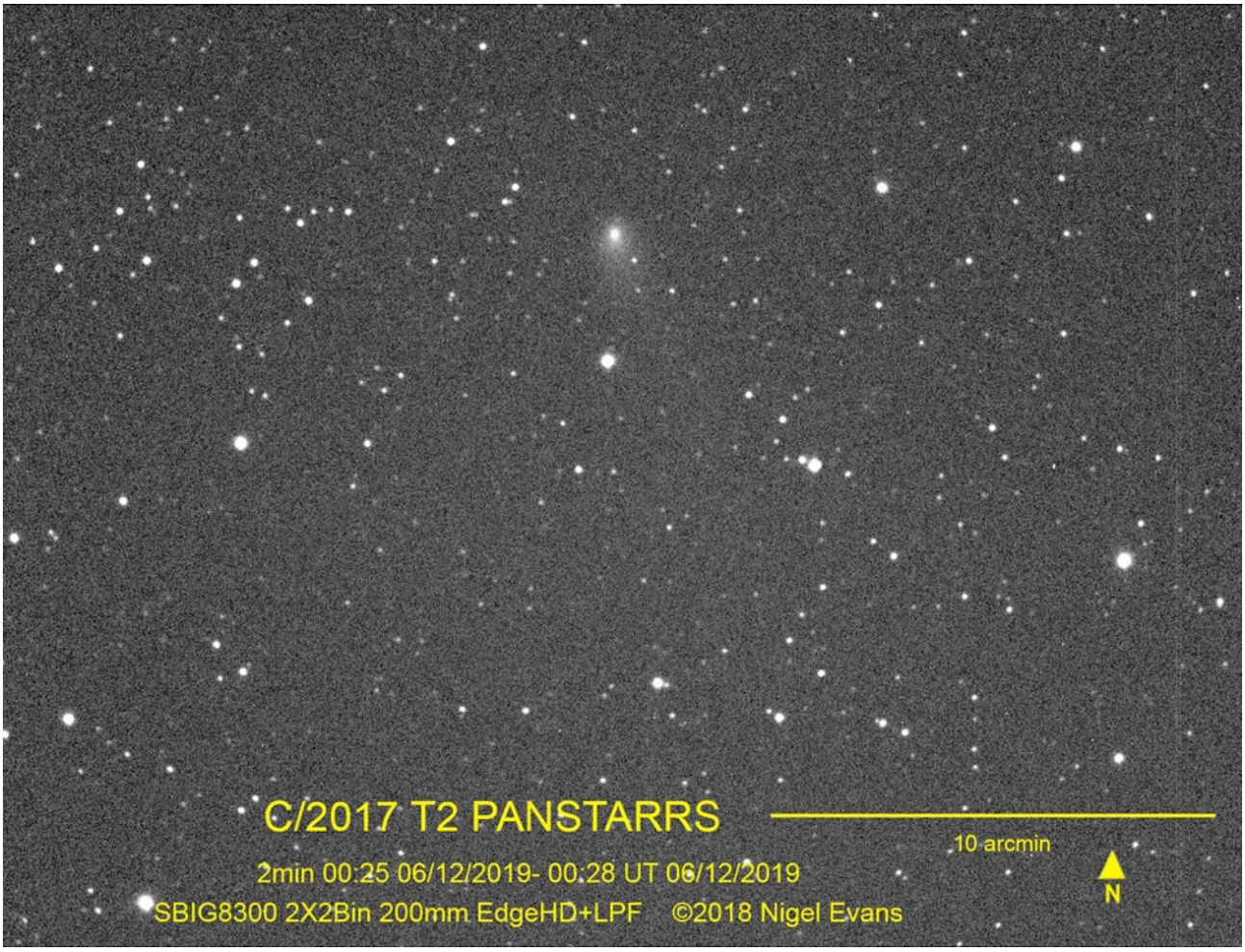
M31

With M31 high up it presented an ideal opportunity to look there. Obviously I did not scan the skies hoping to stumble upon small versions of M13 - I found a reference to extra galactic globular clusters in Sue French's "Deep-Sky wonders". G1 is the brightest of M31's globular clusters, about 2.5 degrees from the centre - an image somewhat sharper than mine was APOD https://apod.nasa.gov/apod/ap981017.html !



C/2017 PANSTARRS

Still no naked eye comets so telescopic ones it is then. C/2017 PANSTARRS was recently well-placed very high up (~85degrees) around midnight. After hiding indoors from the cold weather for an hour while the telescope dutifully recorded the comet, I came out check how it was going. I was horrified - all the stellar images were doughnuts! With the telescope pointed up so high, the camera had spent the time slowly sliding out of the eyepiece holder by about 3mm. Only the first two images were sufficiently in focus to make the final image. :-(



Insight Investment Astronomy Photographer of the Year 2020 is coming soon!

https://www.rmg.co.uk/whats-on/astronomy-photographer-year

The world's greatest astrophotography competition will open for entries at midday on 13January 2020. Encourage your members to enter the competition for a chance for your society to win free tickets to the exhibition.

Entrants can submit up to 10 images for the chance to win huge cash prizes and see their image displayed in a major exhibition. For more details please visit rmg.co.uk/astrocomp.

We are also launching a brand new special prize: the Annie Maunder Prize for Image Innovation! This prize is open to entrants processing open source data (such as from the Hubble Space Telescope). More information, including video tutorials, is coming soon. In the meantime you can check out our rules or email us with any questions at astrophotocomp@rmg.co.uk.

It's easy to win free exhibition tickets for your society: just ask your members to enter your society name under 'How did you hear about this competition?' when they register. All societies listed will be entered into a draw to win 30 free exhibition tickets.

Deadline for entries is midday (GMT) on 6 March 2020.

James Webb revisited

Andy Willshere

I heard on the radio that the European space agency were considering a new space telescope CHEOPS, to go up in a few years time. They think that it will work well with the data that the James Webb telescope will produce. Over a year ago I did an small article about the James Webb, which has been updated and wondered whether anyone might be interested to read it, especially if they missed it first time around.

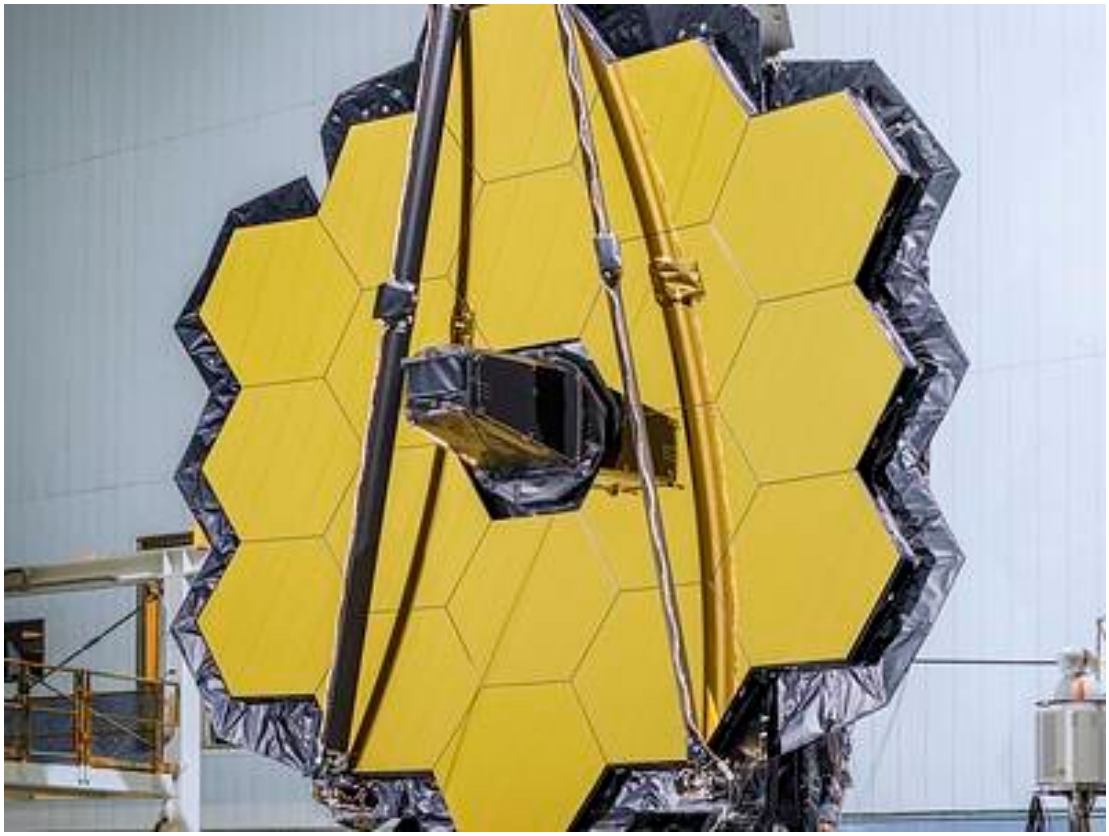
The European Space Agency to launch a new mission designed to study in depth newly found exoplanets.(CHEOPS: Characterising Exoplanet Satellite). It will work in conjunction with the James Webb Space Telescope.

This telescope is named after James.E.Webb who was the second administrator of NASA from February 14, 1961 until October 7 1968. He undertook the goal set by President Kennedy to put a man on the moon and to follow the Apollo program. It was on January 27, 1967, the Apollo-Saturn (AS) 204, was on the launch pad at Kennedy Space Center, Florida. It was going through some simulation tests, when a flash fire killed the three astronauts aboard--"Gus" Grissom, Edward White, and Roger Chaffee. Webb with the blessing of the American President Johnson left no stone unturned to find the cause of the disaster.

The James Webb is a new infrared space telescope now scheduled for launch via an Ariane rocket from French Guiana in 2012, and will be located near the Earth-Sun L2 Lagrangian point. This was discovered by Joseph Lagrange and is a position in space where orbital motions of a body and gravitational forces balance each other. The L2 point can be found 1.5 *106 km behind the Earth if it is viewed from the Sun, and is used by satellites to hover at this area, thus providing a very stable vantage point, staying in line with the Earth as it meanders around the Sun. It will take approximately 30 days for the JWT to get to the start of its orbit at L2 . It will initially be boosted from Earth by an Ariane rocket for about 8 minutes. The JWT will then detach from the Ariane launch vehicle after 30 minutes, and the solar array will be deployed at this point. The main partners for this telescope are NASA, the European Space Agency ESA and the Canadian Space Agency CSA.

Why do we need another observatory in the sky? We already have The Hubble, Spitzer and Chandra as well as many more, performing many exciting scientific experiments. However as the universe is expanding, light is distended into much longer wavelengths, pushing it beyond both visible and near infrared areas. It is therefore necessary for a telescope to operate at infrared wavelengths and for this the James Webb Space telescope was devised. This will make observation of distant galaxies whose light has been stretched into the infrared obtainable. Its mission goals are to search for the first galaxies or luminous objects just after the big bang, and to determine how galaxies evolved from formation to today, and to measure physical and chemical resources of planetary structures.

The telescope has a primary gold coated (1000 angstrom thick) beryllium mirror of 6.5 meter diameter (21.3 ft) which is much greater than Hubble's 2.4 meter diameter. This means that the collecting area of the James Webb is about seven times greater. It will be able to view infrared light from the most remote areas in the universe and find sources that created reionization. It will be launched by an Ariane 5 ECA launch vehicle with a total payload of 6200 Kg, for a period of 5 - 10 years. The mass of the primary mirror is 705Kg with each single segment weighing 20.1 Kg. With segment assembly this is 39.46 Kg. There are 18 hexagonal segments which will unfold when the telescope is in situ using precise micro- motors. Its wavelength coverage is 0.6 to 28.5 microns and its optical resolution is 0.1 arc seconds. Because the telescope will be viewing very faint infrared signals, a sunshield (SPF 1*106) is necessary to shield it from any bright and hot sources. (Sun, Earth etc). The size of the sunshield is 21.197m * 14.162 m. It is because these sources need to be located in the same direction that the L2 point was selected.



Credit for picture: https://www.nasa.gov/mission_pages/webb/images/index.html

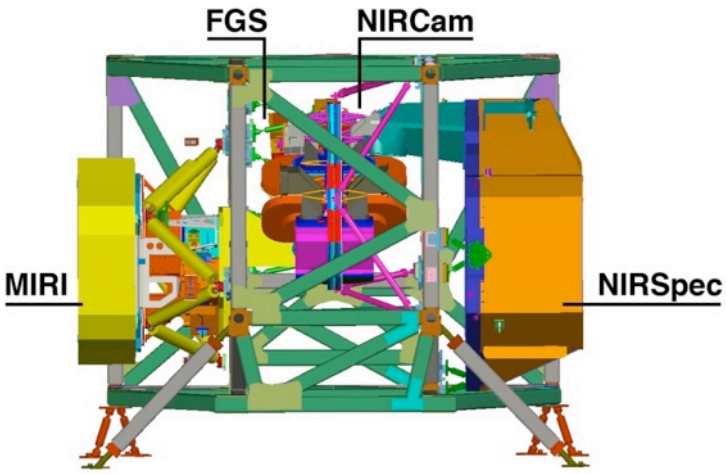
The instruments on board are:

NIRCam, a near infrared camera;

NIRSpec, a near Infrared spectrograph;

MIRI, a mid Infrared instrument;

FGS/NIRISS, Fine guidance sensors and near infrared imager with slitless spectrograph.



Labeled schematic of the ISIM for the James Webb Space Telescope, showing instrument locations.

Credit for picture: https://www.nasa.gov/mission_pages/webb/instruments/index.html

The wavelengths used by MIRI are from 4.9 to 28.8μm and are ideal for direct imaging and spectroscopy of juvenile warm exoplanets and investigating and analysing the redshifts (z>7) of first galaxies. It will also investigate dust and gas given off by protoplanetary disks.

The Near Infrared Camera (NIRCam) uses 0.6 to 5.0μm and has the ability to perform coronography at multiple wavelengths and slitless spectroscopy, as well as time series imaging. High-contrast imaging is used to identify faint source images detected close to bright point

sources. These brighter sources are usually stars and quasars. The faint ones include exoplanets. If normal imaging is used little can be seen of the faint source.

NIRISS will be used to present high - contrast interferometric imaging over wavelengths of 0.6 and 5.0μm. Although this unit is combined with the fine guidance sensor, the two instruments are used separately.

One of its proposed areas of investigation is in studying planets orbiting stars. If an exoplanet passes in front of its host star, filtration of starlight through the planets atmosphere occurs, absorbing specific colours of light that are contingent on the chemical composition. This absorption will be measured by the telescopes ability to obtain spectrographs and look for specific chemical fingerprints of the atmospheres gasses. Initially WASP- 39b and WASP-43b which are fairly easy targets for this procedure will be used.

The challenge from the engineering point of view to survive in very cold and mechanically stressing conditions was very difficult. The telescope is built at room temperatures and therefore must be precisely engineered, so that when all the parts shrink when in the cold environment, they all do so by the same amount. The stresses and strains placed upon the systems will be very large, without the problems associated with radiation from the Sun and galaxy.

References:

https://www.nasa.gov/mission_pages/webb/images/index.html

https://jwst.nasa.gov/science.html

https://www.space.com/21925-james-webb-space-telescope-jwst.html

The Fainting of the Nearby Red Supergiant Betelgeuse

Source: http://www.astronomerstelegram.org/?read=13341

ATel #13341; **E, F. Guinan, R. J. Wasatonic (Villanova Univ.) and T. J. Calderwood (AAVSO)**
on **8 Dec 2019; 03:57 UT**
Credential Certification: Edward Guinan (**edward.guinan@villanova.edu**)

Subjects: Infra-Red, Optical, Ultra-Violet, A Comment, Star, Variables

V-band and Wing TiO-band and Near-IR photometry of the semi-regular variable red supergiant, Betelgeuse (alpha Ori; M1.5 - M2.5 Iab) has been carried out over last 25+ years. This photometry was joined by complementary B & V photometry from T. Calderwood (AAVSO). Betelgeuse and Antares are the two nearest red supergiant core-collapse Type-II supernova (SN II) progenitors. Photometry from this season shows the star has been declining in brightness since October 2019, now reaching a modern all-time low of V = +1.12 mag on 07 December 2019 UT. Betelgeuse undergoes complicated quasi-periodic brightness variations with a dominant period of ~420 +/-15 days. But also Betelgeuse has longer-term (5 - 6 years) and shorter term (100 - 180 days) smaller brightness changes. Currently this is the faintest the star has been during our 25+ years of continuous monitoring and 50 years of photoelectric V-band observations. The light variations are complicated and arise from pulsations as well from the waxing and waning of large super-granules on the star's convective surface. Measures of Wing TiO-band (705 nm) and near-IR colors indicate that currently Betelgeuse has relatively strong TiO-bands and has a corresponding lower photospheric temperature of T~3580 K (relative to T~ 3660 K near maximum brightness- typically V ~ 0.2-0.3 mag). This is an opportune time to secure photometry, spectroscopy, spectropolarimetry and if possible interferometry and Adaptive Optics(AO) imaging. Betelgeuse is being frequently monitored during 2019/20 with HST by Andrea Dupree (CfA) as the leading part of the 2019/20 CfA MOB program (the.mob@cfa.harvard).

Editor's note: Two high resolution spectra are available in the BAA database covering Ca H,K and H alpha regions:–

https://britastro.org/specdb/data_graph.php?obs_id=5553

https://britastro.org/specdb/data_graph.php?obs_id=5554

OASI Annual General Meeting

Friday 17 January 2020, 8pm at Horley Spiritualist Church, 345 London Rd, Ipswich IP2 0BG

The church has ample parking but it can be a bit tricky to find. Satnav may be less than helpful!

Do not approach eastbound from the A12 into Ipswich as there is no right turn into the church.

As you leave Ipswich you will pass the Orwell Housing Association building on your left, next to it is the entrance to another building then the entrance to the church car park.

Google maps gives this satellite view.