Comet Prospects for 2017

February could be a busy month with the possibility of three periodic comets visible in binoculars.

This draft version was updated on 2016 March 17 to 2016 E1.

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These predictions focus on comets that are likely to be within range of visual observers, though comets often do not behave as expected and can spring surprises. Members are encouraged to make visual magnitude estimates, particularly of periodic comets, as long term monitoring over many returns helps understand their evolution. Please submit your magnitude estimates in ICQ format. Guidance on visual observation and how to submit estimates is given in the BAA Observing Guide to Comets. Drawings are also useful, as the human eye can sometimes discern features that initially elude electronic devices.

Theories on the structure of comets suggest that any comet could fragment at any time, so it is worth keeping an eye on some of the fainter comets, which are often ignored. They would make useful targets for those making electronic observations, especially those with time on instruments such as the Faulkes telescopes. Such observers are encouraged to report electronic visual equivalent magnitude estimates via COBS. When possible use a waveband approximating to Visual or V magnitudes. These estimates can be used to extend the visual light curves, and hence derive more accurate absolute magnitudes.

In addition to the information in the BAA Handbook and on the Section web pages, ephemerides for the brighter observable comets are published in the *Circulars*, and ephemerides for new and currently observable comets are on the JPL, CBAT and Seiichi Yoshida's web pages. The BAA Observing Guide to Comets is available from the BAA Office.

Comet **2P/Encke** makes its 63rd observed return to perihelion since its discovery by Mechain in 1786. The orbit is quite stable, and with a period of 3.3 years apparitions repeat on a 10-year cycle. This year the comet is well seen from the northern hemisphere prior to perihelion, which is in mid March. The comet starts the year as a telescopic object, but quickly brightens and could be a binocular object by mid February. It is however dropping rapidly into the northern dusk and will be lost by early March. It may be visible in the LASCO C3 field of the SOHO spacecraft from March 9 to 14. It then emerges rapidly into southern hemisphere skies, but fades equally quickly. BAA visual observations over the last 60 years show little change in the comet's absolute magnitude. The comet is the progenitor of the Taurid meteor complex and may be associated with several Apollo asteroids. This suggests that on occasion it may outburst, though nothing major has been detected to date.

Alexandre Schaumasse discovered comet **24P/Schaumasse** during a visual search with the 400mm coude equatorial at Nice, France in 1911 December as a 12^m diffuse object and it reaches a similar magnitude at average returns. The 1952 return was very favourable and the comet reached 5^m, though there may have been an outburst. The orbit is relatively stable and this will be its 12th observed return. It is a morning object throughout the brighter part of its apparition, so that despite a predicted peak of 10th magnitude most observations are likely to be electronic ones made with robotic telescopes.

29P/Schwassmann-Wachmann is an annual comet that has outbursts, which over the last decade seem to have become more frequent, though this could just reflect more intense coverage. Richard Miles has developed a theory that suggests that these outbursts are in fact periodic, and arise from at least four independent active areas on the slowly rotating nucleus. The activity of the active areas evolves with time. The comet is an ideal target for electronic observations and it should be observed at every opportunity. The comet is at a southern declination and begins the year in solar conjunction. It reaches opposition in Aquarius in August, when it is at a small phase angle and may show enhanced brightness.

Horace Tuttle was the first discoverer of **41P/Tuttle-Giacobini-Kresak** in 1858, when he found a faint comet in Leo Minor. Nearly 50 years later, Professor Michael Giacobini discovered a 13^m object whilst comet hunting, which was observed for a fortnight. Andrew C D Crommelin linked the apparitions in 1928 and made predictions for future returns, but the comet wasn't recovered and it was given up as lost. In 1951, Lubor Kresak discovered a 10^m comet in 25x100 binoculars whilst participating in the Skalnate Pleso Observatory's program of routine searches for comets. After further observations the comet was identified with the lost comet and a better orbit computed. At the 1973 return, which was similar to the 1907 return, it underwent a major outburst and reached 4^m, before fading and then undergoing a second outburst. Alternate returns are favourable and this, its 12th, is one of them. At the last return the comet reached around 10th magnitude but it should do better this time as it passes 0.14 au from the Earth in late March. The comet should be conveniently visible from the UK in the evening sky from the beginning of the year until July. It could be a binocular object from March until June, and possibly a naked eye object around the time of its close approach. A widefield imaging opportunity comes at the end of April when the comet passes 5° from M92.

45P/Honda-Mrkos-Pajdusakova was at perihelion at the end of 2016 and has a brief observing window in the evening twilight at the beginning of January**.** It emerges from solar conjunction at the beginning of February on its way to passing 0.08 au from the Earth on February 11. It could be a binocular object as it moves rapidly across the sky during February. Though it is initially a morning object, it quickly moves into the evening sky after closest approach, but by then begins to fade fast. It passes a few degrees from M3 in mid February.

71P/Clark Michael Clark of Mount John Observatory, New Zealand discovered this comet on a variable star patrol plate in June 1973. At discovery the magnitude reached 13, but alternate returns are unfavourable and it is then 5 magnitudes fainter, though it hasn't been missed. An encounter with Jupiter in 1954 put it into its present orbit, which is such that it can approach quite closely to Mars, passing within 0.09 au in 1978. This is the comet's 9th return since discovery and it could reach 10th magnitude. As might be expected from the discovery, it is best seen from the southern hemisphere though there are some morning observing windows from the UK.

96P/Machholz is at a high southern declination prior to perihelion, but may be within range of visual observation. It is an intrinsically faint comet, but reaches 2nd magnitude due to its relatively close passage to the Sun at perihelion. During its solar conjunction it may be visible in the SOHO C3 field if the spacecraft is still operating.

2015 V2 (Johnson) Jess A Johnson discovered a 17th magnitude comet in Catalina Sky Survey images with the 0.68m Schmidt on November 3.44. The comet could come into visual range in late 2016 and be well placed for viewing from the UK prior to perihelion in June, reaching around 6th or 7th magnitude. A morning object at the start of the year, it is at sufficiently high northern declination by February to be visible in the late evening, when it could be visible in large binoculars. It reaches opposition at the end of May, when it should be an easy binocular object, but is heading south and UK observers will loose it in early July. Southern hemisphere observers will be able to follow it until towards the end of the year. In late March it passes a few degrees from 9th magnitude globular cluster NGC6229. Southern hemisphere or remote observers could image the comet passing close to planetary nebula NGC 5882 around September 4 and open cluster NGC 6208 around October 10.

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The other periodic and parabolic comets that are at perihelion during 2017 are unlikely to become brighter than 10th magnitude or are poorly placed. Ephemerides for these can be found on the CBAT or other WWW pages. Several D/ comets have predictions for a return, though searches at favourable returns in the intervening period have failed to reveal the comets and the orbits will have been perturbed by Jupiter. There is however always a chance that they will be rediscovered accidentally by one of the Sky Survey patrols.

Looking ahead to 2018, there are three periodic comets that are likely to be of significance. Although perhaps 7th magnitude, 21P/Giacobini-Zinner will be a difficult object for visual observers early in the year as it will be quite low down. No significant dust trail encounters are expected at this return. 38P/Stephan-Oterma, which returns every 37 years, is well placed at the end of the year. 46P/Wirtanen makes a close pass to the Earth in December, when it will be well placed for viewing and possibly visible to the naked eye.

Comets reaching perihelion in 2017

Comet	T	q	P	N	H_1	K_1	Peak mag
D/Denning (1894 F1)	Aug 2.4	1.62	9.63	1	10.5	15.0	
D/Harrington-Wilson (1952 B1)	Mar 1.9	1.28	5.58	1	12.0	10.0	
P/Catalina (1999 XN_{120})	Jun 11.7	3.30	8.56	1	13.5	5.0	18
P/Skiff (2000 S1)	Jun 24.6	2.53	17.0	1	10.0	10.0	15
334P/NEAT	May 5.6	4.18	16.7	1	8.5	10.0	17
P/NEAT-LONEOS (2003 SQ_{215})	Feb 1.8	2.28	12.8	1	14.0	5.0	17
P/LINEAR-NEAT (2004 T1)	Oct 13.3	1.71	6.47	1	12.5	10.0	14
336P/McNaught	Feb 3.0	2.78	11.2	1	12.0	10.0	18
P/Catalina (2007 T6)	Feb 15.1	2.22	9.48	1	12.5	10.0	17
P/McNaught (2009 S2)	Dec 21.8	2.21	8.51	1	14.0	10.0	19
P/WISE (2010 D1)	Dec 19.3	2.69	8.49	1	13.0	10.0	19
P/Vales (2010 H2)	Sep 17.1	3.10	7.53	1	6.0	10.0	13
P/WISE (2010 P4)	Aug 18.9	1.86	7.13	1	19.5	15.0	23
P/Spacewatch (2013 YG_{46})	Jan 20.2	1.81	6.01	1	10.0	10.0	15

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Schwartz (2014 B1)	Sep 10.0	9.56			4.0	10.0	19
Asteroid 2015 ER$_6$ (PanSTARRS)	May 10.4	1.08			12.4	5.0	13
PanSTARRS (2015 T2)	May 21.4	6.93			8.0	10.0	21
2P/Encke	Mar 10.1	0.34	3.30	62	10.2	8.0	5
5D/Brorsen	Sep 19.3	0.53	5.62	5	9.5	10.0	
14P/Wolf	Dec 2.6	2.74	8.77	16	10.0	15.0	18
18D/Perrine-Mrkos	Feb 26.2	1.65	7.87	5	11.5	20.0	
24P/Schaumasse	Nov 16.5	1.21	8.26	11	7.6	24.2	10
30P/Reinmuth	Aug 18.8	1.88	7.33	11	9.5	15.0	16
41P/Tuttle-Giacobini-Kresak	Apr 11.4	1.05	5.42	11	7.2	25.3	3
47P/Ashbrook-Jackson	Jun 10.8	2.82	8.37	9	7.6	10.0	15
54P/de Vico-Swift-NEAT	Apr 15.7	2.18	7.39	5	10.0	15.0	17
62P/Tsuchinshan	Nov 15.7	1.38	6.38	8	9.5	15.0	12
65P/Gunn	Oct 16.8	2.91	7.64	8	7.9	6.6	14
71P/Clark	Jun 29.8	1.58	5.54	8	9.7	7.9	10
73P/Schwassmann-Wachmann	Mar 16.7	0.97	5.43	7	11.5	15.0	12
90P/Gehrels	Jun 19.3	2.97	14.9	3	8.5	15.0	19
93P/Lovas	Mar 1.3	1.70	9.19	4	10.1	10.7	14
96P/Machholz	Oct 28.0	0.12	5.29	6	13.0	12.0	2
103P/Hartley	Apr 20.3	1.06	6.48	4	9.0	33.2	11
128P-Shoemaker-Holt	Jan 10.6	3.06	9.56	3	8.5	10.0	15
139P/Vaisala-Oterma	Dec 10.9	3.41	9.64	3	7.0	15.0	17
145P/Shoemaker-Levy	Aug 31.7	1.90	8.43	3	13.5	10.0	17
172P/Yeung	Mar 13.1	3.34	8.63	3	13.0	10.0	21
176P/LINEAR	Mar 12.1	2.58	5.71	3	15.0	5.0	18
182P/LONEOS	Apr 11.6	1.01	5.10	3	18.0	10.0	19
183P/Korlevic-Juric	Nov 11.3	3.87	9.51	4	12.5	5.0	18
188P/LINEAR-Mueller	Feb 17.2	2.56	9.17	2	5.6	15.0	13
213P/Van Ness	Sep 24.3	1.98	6.12	2	10.5	10.0	14
217P/LINEAR	Jul 16.7	1.23	7.86	2	12.0	10.0	14
219P/LINEAR	Feb 21.0	2.37	6.97	2	11.0	10.0	20
227P/Catalina-LINEAR	Jun 21.9	1.79	6.79	3	16.5	5.0	19
229P/Gibbs	May 21.0	2.45	7.80	2	13.0	10.0	19
234P/LINEAR	Jun 1.7	2.85	7.45	2	12.0	10.0	18
236P/LINEAR	Nov 20.7	1.84	7.21	2	14.0	10.0	17
251P/LINEAR	Jul 17.0	1.73	6.56	2	16.5	5.0	18
255P/Levy	May 2.8	1.01	5.30	2	20.0	10.0	21
263P/Gibbs	Sep 29.9	1.26	5.35	2	18.0	10.0	21
311P/PANSTARRS	Jul 10.6	1.94	3.24	2	17.0	10.0	21
PanSTARRS (2015 V1)	Dec 17.9	4.27			6.5	10.0	15
Johnson (2015 V2)	Jun 12.5	1.64			5.0	10.0	7
Lemmon-Yeung-PanSTARRS (2015 VL$_{62}$)	Aug 28.8	2.72			8.0	10.0	14
PanSTARRS (2016 A1)	Nov 23.1	5.32			6.0	10.0	17
P/PanSTARRS (2016 A3)	Mar 11.0	4.85	21.2	1	10.0	10.0	20
P/NEAT (2016 A4)	May 5.6	4.18	16.6	1	10.0	10.0	19
PanSTARRS (2016 E1)	Aug 25.8	7.91			6.5	10.0	20

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The date of perihelion (T), perihelion distance (q), period (P), the number of previously observed returns (N), the magnitude parameters H_1 and K_1 and the brightest magnitude (which must be regarded as uncertain) are given for each comet. 5D has not been seen since 1879, 18D has not been seen since 1968. The magnitudes, orbits, and in particular the time of perihelion of the single apparition D/ comets, are uncertain. The asteroid may show cometary activity as it nears perihelion.

Note: $m_1 = H_1 + 5.0 * \log(d) + K_1 * \log(r)$

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