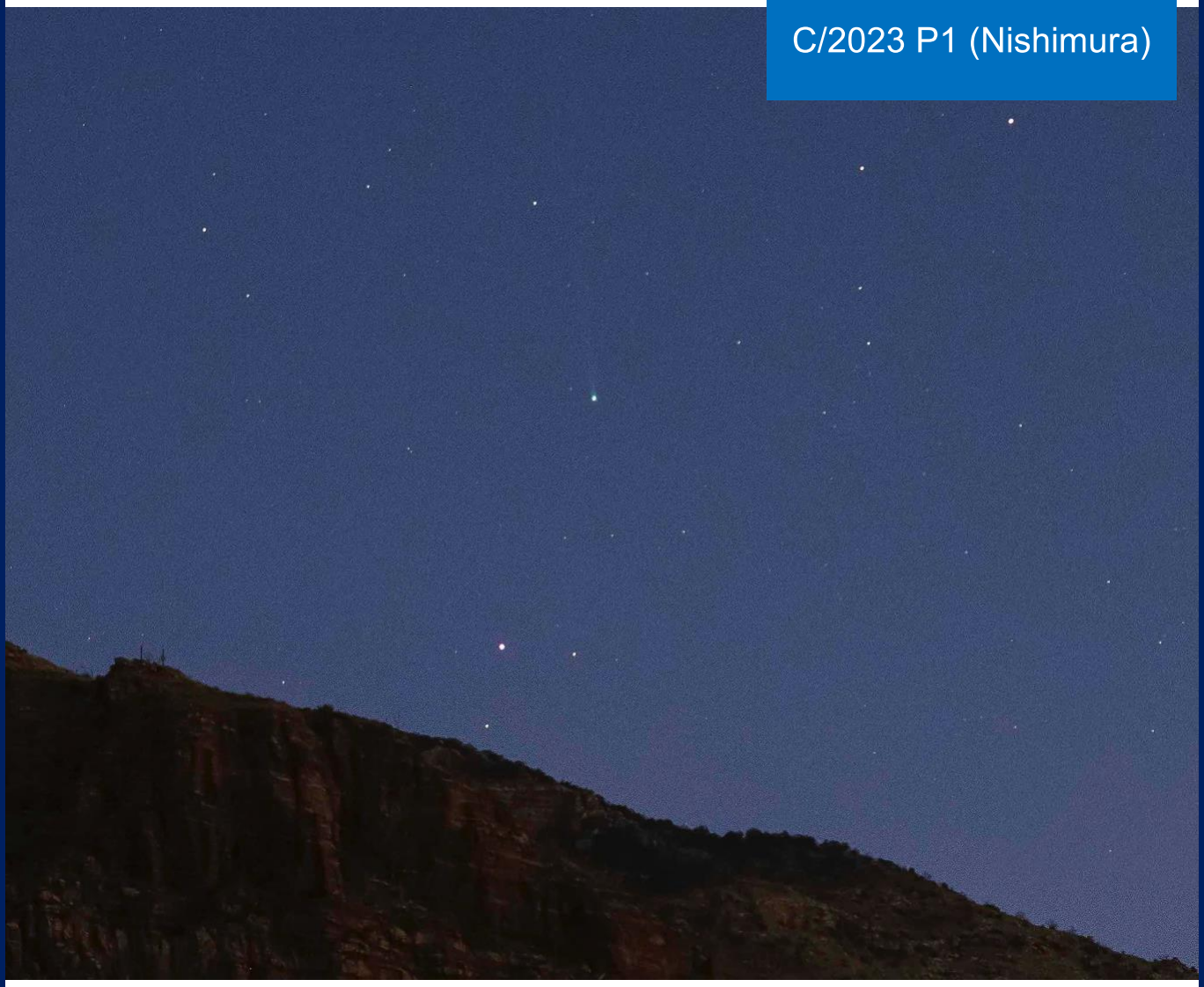
October 2023

ALPO Comet News

A Publication of the Comets Section of the Association of Lunar and Planetary Observers

C/2023 P1 (Nishimura)



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On the Front Cover:

This is one of my favorite images of C/2023 P1 (Nishimura). Not because it showed the most detail, or longest tail, but because it very closely matched my view of the comet in 10x50 binoculars. The image was taken by Eliot Herman as the Nishimura rose over the Tucson foothills on 2023 September 6. The image was captured with a Nikon Z7II and a Nikon 105 mm F1.4 lens.

The monthly ALPO Comet News PDF can be found on the ALPO Comets Section website (http://www.alpo-astronomy.org/cometblog/ and in the Comets Section Image Gallery). A shorter version of this report is posted on a dedicated Cloudy Nights forum (https://www.cloudynights.com/topic/894415-alpo-comet-news-for-october-2023/). All are encouraged to join the discussion over at Cloudy Nights. The ALPO Comets Section welcomes all comet-related articles, observations, images, drawings, magnitude estimates, or spectra. One does not have to be a member of ALPO to submit material, though membership is appreciated.

Please send your observations to the Comets Section at < comets@alpo-astronomy.org >, Coordinator Carl Hergenrother < carl.hergenrother@alpo-astronomy.org >, and/or Acting Assistant Coordinator Michel Deconinck < michel.deconinck@alpo-astronomy.org >.

To learn more about the ALPO, please visit us @ http://www.alpo-astronomy.org.

Summary

After the excitement of C/2023 P1 (Nishimura) last month, you might think October will be a little less eventful for comet watchers. While it is true that October won't deliver a 2nd to 4th magnitude comet like Nishimura was its brightest, there are a large number of comets expected to be brighter than 10th magnitude.

Short-period comets 2P/Encke and 103P/Hartley will be nice 7th to 8th magnitude objects in the morning sky. C/2023 H2 (Lemmon) is a bit of a wild card but could rival Encke and Hartley this month. One of next year's highlights is in the news again as 12P/Pons-Brooks has experienced yet another multi-magnitude outburst, though whether it will be brighter than 11th magnitude this month is still to be seen.

Last month the ALPO Comets Section received 244 observations of comets C/2023 P1 (Nishimura), C/2023 H2 (Lemmon), C/2023 E1 (ATLAS), C/2022 JK5 (PANSTARRS), C/2022 A2 (PANSTARRS), C/2021 X1 (Maury-Attard), C/2021 T4 (Lemmon), C/2021 S3 (PANSTARRS), C/2020 V2 (ZTF), C/2020 K1 (PANSTARRS), C/2017 K2 (PANSTARRS), 311P/PANSTARRS, 237P/LINEAR, 202P/Scotti, 126P/IRAS, 103P/Hartley, 30P/Reinmuth, 29P/Schwassmann-Wachmann, 13P/Olbers, 12P/Pons-Brooks, 2P/Encke. A big thanks to our August contributors: Dan Bartlett, Michel Besson, Denis Buczynski, Dan Crowson, Jose Guilherme de Souza Aguiar, Michel Deconinck, J. J. Gonzalez Suarez, Christian Harder, Scott Harrington, Carl Hergenrother, Eliot Herman, Michael Jäger, John Maikner, Gianluca Masi, Martin Mobberley, Mike Olason, Uwe Pilz, Ludovic Prebet, Michael Rosolina, Greg Ruppel, Chris Schur, Tenho Tuomi, and Chris Wyatt.

Request for Observations

As always, the Comet Section is happy to receive all comet observations, whether textual descriptions, images, drawings, magnitude estimates, or spectra. Please send your observations via email to the Comets Section < comets @ alpo-astronomy . org >, Comets Section Coordinator Carl Hergenrother < carl.hergenrother @ alpo-astronomy . org > and/or Comets Section Acting Assistant Coordinator Michel Deconinck < michel.deconinck @ alpo-astronomy . org >.

Photometric Corrections to Magnitude Measurements

We include lightcurves for the comets discussed in these reports and apply aperture and personal corrections to the visual observations and only personal corrections to digital observations. Though we try to keep these lightcurves up to date, observations submitted a few days before publication may not be included.
All magnitude estimates are affected by many factors, including instrumental (aperture, focal length, magnification, type of optics), environmental (sky brightness due to moonlight, light pollution, twilight, aurora activity, zodiacal light, etc.), cometary (degree of condensation, coma color, strength and type of gas emission lines, coma-tail interface) and personal (sensitivity to different wavelengths, personal technique, observational biases). The first correction used here corrects for differences in aperture [Charles S. Morris, On Aperture Corrections for Comet Magnitude Estimates. Publ Astron Soc Pac 85, 470, 1973]. Visual observations are corrected to a standard aperture of 6.78 cm by 0.019 magnitudes per centimeter for reflectors and 0.066 magnitudes per centimeter for refractors. After applying the aperture correction and if a sufficient number of visual observations are submitted for a particular comet, we also determine personal corrections for each observer for each comet; for digital observations, only a personal correction is applied. A single observer submitting both visual and digital magnitude measurements may also have separate corrections for each observing method. If the magnitudes shown in the text don't match those plotted in the lightcurves, it is because of the application of these corrections.

Acknowledgments

In addition to observations submitted directly to the ALPO, we occasionally use data from other sources to augment our analysis. Therefore, we acknowledge with thanks observations submitted directly to the ALPO and those submitted initially to the International Comet Quarterly, Minor Planet Center, and COBS Comet Observation Database. In particular, we have been using observations submitted to the COBS site by Thomas Lehmann for our analysis and would like to thank Thomas for his COBS observations. We would also like to thank the Jet Propulsion Laboratory for making their Small-Body Browser and Orbit Visualizer available and Seiichi Yoshida for his Comets for Windows programs that produced the lightcurves and orbit diagrams in these pages. Last but not least, we'd like to thank Syuichi Nakano and the Minor Planet Center for their comet orbit elements, the asteroid surveys and dedicated comet hunters for their discoveries, and all of the observers who volunteer their time to add to our knowledge of these fantastic objects.

Thank you to everyone who contributed to the ALPO Comets Section!

Clear skies!
- Carl Hergenrother

Comets Calendar

Lunar Phases

Oct 06 - Last Quarter Moon
Oct 14 - New Moon
Oct 21 - First Quarter Moon
Oct 28 - Full Moon

Comets at Perihelion

Oct 08 - P/2022 R1 (PANSTARRS) [q = 3.57 au, 19.2-yr period, V ~ 18, discovery apparition]
Oct 09 - 365P/PANSTARRS [q = 1.36 au, 5.7-yr period, V ~ 20, will be 3rd observed return, close to Sun at perihelion]
Oct 12 - 103P/Hartley [q = 1.06 au, 6.5-yr period, V ~ 7, discovered in 1985, 7th observed return, visited by Deep Impact/EPOXI spacecraft in 2010, also approached 0.12 au from Earth in 2010 when it reached 5th mag, more below]
Oct 22 - 2P/Encke [q = 0.34 au, 3.3-yr period, V ~ 5, this is its 65th observed return, more below]
Oct 23 - 310P/Hill [q = 2.42 au, 8.5-yr period, V ~ 18, discovered in 2006, also seen at 2015 and current return]
Oct 29 - C/2023 H2 (Lemmon) [q = 0.89 au, V ~ 7-8, dynamically old long-period comet last at perihelion 3500 years ago, more below]

Photo Opportunities

Oct 02-04 - C/2023 E1 (ATLAS) passes within a deg of the bright PN NGC 7293 (Helix Nebula)
Oct 05 - C/2020 V2 (ZTF) passes within 10' of the 12th mag galaxy NGC 491
Oct 12 - 103P/Hartley passes only arc minutes from the bright PN NGC 2392 (Eskimo Nebula)
Oct 13-14 - C/2023 H2 (Lemmon) passes 0.5 deg of the bright galaxy M106
Oct 14 - C/2020 V2 (ZTF) passes within 20' of bright galaxy NGC 300 (Southern Pinwheel Galaxy)
Oct 14-15 - C/2023 H2 (Lemmon) passes 10' of the 11th mag galaxy NGC 4346
Oct 26 - C/2020 V2 (ZTF) orbit plane crossing – a good time to look for anti-tails and dust trails
Oct 29 - C/2021 S3 (PANSTARRS) orbit plane crossing
Oct 31 - C/2023 H2 (Lemmon) orbit plane crossing

Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)		Mag	SC	APER T	FL	POW	COMA Dia	COMA DC	TAIL LENG	TAIL PA	ICQ CODE	Observer Name
C/2023 P1 (Nishimura)													
2023P1	2023 09 23.90	M	4.6	TK	8.0B		20	1	8			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023P1	2023 09 23.90	S	4.5	TK	8.0B		20	1	8			ICQ XX SOU01	Willian Souza
2023P1	2023 09 23.89	M	4.5	TK	10.0B		25	2	7			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023P1	2023 09 23.89	S	4.5	TK	10.0B		25	1	8			ICQ XX SOU01	Willian Souza
2023P1	2023 09 21.36	&M	4.0	TK	25.0L	5	40		8			ICQ XX WYA	Christopher Wyatt
2023P1	2023 09 20.89	M	3.8	TK	10.0B		25	1.5	7			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023P1	2023 09 20.09	Z	2.9		2.5R	4a	090					ICQ xx OLAaa	Mike Olason
2023P1	2023 09 18.80	I	2.5	TK	20.3T	10	77	0.2	8			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023P1	2023 09 18.09	Z	2.3		2.5R	4a	090					ICQ xx OLAaa	Mike Olason
2023P1	2023 09 10.16	B	4.4	S	5.0B		7		6	3.5	250	ICQ XX DEC	Michel Deconinck
2023P1	2023 09 09.51	Z	4.6		5.0R	4a	300	6				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 09.50	aS	4.3	TK	5.0B		10	3	7/			ICQ xx HER02	Carl Hergenrother
2023P1	2023 09 08.51	Z	4.6		5.0R	4a	300	7				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 07.50	Z	5.2		5.0R	4a	300	7				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 07.49	aS	5.1	TK	5.0B		10	4	7	0.5	310	ICQ xx HER02	Carl Hergenrother
2023P1	2023 09 07.43		5.2		6.0B		12					ICQ xx HARaa	Scott Harrington
2023P1	2023 09 06.50	Z	5.6		5.0R	4a	200	7				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 06.49	aS	5.3	TK	5.0B		10	5	6/	0.5	310	ICQ xx HER02	Carl Hergenrother
2023P1	2023 09 06.40		5.2		7.0B		15	9	7/			ICQ xx ROSaa	Michael Rosolina
2023P1	2023 09 06.11	S	4.9:TI		7.0B		16	2.5	7	15	m300	ICQ XX HAR11	Christian Harder
2023P1	2023 09 05.49	Z	5.9		2.5R	4a	300	7				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 05.48	S	5.6	TK	5.0B		10	3	7			ICQ xx HER02	Carl Hergenrother
2023P1	2023 09 05.17	S	5.5	TK	5.0B		10	3	7/	0.8	300	ICQ XX GON05	Juan Jose Gonzalez Suarez
2023P1	2023 09 05.16	S	5.7	TK	8.0B		20	3	6/	0.8	300	ICQ XX GON05	Juan Jose Gonzalez Suarez
2023P1	2023 09 05.14	S	5.4	S	5.0B	7	7					ICQ XX DEC	Michel Deconinck
2023P1	2023 09 05.12	S	5.5	S	12.6B	5	39	5	6/	25	m250	ICQ XX DEC	Michel Deconinck
2023P1	2023 09 04.48	Z	6.1		5.0R	4a	150	6				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 04.43		6.2		6.0B		12					ICQ xx HARaa	Scott Harrington
2023P1	2023 09 03.48	S	6.0	TK	5.0B		10	4	6/			ICQ xx HER02	Carl Hergenrother
2023P1	2023 09 03.48	Z	6.2		5.0R	4a	150	6				ICQ xx OLAaa	Mike Olason
2023P1	2023 09 02.42		6.8		6.0B		12					ICQ xx HARaa	Scott Harrington
2023P1	2023 08 29.48	Z	7.4		5.0R	4a	300	5		>1.2	283	ICQ xx OLAaa	Mike Olason
2023P1	2023 08 25.48	Z	8.0		6.6R	6a	60	5				ICQ xx OLAaa	Mike Olason
2023P1	2023 08 15.48	Z	10.6		6.6R	6a	10	2				ICQ xx OLAaa	Mike Olason
C/2023 H2 (Lemmon)													
2023H2	2023 09 26.15		-[10.5	S	12.6B	5	25					ICQ XX DEC	Michel Deconinck
2023H2	2023 09 24.19	S	8.9	TK	20.3T	10	77	12	1/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 09 18.83	S	9.3	TK	20.3T	10	100	7	1/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 09 16.81	S	12.5	TI	53.1L		139	1.5	2/			ICQ XX HAR11	Christian Harder
2023H2	2023 09 15.83	S	12.5	TI	53.1L		139	1.8	2/			ICQ XX HAR11	Christian Harder
C/2023 E1 (ATLAS)													
2023E1	2023 09 24.00	S	10.2	TK	20.3T	10	77	10	2			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023E1	2023 09 23.90	S	10.7	TI	29.8L	4	108	2.5	1/			ICQ XX HAR11	Christian Harder
2023E1	2023 09 18.68	xM	11.3	AQ	40.0L	4	59	6.8	3/			ICQ XX WYA	Christopher Wyatt
2023E1	2023 09 17.99	M	11.1	TK	30.0L	5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023E1	2023 09 17.01	M	11.0	TK	30.0L	5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023E1	2023 09 16.83	S	12.0	TI	53.1L		111	3	1			ICQ XX HAR11	Christian Harder
2023E1	2023 09 16.47	xS	10.5	TK	40.0L	4	59	6	3			ICQ XX WYA	Christopher Wyatt
2023E1	2023 09 16.09	M	10.8	TK	30.0L	5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023E1	2023 09 15.87	S	11.9	TI	53.1L		111	4	1			ICQ XX HAR11	Christian Harder
2023E1	2023 09 13.85	S	9.6	TK	20.3T	10	100	10	2/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023E1	2023 09 13.10	M	10.5	TK	30.0L	5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023E1	2023 09 12.08	M	10.5	TK	30.0L	5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023E1	2023 09 09.84	S	10.3	TI	53.1L		111	4.5	1/			ICQ XX HAR11	Christian Harder
2023E1	2023 09 09.45	xS	10.2	TK	40.0L	4	59	8.6	3/			ICQ XX WYA	Christopher Wyatt
2023E1	2023 09 08.84	S	10.8	TI	53.1L		111	6.5	2			ICQ XX HAR11	Christian Harder
2023E1	2023 09 06.84	S	10.6	TI	35.3L		105	5	2			ICQ XX HAR11	Christian Harder
2023E1	2023 09 05.83	S	9.8	TI	35.3L		105	5	2			ICQ XX HAR11	Christian Harder
C/2022 JK5 (PANSTARRS)													
2022JK5	2023 09 18.69	xM	14.0	AQ	40.0L	4	182	1.2	4/			ICQ XX WYA	Christopher Wyatt
2022JK5	2023 09 16.47	xM	14.7	AQ	40.0L	4	182	1	6			ICQ XX WYA	Christopher Wyatt
2022JK5	2023 09 12.19	M	13.7	AQ	30.0L	5	121	1	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2022JK5	2023 09 09.45	xM	13.7	AQ	40.0L	4	182	1.1	6			ICQ XX WYA	Christopher Wyatt
C/2022 A2 (PANSTARRS)													
2022A2	2023 09 18.68	xM	12.8	AQ	40.0L	4	108	1.4	4/			ICQ XX WYA	Christopher Wyatt
2022A2	2023 09 17.30	M	12.8	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar

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   2022A2  2023 09 16.48 xM 12.6 AQ 40.0L 4  59   2.5  5/          ICQ XX WYA   Christopher Wyatt
   2022A2  2023 09 16.31  M 12.8 AQ 30.0L 5 121   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022A2  2023 09 15.88  S 11.7 TI 53.1L   111   3.5  2           ICQ XX HAR11 Christian Harder
   2022A2  2023 09 13.31  M 12.6 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022A2  2023 09 12.31  M 12.6 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022A2  2023 09 09.46 xM 12.7 AQ 40.0L 4 108   2.1  6           ICQ XX WYA   Christopher Wyatt
   2022A2  2023 09 08.88  S 11.4 TI 53.1L   139   3.5  2           ICQ XX HAR11 Christian Harder
   2022A2  2023 09 06.83  S 11.8 TI 35.3L   122                    ICQ XX HAR11 Christian Harder
   2022A2  2023 09 05.83  S 12.0 TI 35.3L   122   2.2  1           ICQ XX HAR11 Christian Harder
C/2021 X1 (Maury-Attard)
   2021X1  2023 09 18.69 xM 14.6 AQ 40.0L 4 108   1.3  4           ICQ XX WYA   Christopher Wyatt
   2021X1  2023 09 16.49 xS 14.5 AQ 40.0L 4 182   0.5  3/          ICQ XX WYA   Christopher Wyatt
C/2021 T4 (Lemmon)
   2021T4  2023 09 15.90  M 11.7 AQ 30.0L 5  88   2    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021T4  2023 09 11.90  M 11.4 AQ 27.0L 5  90   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021T4  2023 09 09.44 xM 11.5 AQ 40.0L 4  59   2.9  3/          ICQ XX WYA   Christopher Wyatt
C/2021 S3 (PANSTARRS)
   2021S3  2023 09 16.35  M 12.3 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 13.34  M 12.5 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 12.34  M 12.5 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 11.35  M 12.7 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
C/2020 V2 (ZTF)
   2020V2  2023 09 26.16  O  9.0 S  12.6B 5  25   6.5  2           ICQ XX DEC   Michel Deconinck
   2020V2  2023 09 24.13  M 10.3 AQ 30.0L 5  88   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 24.01  S  9.9 TK 20.3T10  77   3.5  4/          ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 09 20.13  M 10.4 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 20.46  S 10.1 TK 12.5B    30   3    2           ICQ xx HER02 Carl Hergenrother
   2020V2  2023 09 18.70 xM 10.2 TK 40.0L 4  59   3    6  18   m  3 ICQ XX WYA   Christopher Wyatt
   2020V2  2023 09 17.13  M 10.4 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 17.00  S 10.5:TI 53.1L    81   3    4           ICQ XX HAR11 Christian Harder
   2020V2  2023 09 16.48 xM 10.9 AQ 40.0L 4  59   6    6   3.5 m335 ICQ XX WYA   Christopher Wyatt
   2020V2  2023 09 16.15  M 10.3 AQ 30.0L 5  88   1    2/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 16.03  S  9.6 TI 53.1L   111   3    4           ICQ XX HAR11 Christian Harder
   2020V2  2023 09 15.15  M 10.3 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 14.05  S  9.6 TK 20.3T10  77   3.5  5           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 09 13.20  M 10.2 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 12.20  M 10.2 AQ 30.0L 5  88   1    2/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
C/2020 K1 (PANSTARRS)
   2020K1  2023 09 18.71 xM 14.0 AQ 40.0L 4 182   0.8  4/          ICQ XX WYA   Christopher Wyatt
   2020K1  2023 09 16.45 xM 13.4 AQ 40.0L 4 108   1    4/          ICQ XX WYA   Christopher Wyatt
   2020K1  2023 09 16.35  M 13.5 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020K1  2023 09 12.35  M 13.5 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020K1  2023 09 12.35  M 13.4 AQ 30.0L 5 121   1    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020K1  2023 09 09.43 xS 13.4 AQ 40.0L 4 108   1    3           ICQ XX WYA   Christopher Wyatt
C/2017 K2 (PANSTARRS)
   2017K2  2023 09 26.14  -[ 9.9 S  12.6B 5  25                    ICQ XX DEC   Michel Deconinck
   2017K2  2023 09 18.72 xM 13.9 AQ 40.0L 4 182   0.9  6           ICQ XX WYA   Christopher Wyatt
   2017K2  2023 09 16.34  M 13.6 AQ 30.0L 5 100   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 09 13.32  M 13.4 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 09 12.32  M 13.3 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
311P/PANSTARRS
311        2023 09 17.31  C 20.9 BG 30.5H 4E400                    ICQ XX MAI01 John Maikner
237P/LINEAR
237        2023 09 05.82  S 13.1 TI 35.3L   176   0.7  3           ICQ XX HAR11 Christian Harder
202P/Scotti
202        2023 09 21.28  C  -   BG 30.5H 4C600                    ICQ XX MAI01 John Maikner
126P/IRAS
126        2023 09 15.89  S 14.3 TI 53.1L   155   0.5  3           ICQ XX HAR11 Christian Harder
103P/Hartley
103        2023 09 27.14  S  8.8 TI 19.8L 5  40   9    2/          ICQ XX HAR11 Christian Harder
103        2023 09 26.16  O  8.9 S  12.6B 5  25   5.5  5           ICQ XX DEC   Michel Deconinck
103        2023 09 26.14  S  8.7 TI 19.8L 5  40   8    2/          ICQ XX HAR11 Christian Harder
103        2023 09 26.12  S 11.1 TK 32.0L 5  80   4    2                  PIL01 Uwe Pilz
103        2023 09 25.48  S  9.0 TK 12.5B    30   6    3           ICQ xx HER02 Carl Hergenrother
103        2023 09 25.02  S  8.8 TI 29.8L 4  79   6.5  3           ICQ XX HAR11 Christian Harder
103        2023 09 24.34  M  9.9 TK 30.0L 5  88   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 24.02  S  8.7 TK 20.3T10  77   7    3/          ICQ XX GON05 Juan Jose Gonzalez Suarez
103        2023 09 23.92  S  9.8 TI 29.8L 4  79   5    2           ICQ XX HAR11 Christian Harder
103        2023 09 20.47  S  9.9 TK 12.5B    30   5    3           ICQ xx HER02 Carl Hergenrother
103        2023 09 20.33  M 10.1 TK 30.0L 5  88   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 18.72 xM 10.6 AQ 40.0L 4  59   5    3           ICQ XX WYA   Christopher Wyatt
103        2023 09 17.33  M 10.2 TK 30.0L 5  88   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 16.94  S 10.3 TI 53.1L   111   5    3           ICQ XX HAR11 Christian Harder
103        2023 09 15.94  S 10.2 TI 53.1L   111   5    2/          ICQ XX HAR11 Christian Harder
103        2023 09 15.47  S  9.8 TK 12.5B    30   3    3           ICQ xx HER02 Carl Hergenrother
103        2023 09 13.96  S 10.1 TK 20.3T10  77   5    2/          ICQ XX GON05 Juan Jose Gonzalez Suarez
```

```
103        2023 09 13.32  M 10.3 TK 30.0L 5  88   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 12.33  M 10.4 TK 30.0L 5  88   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 11.33  M 10.4 TK 30.0L 5  88   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 09.92  S 10.3 TI 29.8L 4  79   3.5  2           ICQ XX HAR11 Christian Harder
103        2023 09 08.90  S 10.5 TI 53.1L   139   3.5  2/          ICQ XX HAR11 Christian Harder
103        2023 09 06.85  S  -   TI 35.3L   122   3.8  2           ICQ XX HAR11 Christian Harder
30P/Reinmuth
 30        2023 09 21.25  C 18.7 BG 30.5H 4A500                    ICQ XX MAI01 John Maikner
29P/Schwassmann-Wachmann
 29        2023 09 18.76 &I[14.3 AQ 40.0L 4 261                    ICQ XX WYA   Christopher Wyatt
13P/Olbers
 13        2023 09 21.35  C 20.9 BG 30.5H 4A740                    ICQ XX MAI01 John Maikner
12P/Pons-Brooks
 12        2023 09 23.98  S 11.6 AQ 20.3T10 100   6    0/          ICQ XX GON05 Juan Jose Gonzalez Suarez
 12        2023 09 16.82  S 14.2 TI 53.1L   139   1.2  2/          ICQ XX HAR11 Christian Harder
 12        2023 09 15.85  S 14.3 TI 53.1L   155   0.75 2/          ICQ XX HAR11 Christian Harder
 12        2023 09 14.02  S 11.5 AQ 20.3T10 100   6    0/          ICQ XX GON05 Juan Jose Gonzalez Suarez
2P/Encke
  2        2023 09 27.13  S  9.0 TI 19.8L 5  40   3.5  4           ICQ XX HAR11 Christian Harder
  2        2023 09 26.13  S  9.5 TK 32.0L 5  80   5    7                  PIL01 Uwe Pilz
  2        2023 09 26.13  S  9.0 TI 19.8L 5  40   4.5  4           ICQ XX HAR11 Christian Harder
  2        2023 09 26.13  O  8.2 S  12.6B 5  23   4.5  3           ICQ XX DEC   Michel Deconinck
  2        2023 09 25.48  S  9.4 TK 12.5B    30   2.5  5           ICQ xx HER02 Carl Hergenrother
  2        2023 09 24.20  S  8.9 TK 20.3T10  77   6    3           ICQ XX GON05 Juan Jose Gonzalez Suarez
  2        2023 09 20.47  S  9.6 TK 12.5B    30   3    4           ICQ xx HER02 Carl Hergenrother
  2        2023 09 20.33  M 10.9 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 18.77 &S 10.5 TK 40.0L 4  59   2.8  3           ICQ XX WYA   Christopher Wyatt
  2        2023 09 17.33  M 11.2 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 16.33  M 11.2 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 15.47  S 10.2 TK 12.5B    30   2    3           ICQ xx HER02 Carl Hergenrother
  2        2023 09 14.12  S 10.4 TK 20.3T10  77   5    2           ICQ XX GON05 Juan Jose Gonzalez Suarez
  2        2023 09 13.33  M 11.5 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 12.33  M 11.5 AQ 30.0L 5  88   1    2/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 11.32  M 11.7 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Comets News

New Discoveries and Recoveries

P/2023 S1 – This currently designated, but unnamed, comet was reported by the Pan-STARRS project on 2023 September 20 at 20th magnitude. Earlier observations had also been reported to the MPC in the preceding week by the Mount Lemmon Survey, both Pan-STARRS telescopes, and T. Maroti with a 0.28-m f/2.2 reflector on Sept. 20.0 at Csokako, Hungary.

P/2023 S1 arrives at perihelion on 2025 February 26 at 2.63 au (the comet is currently at 3.7 au from the Sun). Though its orbit is uncertain, S. Nakano reports that the comet is capable of making very close approaches to Jupiter and may have passed very close to Jupiter in June 2021, though the actual miss distance is still highly uncertain. Regardless, it looks likely that S1 was on a very different, and probably distant, orbit prior to its 2021 encounter with Jupiter. [CBET 5296, MPEC 2023-S264]

2023 RN3 – MPEC 2023-R115 reported the discovery by the ATLAS 0.5-m on Haleakala of an 18th magnitude stellar object on a cometary orbit. 2023 RN3 was at perihelion on 2022 December 5 at 4.99 au. Its orbit carries it out to 17.3 au with a 37-year orbital period. It would not surprise me if future observations detect cometary activity on RN3. [MPEC 2023-R115]

C/2023 R2 (PANSTARRS) – A 20th magnitude comet with a small perihelion distance was found with the Pan-STARRS2 1.8-m on Haleakala on 2023 September 10. Perihelion will be at a distance of only 0.91 au from the Sun on 2024 April 12. Unfortunately, the comet will be located within 15-20 degrees of the Sun when at its brightest, which currently is only predicted to be around 12th magnitude. [CBET5301, MPEC 2023-T7]

C/2023 R1 (PANSTARRS) – This 20th magnitude comet was found on 2023 September 7 with the Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala. Now, at a distant 8 au from the Sun, C/2023 R1 will more than halve that distance when it arrives at perihelion in April 2026 at 3.57 au. A peak brightness near 18th magnitude may be reached in mid-2026. [CBET 5293, MPEC 2023-R197]

C/2023 Q1 (PANSTARRS) – This time, it was the Pan-STARRS1 1.8-m Ritchey-Chretien reflector at Haleakala that found this comet. C/2023 Q1 was a faint 22nd magnitude when found on 2023 August 20. It should peak around 15th magnitude at the time of its 2024 December 2 perihelion at 2.58 au. [CBET 5300, MPEC 2023-T8]

P/2023 KF3 = P/2010 YK3 – An apparently asteroidal object discovered by the Mount Lemmon Survey 1.5-m on 2023 May 24 at 20th magnitude was reported by D. Rankin at Mount Lemmon and other follow-up observers as a comet. P/2023 KF3 was linked with 2010 YK3, a 19th magnitude LINEAR asteroidal discovery from December 2010. K. Ly found additional unrecognized Pan-STARRS observations from late 2010. The updated orbit allowed a further linkage to a single-night object observed by the Spacewatch 0.9-m in June 1996 at 20th magnitude.

During the current return, P/2023 KF3 is at perihelion on 2023 December 20 at 2.12 au. This month should see the comet at its peak brightness of 16th magnitude. [CBET 5292, MPEC 2023-R42]

Comets Between Magnitude 6 and 10

C/2023 P1 (Nishimura)

Discovered 2023 August 12 by amateur Hideo Nishimura with a DSLR and telephoto lens

Orbit (from Minor Planet Center, MPEC 2023-S260)

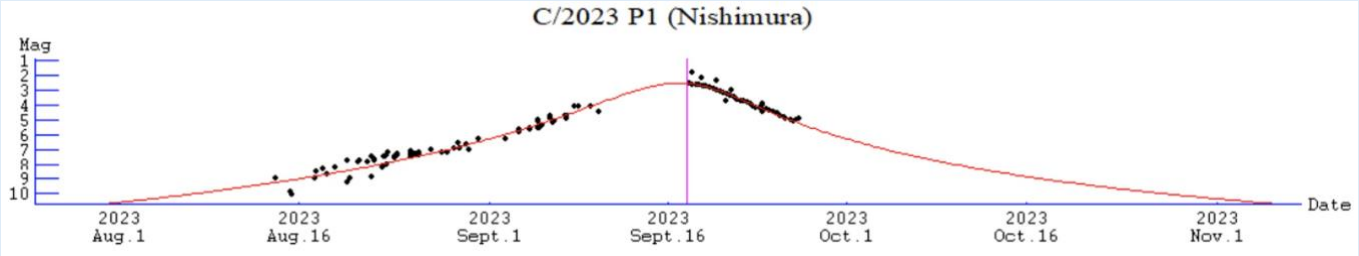
```
    C/2023 P1 (Nishimura)
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2023 Sept. 17.64164 TT                                  Rudenko
q   0.2251519           (2000.0)            P               Q
z  +0.0174593      Peri.  116.29890     +0.38229178     -0.62774686
 +/-0.0000119      Node    66.83403     -0.85524025     -0.51822609
e   0.9960690      Incl.  132.47732     +0.34988156     -0.58084043
From 680 observations 2023 Jan. 19-Sept. 10, mean residual 0".7.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2023 P1 (Nishimura)                                                Max El
                                                                      (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag  40N  40S
2023-Oct-01  12 56  -14 25    0.491   1.403     13E   Vir   6.3    0    0
2023-Oct-06  12 56  -18 28    0.617   1.538     13E   Vir   7.4    0    0
2023-Oct-11  12 56  -21 42    0.737   1.654     15M   Crv   8.2    0    0
2023-Oct-16  12 56  -24 26    0.852   1.754     16M   Hya   8.8    0    0
2023-Oct-21  12 55  -26 52    0.962   1.841     19M   Hya   9.4    0    1
2023-Oct-26  12 55  -29 04    1.068   1.917     22M   Hya   9.9    0    5
2023-Oct-31  12 55  -31 08    1.170   1.982     25M   Cen  10.3    0    8
2023-Nov-05  12 54  -33 06    1.269   2.038     29M   Cen  10.6    0   11
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  8.2 + 5 log d +  8.5 log r
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
             (UT)                      T         Dia  DC  LENG  PA
   2023P1  2023 09 23.90  M  4.6 TK  8.0B    20   1    8                ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2023P1  2023 09 23.90  S  4.5 TK  8.0B    20   1    8                ICQ XX SOU01 Willian Souza
   2023P1  2023 09 23.89  M  4.5 TK 10.0B    25   2    7                ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2023P1  2023 09 23.89  S  4.5 TK 10.0B    25   1    8                ICQ XX SOU01 Willian Souza
   2023P1  2023 09 21.36 &M  4.0 TK 25.0L 5  40        8                ICQ XX WYA   Christopher Wyatt
   2023P1  2023 09 20.89  M  3.8 TK 10.0B    25   1.5  7                ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2023P1  2023 09 20.09  Z  2.9     2.5R 4a090                        ICQ xx OLAaa Mike Olason
   2023P1  2023 09 18.80  I  2.5 TK 20.3T10  77   0.2  8                ICQ XX GON05 Juan Jose Gonzalez Suarez
   2023P1  2023 09 18.09  Z  2.3     2.5R 4a090                        ICQ xx OLAaa Mike Olason
   2023P1  2023 09 10.16  B  4.4 S   5.0B     7        6   3.5  250 ICQ XX DEC   Michel Deconinck
   2023P1  2023 09 09.51  Z  4.6     5.0R 4a300   6                    ICQ xx OLAaa Mike Olason
   2023P1  2023 09 09.50 aS  4.3 TK  5.0B    10   3    7/               ICQ xx HER02 Carl Hergenrother
   2023P1  2023 09 08.51  Z  4.6     5.0R 4a300   7                    ICQ xx OLAaa Mike Olason
   2023P1  2023 09 07.50  Z  5.2     5.0R 4a300   7                    ICQ xx OLAaa Mike Olason
   2023P1  2023 09 07.49 aS  5.1 TK  5.0B    10   4    7   0.5  310 ICQ xx HER02 Carl Hergenrother
   2023P1  2023 09 07.43     5.2     6.0B    12                        ICQ xx HARaa Scott Harrington
   2023P1  2023 09 06.50  Z  5.6     5.0R 4a200   7                    ICQ xx OLAaa Mike Olason
   2023P1  2023 09 06.49 aS  5.3 TK  5.0B    10   5    6/  0.5  310 ICQ xx HER02 Carl Hergenrother
   2023P1  2023 09 06.40     5.2     7.0B    15   9    7/               ICQ xx ROSaa Michael Rosolina
   2023P1  2023 09 06.11  S  4.9:TI  7.0B    16   2.5  7  15   m300 ICQ XX HAR11 Christian Harder
```

```
2023P1  2023 09 05.49  Z  5.9     2.5R 4a300   7                ICQ xx OLAaa Mike Olason
2023P1  2023 09 05.48  S  5.6 TK  5.0B    10   3    7           ICQ xx HER02 Carl Hergenrother
2023P1  2023 09 05.17  S  5.5 TK  5.0B    10   3    7/  0.8  300 ICQ XX GON05 Juan Jose Gonzalez Suarez
2023P1  2023 09 05.16  S  5.7 TK  8.0B    20   3    6/  0.8  300 ICQ XX GON05 Juan Jose Gonzalez Suarez
2023P1  2023 09 05.14  S  5.4 S   5.0B 7   7                   ICQ XX DEC   Michel Deconinck
2023P1  2023 09 05.12  S  5.5 S  12.6B 5  39   5    6/ 25   m250 ICQ XX DEC   Michel Deconinck
2023P1  2023 09 04.48  Z  6.1     5.0R 4a150   6               ICQ xx OLAaa Mike Olason
2023P1  2023 09 04.43     6.2     6.0B    12                   ICQ xx HARaa Scott Harrington
2023P1  2023 09 03.48  S  6.0 TK  5.0B    10   4    6/          ICQ xx HER02 Carl Hergenrother
2023P1  2023 09 03.48  Z  6.2     5.0R 4a150   6               ICQ xx OLAaa Mike Olason
2023P1  2023 09 02.42     6.8     6.0B    12                   ICQ xx HARaa Scott Harrington
```

C/2023 P1 (Nishimura) developed into one of the highlights of 2023. A surprise discovery by 3-time amateur comet discoverer Hideo Nishimura, C/2023 P1 eventually brightened to 2nd magnitude, though it was a very difficult observation close to the Sun at that time.

The comet was already a 10th magnitude object at discovery on August 12. By the start of September, it was close to magnitude 6 and an easy object in small binoculars. With the comet rapidly moving closer to the Sun in the morning sky, it brightened up to 3rd to 4th magnitude before being lost in the glow of dawn by September 11.

While the comet did reach naked eye brightness, it was located low in the sky and often against a bright twilight sky when bright. Still, Piotr Guzik of Poland reported a naked-eye sighting to the COBS site on September 8 at magnitude 4.7. Morning observations continued until September 10 (for ALPO observations) and 11 (for COBS observations). At that time, visual observers reported a very condensed, nearly star-like nucleus (DC = 8) with a diameter of 2-4'. A long tail up to 3.5 deg in length was also seen.

The comet disappeared from view for a few days by was then recovered both digitally and visually on September 15 (Jakub Cerny via COBS). After showing a gas coma, a long gas tail, and just a hint of a dust coma in the morning sky, when the comet reappeared in the evening, it showed a significant dust coma and tail. This was especially evident in images taken by the STEREO-A spacecraft between September 17 and October 2-3. At their longest extent, both the gas and dust tails extended for about 8 degrees in length in the STEREO-A images.

Though the comet remains visible to STEREO-A, it has not been seen by Earth-based observers since September 23. After peaking at around magnitude 2.5 at perihelion, visual observers last saw the comet at magnitude 4.5 on the 23rd, and my own measures of the STEREO-A data showed the comet having faded to around magnitude 6.0 by October 1. Combining the data submitted to the ALPO and the STEREO-A photometry found a fairly steady 2.5n ~ 8.5 brightening and fading rate since discovery.

C/2023 P1 remains too close to the Sun for ground-based observers until around mid-month when southern hemisphere observers have another chance to see the comet, though it should have faded to 8th magnitude by then.

C/2023 H2 (Lemmon)

Discovered 2023 April 23 by the Catalina Sky Survey with the 1.5-m Mount Lemmon reflector

Orbit (from Minor Planet Center, MPEC 2023-S260)

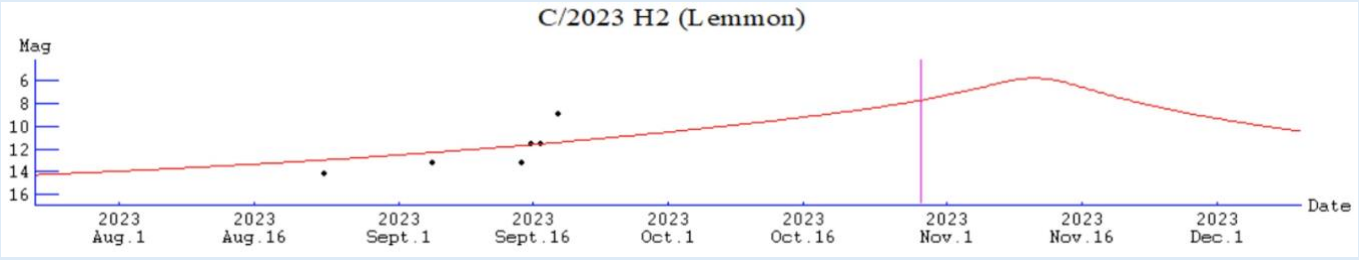
```
    C/2023 H2 (Lemmon)
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2023 Oct. 29.18843 TT                                  Rudenko
q   0.8944091            (2000.0)            P              Q
z  +0.0040752      Peri.  150.64856     +0.57677022     +0.60274465
 +/-0.0000071      Node   217.04388     +0.44788983     +0.33115658
e   0.9963551      Incl.  113.75334     +0.68317700     -0.72597121
From 151 observations 2023 Mar. 26-Sept. 28, mean residual 0".7.
1/a(orig) = +0.004319 AU**-1, 1/a(fut) = +0.004201 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2023 H2 (Lemmon)                                                    Max El
                                                                      (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag  40N  40S
2023-Oct-01  12 00  +45 00    1.027   1.373     48M    UMa   10.5   19    0
2023-Oct-06  12 06  +45 37    0.987   1.234     51M    UMa   10.1   22    0
2023-Oct-11  12 14  +46 22    0.953   1.087     54M    CVn    9.7   25    0
2023-Oct-16  12 24  +47 15    0.926   0.932     57M    CVn    9.2   27    0
2023-Oct-21  12 40  +48 17    0.907   0.770     60M    CVn    8.7   29    0
2023-Oct-26  13 05  +49 25    0.896   0.606     62M    CVn    8.1   29    0
2023-Oct-31  13 51  +50 13    0.895   0.442     64M    UMa    7.4   26    0
2023-Nov-05  15 27  +47 38    0.903   0.291     64E    Boo    6.6   30    0
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  9.7 + 5 log d + 10.0 log r
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
              (UT)                    T         Dia  DC  LENG  PA
   2023H2  2023 09 26.15  -[10.5 S  12.6B 5  25                    ICQ XX DEC   Michel Deconinck
   2023H2  2023 09 24.19  S  8.9 TK 20.3T10  77  12    1/          ICQ XX GON05 Juan Jose Gonzalez Suarez
   2023H2  2023 09 18.83  S  9.3 TK 20.3T10 100   7    1/          ICQ XX GON05 Juan Jose Gonzalez Suarez
   2023H2  2023 09 16.81  S 12.5 TI 53.1L   139   1.5  2/          ICQ XX HAR11 Christian Harder
   2023H2  2023 09 15.83  S 12.5 TI 53.1L   139   1.8  2/          ICQ XX HAR11 Christian Harder
```

There is a lot of uncertainty regarding this comet. It could be the brightest comet in the sky by the end of the month, though "could be" is the important part of that statement. The Mount Lemmon Survey / Catalina Sky Survey discovered C/2023 H2 (Lemmon) as an asteroidal object on 2023 April 23 at 20-21st magnitude. Perihelion will be on October 29, at 0.89 au, and closest approach to Earth 2 weeks later on November 10 at 0.19 au. Recent magnitude estimates from the ALPO and COBS range from magnitude 8.9 to 13.2. Even taking the middle of that range and assuming a 10 log r brightening trend brings the comet to magnitude 7.4 by the end of the month. This month, H2 is located north of the Sun, moving from the morning into the evening sky as it moves through Ursa Major (Oct 1-9), Canes Venatici (9-29), and back into Ursa Major (29-31).

C/2020 V2 (ZTF)

Discovered 2020 November 2 by the ZTF survey
Dynamically new long-period comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

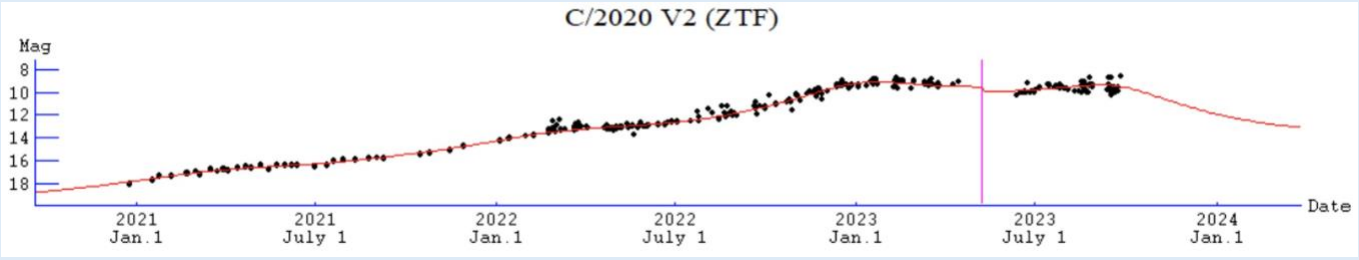
```
    C/2020 V2 (ZTF)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 8.56879 TT                                  Rudenko
q   2.2278852          (2000.0)            P              Q
z  -0.0004233      Peri.  162.43021     +0.69786063     +0.59391824
 +/-0.0000003      Node   212.37198     +0.53387480     -0.05875747
e   1.0009431      Incl.  131.61079     +0.47746020     -0.80237689
From 4896 observations 2020 Apr. 18-2023 Sept. 27, mean residual 0".9.
1/a(orig) = +0.000019 AU**-1, 1/a(fut) = -0.000217 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2020 V2 (ZTF)                                                      Max El
                                                                      (deg)
    Date       R.A.    Decl.      r        d     Elong  Const  Mag  40N  40S
2023-Oct-01  01 35   -31 41    2.768    1.911    141E    Scl    9.6   18   82
2023-Oct-06  01 20   -34 19    2.801    1.960    139E    Scl    9.7   16   84
2023-Oct-11  01 05   -36 35    2.834    2.023    136E    Scl    9.8   13   87
2023-Oct-16  00 51   -38 27    2.868    2.099    132E    Scl    9.9   12   88
2023-Oct-21  00 37   -39 56    2.902    2.185    127E    Phe   10.1   10   90
2023-Oct-26  00 24   -41 05    2.937    2.281    122E    Phe   10.2    9   89
2023-Oct-31  00 12   -41 55    2.972    2.385    117E    Phe   10.4    8   88
2023-Nov-05  00 01   -42 29    3.007    2.495    111E    Phe   10.5    8   88
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 = -1.4 + 5 log d + 15.9 log r [up to T-580 days
m1 =  3.2 + 5 log d + 10.1 log r [between T-580 and T-220 days]
m1 =  4.0 + 5 log d +  8.6 log r [T-220 days and onward]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

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Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
              (UT)                    T         Dia  DC  LENG  PA
   2020V2  2023 09 26.16  O  9.0 S  12.6B 5  25   6.5  2           ICQ XX DEC   Michel Deconinck
   2020V2  2023 09 24.13  M 10.3 AQ 30.0L 5  88   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 24.01  S  9.9 TK 20.3T10  77   3.5  4/          ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 09 20.13  M 10.4 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 20.46  S 10.1 TK 12.5B    30   3    2           ICQ xx HER02 Carl Hergenrother
   2020V2  2023 09 18.70 xM 10.2 TK 40.0L 4  59   3    6  18   m  3 ICQ XX WYA   Christopher Wyatt
   2020V2  2023 09 17.13  M 10.4 AQ 30.0L 5  88   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 17.00  S 10.5:TI 53.1L    81   3    4           ICQ XX HAR11 Christian Harder
   2020V2  2023 09 16.48 xM 10.9 AQ 40.0L 4  59   6    6   3.5 m335 ICQ XX WYA   Christopher Wyatt
   2020V2  2023 09 16.15  M 10.3 AQ 30.0L 5  88   1    2/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 16.03  S  9.6 TI 53.1L   111   3    4           ICQ XX HAR11 Christian Harder
   2020V2  2023 09 15.15  M 10.3 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 14.05  S  9.6 TK 20.3T10  77   3.5  5           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 09 13.20  M 10.2 AQ 30.0L 5  88   1    2           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2020V2  2023 09 12.20  M 10.2 AQ 30.0L 5  88   1    2/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

C/2020 V2 (ZTF) has been with us for a while now. It was found by the Zwicky Transient Facility nearly 3 years ago, on November 2, 2020, when it was a distant 8.7 au from the Sun and 9.4 au from Earth.

The comet has been a reasonably bright object, brighter than magnitude 10-11, all year long. Since perihelion was at a distant 2.23 au, we experienced two "close" approaches to the comet, resulting in two peaks in brightness, both around magnitude 9.5 (2.06 au on 2023 January 5 and 1.85 au on 2023 September 17).

Since reappearing in the morning sky a few months ago, the comet has been well observed. In September, 15 magnitude measurements were received by the ALPO. The comet was estimated to be between 9.0 and 10.9 (aperture and personal bias corrected to between 8.6 and 10.3). Most observations found the coma to be compact at 1' to 3.5' in diameter, though two observations by Chris Wyatt measured a larger ~6'coma. Chris also reported a tail up to a third of a degree in length.

C/2020 V2 is now an evening object as it moves through the southern constellations of Sculptor (Oct 1-18) and Phoenix (18-31). While still visible from both hemispheres, it continues to move south and become more difficult for northern observers. Now moving away from its last close approach to Earth, it should fade from around magnitude 9.6 to 10.4.

Imagers and visual observers are encouraged to watch the comet towards the end of the month. With an orbit plane crossing on October 26, we may be able to detect an anti-tail.

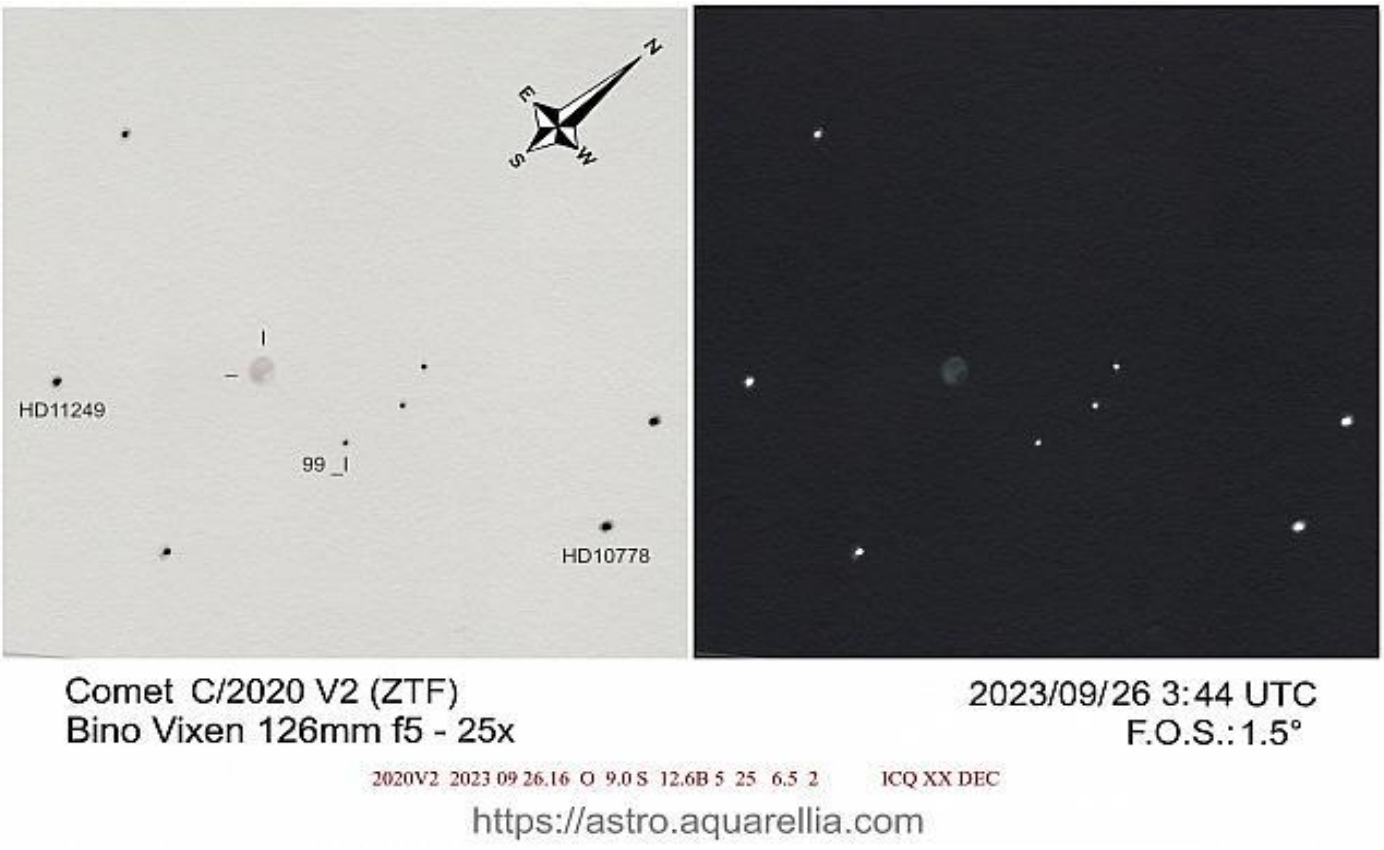


Figure 1 - C/2020 V2 (ZTF) as observed by Michel Deconinck in Vixen 25x126 binoculars on 2023 September 26.

2P/Encke

Discovered visually on four separate occasions in 1786 by Méchain, 1795 by Herschel, 1805 by Pons, Huth, and Bouvard, and again by Pons in 1818
Jupiter-family comet / Encke-type comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

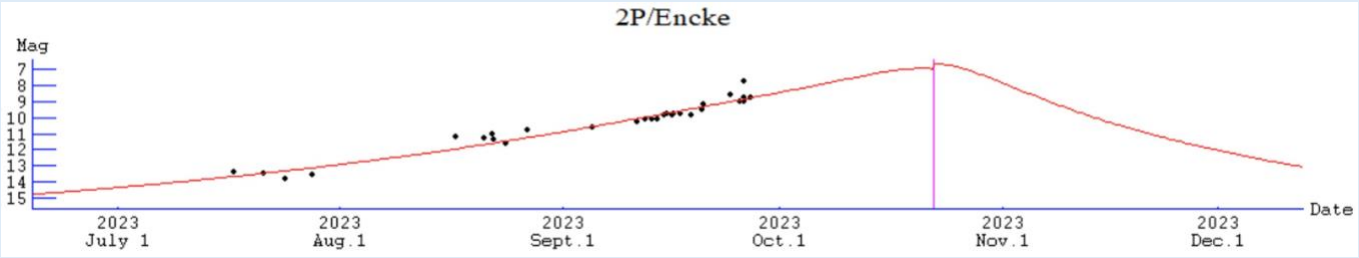
```
   2P/Encke
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2023 Oct. 22.52790 TT                                  Rudenko
q   0.3396000           (2000.0)            P              Q
n   0.29823172     Peri.  187.28599     -0.94616112     -0.31203233
a   2.2187081      Node   334.02023     +0.30601980     -0.77555666
e   0.8469379      Incl.   11.33671     +0.10550365     -0.54876925
P   3.30
From 3426 observations 2009 Aug. 22-2023 Sept. 28, mean residual 0".8.
     Nongravitational parameters A1 = +0.01, A2 = -0.0001.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
2P/Encke                                                                Max El
                                                                         (deg)
    Date       R.A.    Decl.      r        d     Elong  Const  Mag  40N   40S
2023-Oct-01  10 18  +18 46    0.634    0.922     38M    Leo    8.5   19     0
2023-Oct-06  10 58  +13 07    0.542    0.966     31M    Leo    8.0   13     0
2023-Oct-11  11 35  +07 07    0.455    1.034     25M    Leo    7.6    7     0
2023-Oct-16  12 12  +00 57    0.382    1.122     19M    Vir    7.1    1     0
2023-Oct-21  12 50  -05 12    0.342    1.221     13M    Vir    7.0    0     0
2023-Oct-26  13 29  -10 59    0.352    1.314      7M    Vir    6.9    0     0
2023-Oct-31  14 08  -15 55    0.408    1.395      3M    Vir    7.7    0     0
2023-Nov-05  14 45  -19 49    0.488    1.469      4E    Lib    8.6    0     0
```

Comet Magnitude Formula (from 2020 and 2023 ALPO observations)

```
m1 = 10.2 + 5 log d +  7.9 log r [Pre-perihelion]
m1 = 10.9 + 5 log d + 10.1 log r [Post-perihelion]
where "T" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Estimates submitted to the ALPO Comets Section

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Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ CODE Observer Name
               (UT)                    T         Dia  DC  LENG  PA
  2        2023 09 27.13  S  9.0 TI 19.8L 5  40   3.5  4            ICQ XX HAR11 Christian Harder
  2        2023 09 26.13  S  9.5 TK 32.0L 5  80   5    7                 PIL01 Uwe Pilz
  2        2023 09 26.13  S  9.0 TI 19.8L 5  40   4.5  4            ICQ XX HAR11 Christian Harder
  2        2023 09 26.13  O  8.2 S  12.6B 5  23   4.5  3            ICQ XX DEC   Michel Deconinck
  2        2023 09 25.48  S  9.4 TK 12.5B    30   2.5  5            ICQ xx HER02 Carl Hergenrother
  2        2023 09 24.20  S  8.9 TK 20.3T10  77   6    3            ICQ XX GON05 Juan Jose Gonzalez Suarez
  2        2023 09 20.47  S  9.6 TK 12.5B    30   3    4            ICQ xx HER02 Carl Hergenrother
  2        2023 09 20.33  M 10.9 AQ 30.0L 5  88   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 18.77 &S 10.5 TK 40.0L 4  59   2.8  3            ICQ XX WYA   Christopher Wyatt
  2        2023 09 17.33  M 11.2 AQ 30.0L 5  88   1    2            ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 16.33  M 11.2 AQ 30.0L 5  88   1    2            ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 15.47  S 10.2 TK 12.5B    30   2    3            ICQ xx HER02 Carl Hergenrother
  2        2023 09 14.12  S 10.4 TK 20.3T10  77   5    2            ICQ XX GON05 Juan Jose Gonzalez Suarez
  2        2023 09 13.33  M 11.5 AQ 30.0L 5  88   1    2            ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 12.33  M 11.5 AQ 30.0L 5  88   1    2/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
  2        2023 09 11.32  M 11.7 AQ 30.0L 5  88   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Frequent visitor to the inner solar system, 2P/Encke is now in the middle of its 65th observed apparition. With an orbital period of 3.3 years, it has the shortest orbital period of any sublimating comet. With a small aphelion distance of 4.09 au, Encke is decoupled from Jupiter's strong gravitational influence. Orbital dynamicists have been wrestling with how to get an outer solar system object like Encke onto its present orbit. It is also the parent of the Taurid Meteoroid Complex. Studies of the orbital evolution of Encke, the Taurids meteors, and a small number of near-Earth asteroids in similar orbits suggest the possibility of a break-up event occurring thousands of years ago to explain their formation.

Even Encke's discovery story is interesting. It was discovered on 4 separate occasions before its periodic nature was known. Pierre Méchain was the first to see Encke in January 1786. Caroline Herschel made an independent discovery in 1795, while three observers, including Jean-Louis Pons, found it in 1805 (J. S. Huth and A. Bouvard were the other two independent discoverers). Pons would also discover the comet a final time in 1818. So why Comet Encke and not Comet Méchain-Herschel-Pons-Huth-Bouvard or some other variation? 2P/Encke joins 1P/Halley and 27P/Crommelin in being named after an orbit computer rather than its discoverer. It was the German mathematician Johann F. Encke who established its periodic nature and linked the four sightings.

With perihelion on 2023 October 22, the comet is a northern hemisphere-only object in the morning sky before perihelion but not visible after perihelion until March/April, when it will be a very faint object. Encke should start the month around magnitude 8.5 in Leo before brightening to around magnitude 7.0 before being lost in the glare of dawn.

Figure 2 – Tenho Tuomi imaged 2P/Encke on September 22 with a 0.3-m reflector at f/4. The resulting image is a co-add of 20x60-s exposures.

103P/Hartley

Discovered photographically on 1986 March 15 by Malcolm Hartley at Siding Spring Observatory in Australia
Jupiter-family comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

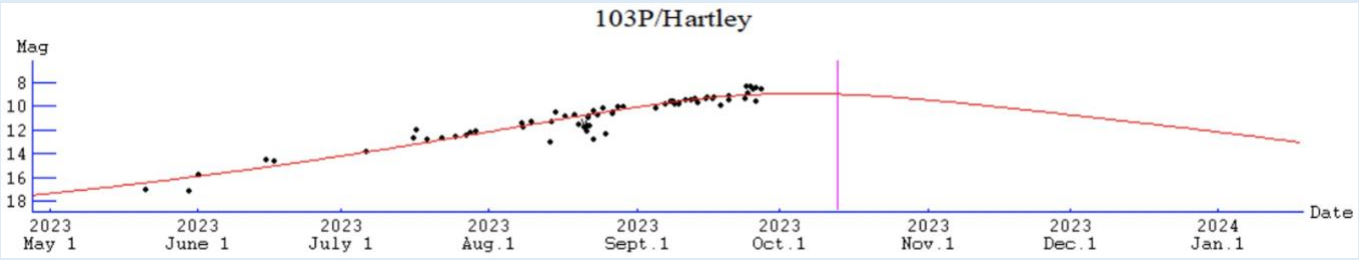
```
103P/Hartley
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2023 Oct. 12.51244 TT                                  Rudenko
q   1.0640924           (2000.0)            P              Q
n   0.15210827     Peri.  181.30120     +0.75453046     -0.63878152
a   3.4756350      Node   219.75003     +0.60421703     +0.76567075
e   0.6938423      Incl.   13.61045     +0.25613585     +0.07554121
P   6.48
From 7647 observations 2004 Sept. 20-2023 Sept. 28, mean residual 0".6.
     Nongravitational parameters A1 = +0.17, A2 = +0.0248.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
103P/Hartley                                                          Max El
                                                                       (deg)
    Date       R.A.    Decl.      r        d     Elong  Const  Mag  40N  40S
2023-Oct-01  06 25  +31 49    1.080    0.376     91M   Aur    9.0   71   14
2023-Oct-06  06 54  +27 26    1.071    0.382     90M   Gem    8.9   68   17
2023-Oct-11  07 18  +22 57    1.067    0.392     89M   Gem    9.0   65   20
2023-Oct-16  07 38  +18 34    1.068    0.405     88M   Gem    9.0   62   22
2023-Oct-21  07 55  +14 23    1.073    0.420     88M   Cnc    9.2   59   25
2023-Oct-26  08 10  +10 28    1.082    0.436     89M   Cnc    9.3   57   28
2023-Oct-31  08 23  +06 52    1.095    0.453     90M   Cnc    9.5   55   31
2023-Nov-05  08 33  +03 34    1.113    0.471     92M   Hya    9.6   52   34
```

Comet Magnitude Formula (from 2023 ALPO data)

```
m1 = 10.6 + 5 log d + 14.4 log r
where "T" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Estimates submitted to the ALPO Comets Section

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Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ CODE Observer Name
               (UT)                    T         Dia  DC  LENG  PA
103        2023 09 27.14  S  8.8 TI 19.8L 5  40   9    2/           ICQ XX HAR11 Christian Harder
103        2023 09 26.16  O  8.9 S  12.6B 5  25   5.5  5            ICQ XX DEC   Michel Deconinck
103        2023 09 26.14  S  8.7 TI 19.8L 5  40   8    2/           ICQ XX HAR11 Christian Harder
103        2023 09 26.12  S 11.1 TK 32.0L 5  80   4    2                 PIL01 Uwe Pilz
103        2023 09 25.48  S  9.0 TK 12.5B    30   6    3            ICQ xx HER02 Carl Hergenrother
103        2023 09 25.02  S  8.8 TI 29.8L 4  79   6.5  3            ICQ XX HAR11 Christian Harder
103        2023 09 24.34  M  9.9 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 24.02  S  8.7 TK 20.3T10  77   7    3/           ICQ XX GON05 Juan Jose Gonzalez Suarez
103        2023 09 23.92  S  9.8 TI 29.8L 4  79   5    2            ICQ XX HAR11 Christian Harder
103        2023 09 20.47  S  9.9 TK 12.5B    30   5    3            ICQ xx HER02 Carl Hergenrother
103        2023 09 20.33  M 10.1 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 18.72 xM 10.6 AQ 40.0L 4  59   5    3            ICQ XX WYA   Christopher Wyatt
103        2023 09 17.33  M 10.2 TK 30.0L 5  88   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 16.94  S 10.3 TI 53.1L   111   5    3            ICQ XX HAR11 Christian Harder
103        2023 09 15.94  S 10.2 TI 53.1L   111   5    2/           ICQ XX HAR11 Christian Harder
103        2023 09 15.47  S  9.8 TK 12.5B    30   3    3            ICQ xx HER02 Carl Hergenrother
103        2023 09 13.96  S 10.1 TK 20.3T10  77   5    2/           ICQ XX GON05 Juan Jose Gonzalez Suarez
103        2023 09 13.32  M 10.3 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 12.33  M 10.4 TK 30.0L 5  88   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
103        2023 09 11.33  M 10.4 TK 30.0L 5  88   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

```
103        2023 09 09.92  S 10.3 TI 29.8L 4  79   3.5  2           ICQ XX HAR11 Christian Harder
103        2023 09 08.90  S 10.5 TI 53.1L   139   3.5  2/          ICQ XX HAR11 Christian Harder
103        2023 09 06.85  S  -   TI 35.3L   122   3.8  2           ICQ XX HAR11 Christian Harder
```

103P/Hartley has been one of the brighter short-period comets of the past 30+ years, with bright, well-observed apparitions in 1991, 1997, and 2010. During its 2010 return, the NASA Deep Impact/EPOXI spacecraft flew within 700 km of 103P, providing high-resolution images of its peanut-shaped, 2.25 km (1.4 miles) long nucleus.

103P was first seen on photographic plates obtained in March 1986 by Malcolm Hartley at the Siding Spring Observatory in Australia. At the time, the comet was a 17th-magnitude object and 9 months past perihelion. At its first two predicted returns in 1991 and 1997, the comet brightened to 8th magnitude. Until experiencing a very close approach to Jupiter in 1971 (0.09 au), 103P was further from the Sun. As a result, the comet never became bright enough to be discovered. Though the comet was probably very active during the 1973 and 1979 returns, perihelion occurred on the other side of the Sun and out of view from Earth. The same was true in 1985, so its discovery in 1986 was despite a poor apparition.

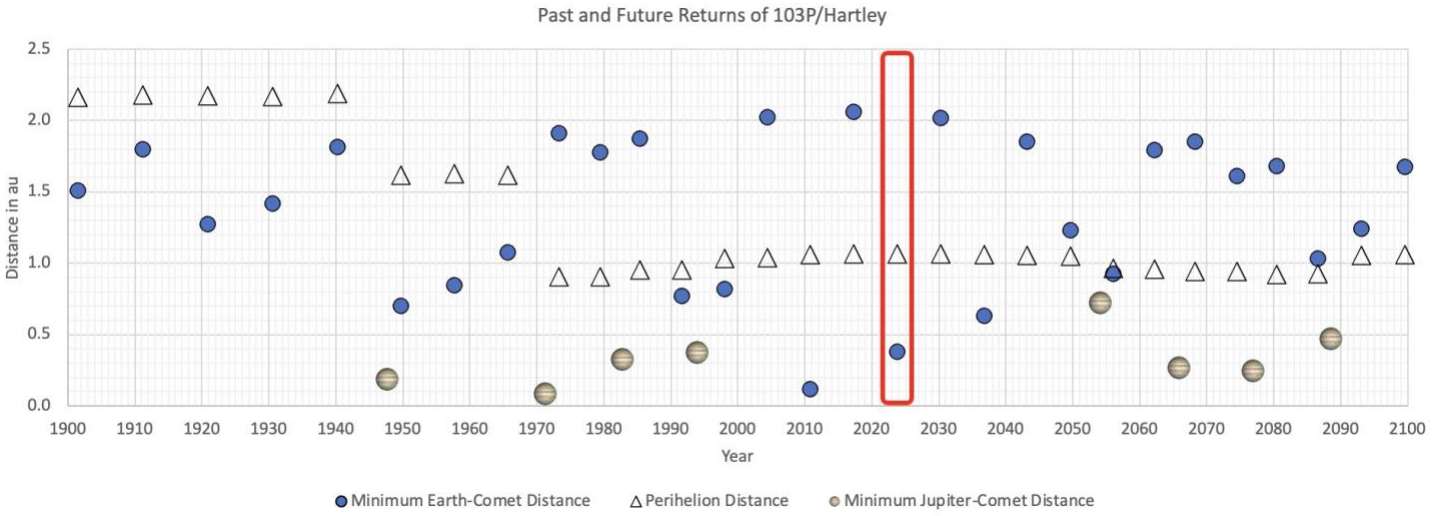


Figure 3 - Orbital evolution of 103P/Hartley. The current return is highlighted within the red rectangle.

This month, Hartley 2 reaches perihelion on the 12th at 1.06 au from the Sun, with the closest approach to Earth having occurred on September 26 at 0.38 au. While not as good as the 2010 return, the current return is the second-best between 1900 and 2100 in terms of distance to the Earth and Sun.

103P has been underperforming its predicted brightness this return. It was still reported as fainter than 10th magnitude through September 20, about 2 magnitudes fainter than predicted. Things seem to have changed for the better during the last week of September, with the comet now being reported as bright as magnitude 8.8 in ALPO data and even as bright as 8.0 in reports submitted to COBS.

Early October should see the comet at its brightest. It remains observable from both hemispheres in the morning sky as it moves through Auriga (Oct 1-2), Gemini (2-19), and Cancer (19-31).

A nice photo/observing op will occur on October 12 when the comet will pass only arc minutes from the Eskimo Nebula (NGC 2392).

Comets Between Magnitude 10 and 12

C/2021 S3 (PANSTARRS)

Discovered 2021 September 24 by PANSTARRS with the Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala
Dynamically new long-period comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

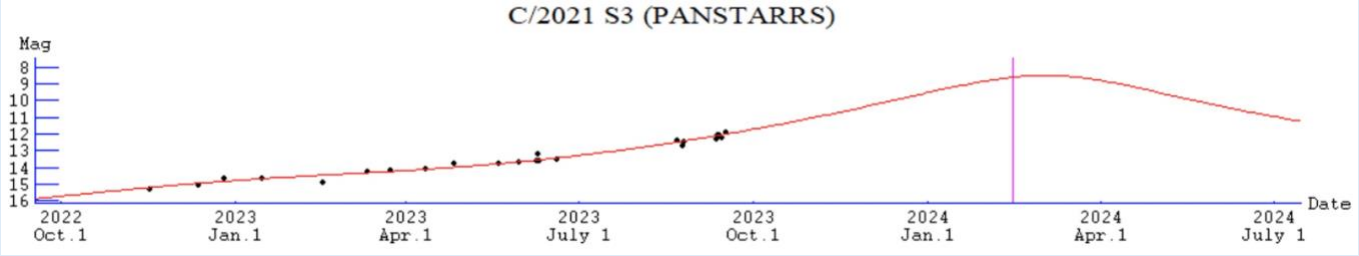
```
    C/2021 S3 (PANSTARRS)
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2024 Feb. 14.71721 TT                                  Rudenko
q   1.3201268           (2000.0)            P               Q
z  -0.0001436      Peri.    6.86235     -0.77074004     +0.39897226
 +/-0.0000025      Node   215.62079     -0.61758585     -0.65952908
e   1.0001896      Incl.   58.53345     -0.15667644     +0.63705771
From 984 observations 2020 Dec. 6-2023 Sept. 15, mean residual 0".4.
1/a(orig) = +0.000149 AU**-1, 1/a(fut) = +0.000064 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2021 S3 (PANSTARRS)                                                Max El
                                                                     (deg)
    Date      R.A.   Decl.     r       d    Elong  Const  Mag  40N   40S
2023-Oct-01  10 02  -32 23   2.329   2.929    44M   Ant  11.7    0    27
2023-Oct-06  10 14  -33 11   2.276   2.872    44M   Ant  11.6    0    27
2023-Oct-11  10 27  -33 59   2.224   2.815    45M   Ant  11.5    0    27
2023-Oct-16  10 40  -34 47   2.172   2.758    45M   Ant  11.4    0    27
2023-Oct-21  10 54  -35 34   2.121   2.701    45M   Ant  11.3    0    27
2023-Oct-26  11 08  -36 19   2.070   2.645    45M   Aqr  11.2    0    27
2023-Oct-31  11 22  -37 02   2.019   2.588    45M   Aqr  11.1    0    26
2023-Nov-05  11 37  -37 42   1.969   2.532    45M   Aqr  10.9    0    26
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  7.1 + 5 log d + 6.2 log r
Where "t" is the date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au.
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
               (UT)                    T         Dia  DC  LENG  PA
   2021S3  2023 09 16.35  M 12.3 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 13.34  M 12.5 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 12.34  M 12.5 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021S3  2023 09 11.35  M 12.7 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

C/2021 S3 (PANSTARRS) was discovered at 19-20th magnitude on 2021 September 24 with the Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala on Maui. The comet is still some months from its best when it will be at perihelion on 2024 February 14, at 1.32 au, and closest to Earth on 2024 March 14, at 1.30 au.

Jose Guilherme de Souza Aguiar made 4 visual observations of S3 in September. His observations found a 12th-magnitude object with a small, moderately condensed (DC = 3.5-4) 1' coma. Combining the visual observations with photometry submitted to COBS by Thomas Lehmann still finds a very slow brightening rate (2.5n ~ 6.2). Even at this slow rate, the comet should peak around magnitude 8.5 in February and March. This month, it will be a morning object only observable from the southern hemisphere as it moves through Antlia (Oct 1-25) and Centaurus (25-31).

12P/Pons-Brooks

Discovered visually on 1812 July 12 by Jean-Louis Pons and rediscovered visually on 1883 September 2 by William R. Brooks
Halley-type comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

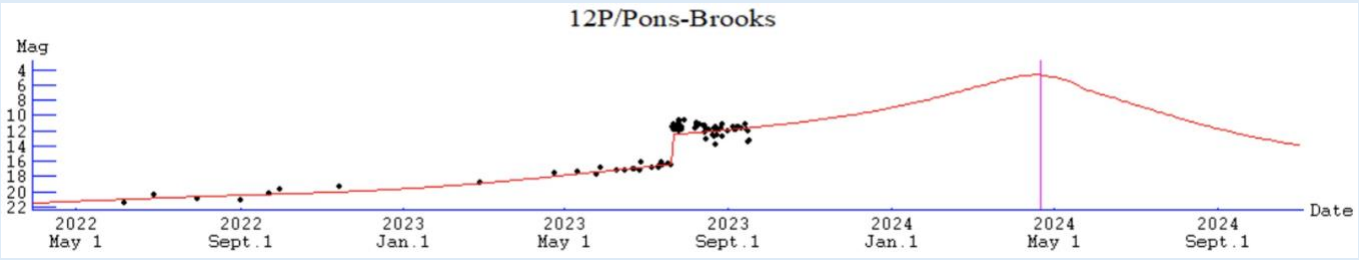
```
  12P/Pons-Brooks
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5
T 2024 Apr. 21.13193 TT                                  Rudenko
q   0.7808751           (2000.0)            P              Q
n   0.01383246     Peri.  198.98724     +0.14512285     -0.32930519
a  17.1871238      Node   255.85546     +0.98565780     +0.13020449
e   0.9545663      Incl.   74.19104     +0.08612820     -0.93520312
P  71.3
From 3193 observations 2020 June 10-2023 Sept. 28, mean residual 0".6.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
12P/Pons-Brooks                                                    Max El
                                                                    (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag  40N  40S
2023-Oct-01  17 20   +46 52    3.107   3.104     80E    Her  11.3   63    0
2023-Oct-06  17 21   +45 59    3.050   3.072     79E    Her  11.2   61    0
2023-Oct-11  17 24   +45 07    2.993   3.039     77E    Her  11.2   59    0
2023-Oct-16  17 27   +44 16    2.936   3.004     76E    Her  11.1   58    0
2023-Oct-21  17 31   +43 28    2.879   2.968     75E    Her  10.9   56    0
2023-Oct-26  17 36   +42 41    2.821   2.930     73E    Her  10.8   54    0
2023-Oct-31  17 41   +41 58    2.762   2.890     72E    Her  10.7   52    0
2023-Nov-05  17 46   +41 17    2.703   2.849     71E    Her  10.6   51    0
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  4.4 + 5 log d +  6.2 log r [Before perihelion]
m1 =  4.5 + 5 log d +  7.2 log r [After perihelion]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

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Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ CODE Observer Name
               (UT)                    T         Dia  DC  LENG  PA
 12        2023 09 23.98  S 11.6 AQ 20.3T10 100   6    0/                ICQ XX GON05 Juan Jose Gonzalez Suarez
 12        2023 09 16.82  S 14.2 TI 53.1L   139   1.2  2/                ICQ XX HAR11 Christian Harder
 12        2023 09 15.85  S 14.3 TI 53.1L   155   0.75 2/                ICQ XX HAR11 Christian Harder
 12        2023 09 14.02  S 11.5 AQ 20.3T10 100   6    0/                ICQ XX GON05 Juan Jose Gonzalez Suarez
```

One of the better comets of 2024 should be 12P/Pons-Brooks. Its current return is its 6th or 7th observed one and first since 1954. 12P was discovered on 1812 July 21 by Jean-Louis Pons and reached 4th magnitude with a 3-degree long tail during that return. William R. Brooks at Phelps, New York, re-discovered 12P on 1883 September 2. During that return, it approached within 0.63 au of Earth and brightened to 3rd magnitude with a tail up to 20 degrees long. The most recent return in 1954 saw the comet reach 5th magnitude. Maik Meyer recently identified comets seen in 1457 and 1385 as previous returns of 12P. It may also have been seen in 245 AD.

Pons-Brooks is a Halley-type comet. These objects are usually defined as periodic comets with orbital periods between 20 and 200 years. The most famous Halley-type object is, of course, the namesake 1P/Halley, history's most famous comet. 1P/Halley and 12P/Pons-Brooks have orbits with similar perihelion distances (0.58 au for 1P, 0.78 au for 12P, aphelion distances (35.3 vs 33.6 au), and not surprisingly, orbital periods (75.9 vs 71.3 years). This doesn't mean 1P and 12P originated from the same object but does suggest that the two may have followed a similar path to their current orbit.

A quick search of the JPL comet orbit database finds 10 objects with perihelia and orbital periods similar to 12P (the criteria was somewhat arbitrarily set to objects with perihelia less than 1.2 au and orbital periods between 66 and 86 years). One of the 10 was the apparently inactive asteroid 1999 XS35. In addition to 12P, this and next year have seen or will see the return of two others, C/2013 E1 (ATLAS) and 13P/Olbers. Older observers may also have observed 23P/Brorsen-Metcalf in 1989 and 122P/de Vico in 1995, both having reached 5th magnitude.

The current return is similar to the previous one in 1954, which means it isn't great, with the comet never getting closer to Earth than 1.55 au. That, combined with perihelion on 2024 April 21 at 0.78 au, means it will be located at very low solar elongations when it will be at its brightest (a peak at 4-5th magnitude).

12P is a very outburst-prone object. The current return is bringing more of the same. On 2023 July 20, an outburst increased its brightness from 16th to 11th magnitude. The comet's subsequent coma morphology suggests that the late July outburst consisted of two events about 30 hours apart. Another outburst on September 23 was reported by Michael S. P. Kelley and others. An increase in brightness of 0.9 magnitudes was measured within a 5" radius aperture. HOT OFF THE PRESSES: Richard Miles has just reported another large outburst of 12P/Pons-Brooks on October 5, comparable in magnitude to the late July outburst.

The expanding dust coma from the July outburst was still readily visible in images taken in September. It was also still observable visually, as evident in those observations with a large measured coma. An image by Dan Bartlett taken on September 7 shows a compact, small inner coma consisting of recent dust production, a large diffuse coma from the July outburst (the remnant of the "horns" images in the days and weeks after the outburst), and a broad, faint tail that appears to made of dust being blown out of the large "horns" coma.

Based on the comet's 1954 brightness, the current return was running about 4 magnitudes faint until the July outburst. Since then, the brightness has been closely following the 1954 lightcurve. This month the comet remains a visual object for large aperture telescopes or very dark skies as it brightens from magnitude 11.3 to 10.7. This month also sees Pons-Brooks move within 3 au of the Earth and Sun. The comet remains a northern evening object in Hercules, keeping it solely within sight of northern hemisphere observers.

Figure 4 - 12P/Pons-Brooks as imaged by Dan Bartlett on 2023 September 7 with a C14 Hyperstar at f/2. The image is a co-add of 26 x 300-s exposures with a ZWO ASI 2600MC Pro camera.

62P/Tsuchinshan

Discovered photographically on 1965 January 1 at the Purple Mountain (Tsuchinshan) Observatory
Short-period comet

Orbit (from Minor Planet Center, MPEC 2023-S260)

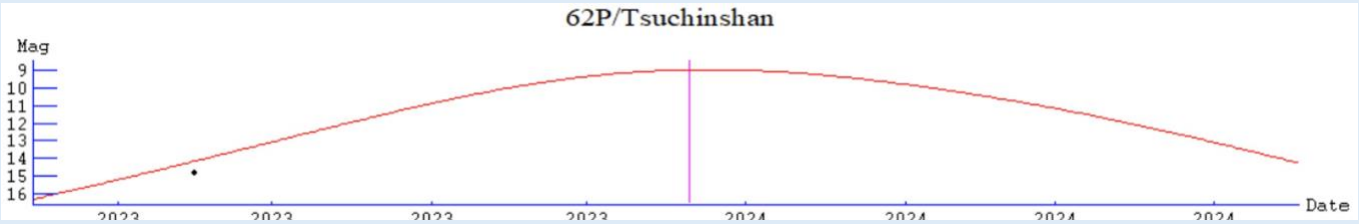
```
  62P/Tsuchinshan
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Dec. 25.05802 TT                                  Rudenko
q   1.2637825            (2000.0)            P              Q
n   0.15932788     Peri.   47.31042     -0.43615269     -0.89657754
a   3.3698317      Node    68.69727     +0.79959145     -0.42535264
e   0.6249716      Incl.    4.73694     +0.41282484     -0.12338496
P   6.19
From 878 observations 2017 Aug. 10-2023 Sept. 28, mean residual 0".6.
     Nongravitational parameters A1 = +0.03, A2 = -0.1229.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
62P/Tsuchinshan                                                    Max El
                                                                    (deg)
    Date       R.A.    Decl.      r        d     Elong  Cont   Mag  40N  40S
2023-Oct-01   06 12   +21 22    1.558    1.121     94M    Gem   13.1   66   25
2023-Oct-06   06 29   +21 30    1.524    1.060     95M    Gem   12.7   67   24
2023-Oct-11   06 46   +21 33    1.491    1.002     96M    Gem   12.3   68   24
2023-Oct-16   07 04   +21 31    1.459    0.948     97M    Gem   12.0   69   23
2023-Oct-21   07 22   +21 22    1.428    0.898     97M    Gem   11.6   69   22
2023-Oct-26   07 42   +21 08    1.399    0.851     98M    Gem   11.3   70   22
2023-Oct-31   08 02   +20 46    1.371    0.809     98M    Gem   11.0   70   21
2023-Nov-05   08 22   +20 16    1.345    0.770     98M    Cnc   10.7   69   21
```

Comet Magnitude Formula (from Seiichi Yoshida)

```
m1 =  9.5 + 5 log d + 30.0 log r [Until 78 days before perihelion]
m1 =  0.9 + 5 log d + 75.0 log r [Between T-78 days and perihelion]
m1 =  5.5 + 5 log d + 30.0 log r [After perihelion]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Also heading inbound this month is short-period comet 62P/Tsuchinshan. The comet was discovered on 1965 January 1 and this year brings its 9th observed return after having been observed at returns in 1965, 1971, 1978, 1985, 1991, 1998, 2004, and 2017.

The comet is named after the Purple Mountain Observatory, also known as the Zijinshan Astronomical Observatory, located on the Purple Mountain east of Nanjing, China. The IAU uses the anglicized name "Tsuchinshan" for the Purple Mountain Observatory. 62P is one of 6 comets discovered at the observatory. The other 5 include another short-period comet discovered only 11 days after 62P, 60P/Tsuchinshan, and long-period comets C/1977 V1 (Tsuchinshan), C/2017 E2 (Tsuchinshan), C/2021 S4 (Tsuchinshan), and C/2023 A3 (Tsuchinshan-ATLAS). The last comet on that list is expected to become a bright object in 2024, though it won't be discussed in detail in this issue of the ALPO Comet News due to its close proximity to the Sun in October.

Prior to a close approach to 0.15 au of Jupiter in 1960, 62P had an orbit that brought it no closer than about 2 au of the Sun. After 1960, its perihelion distance dropped to 1.5 au. The discovery apparition of 1965 was the first after the close approach and saw the comet brighten to 15th magnitude. Surprisingly, during its 1985 return,

which was very similar to the one in 1965, 62P reached 10th magnitude. Additional close approaches to Jupiter in 2009 and 2020 dropped perihelion to 1.38 and 1.26 au, respectively. At its most recent return in 2017, the comet reached 10th magnitude even though it came no closer than 1.02 au from Earth. This year, the comet will arrive at perihelion on 2023 December 25, at 1.26 au, and have its closest approach to Earth on 2024 January 29, at 0.50 au. This should be 62P's best and brightest apparition between 1900 and 2100.

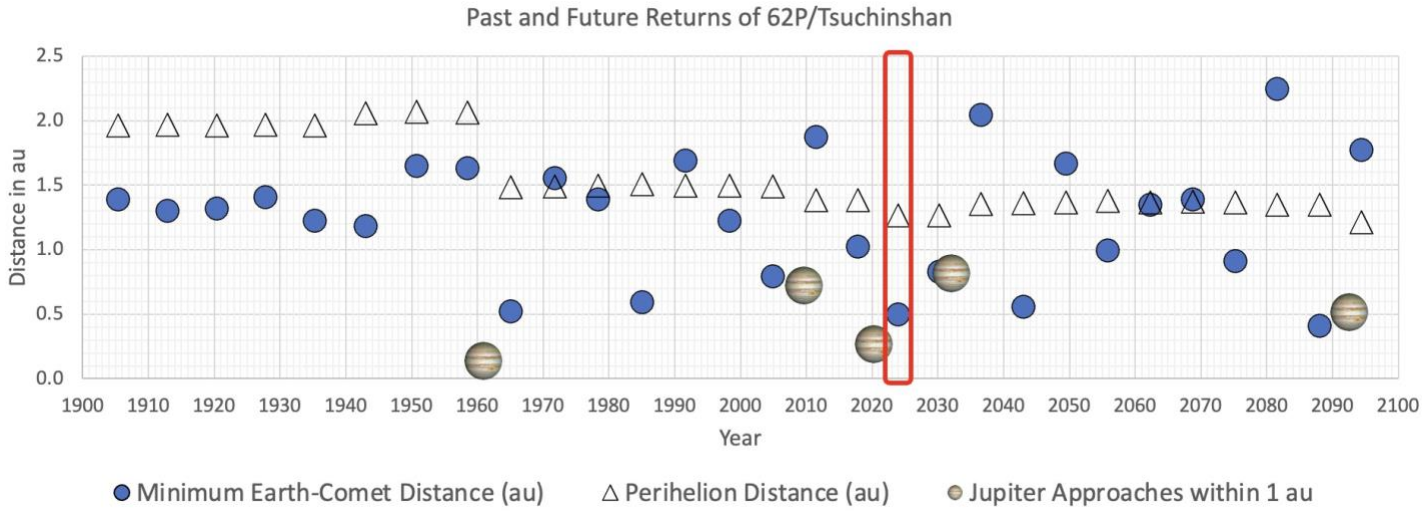


Figure 5 - Orbital evolution of 62P/Tsuchinshan from JPL Horizons data. The current apparition in highlighted in red.

Only a single observation has been submitted to the ALPO and a few more to COBS. The most recent were submitted during the second half of September and found the comet at magnitude 14.8 (Thomas Lehmann on September 16). According to Seiichi Yoshida's analysis of past returns, 62P brightens rapidly. As a result, it should start October at magnitude 13.1 and brighten to 11.0 by the end of the month. If it follows Yoshida's prediction, it will peak around magnitude 9.0 in late December and early January.

The comet will be observable from both hemispheres, though better placed for northern hemisphere observers. It is a morning object and will spend the month in Gemini.

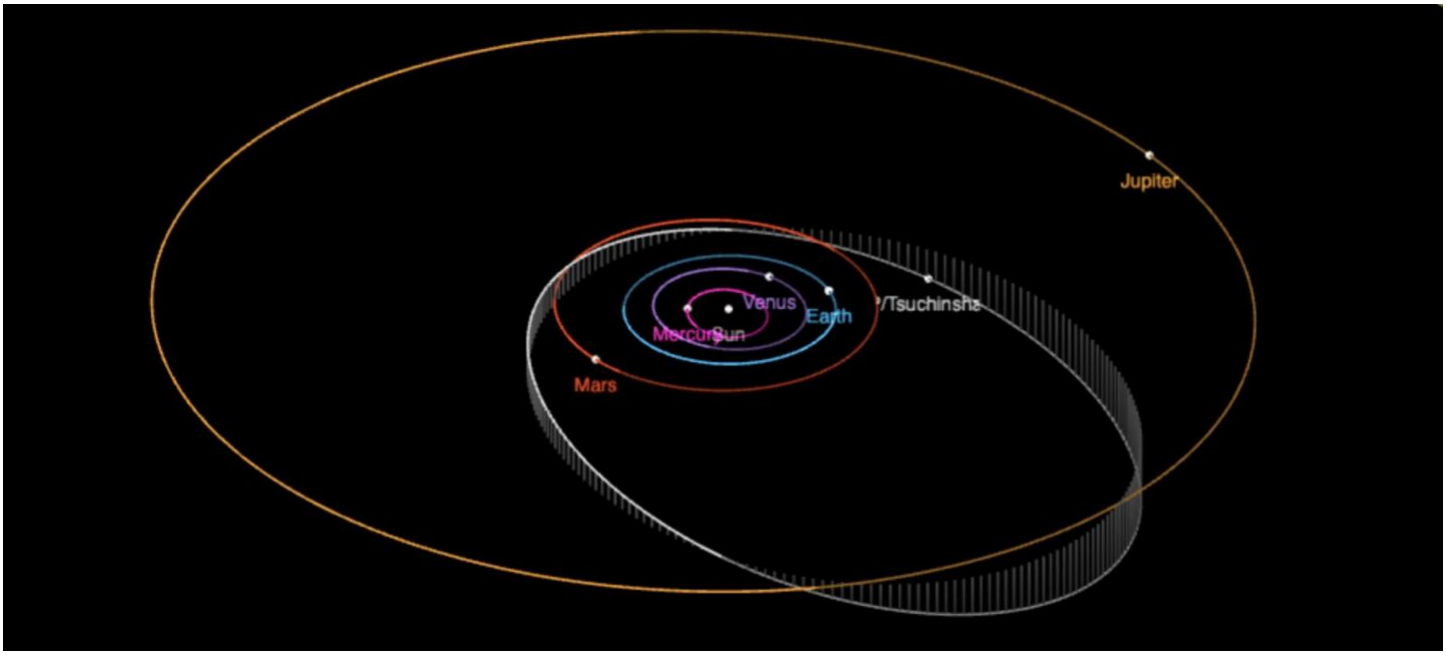


Figure 6 - Orbit & position of 62P for 2023 October 15. From the JPL Small-Body orbit viewer.