Comet Prospects for 2009

2009 is a fairly good year with three comets likely to come within binocular range. The best is a long period comet discovered in 2007, which could be within naked eye range in February. There are several other comets that should be within visual range for larger telescopes and many more for the CCD observers.

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 periodic comets, which are often ignored. This would make a useful project for CCD observers. Perhaps the most spectacular example of such fragmentation is 73P/Schwassmann-Wachmann, which exhibited a debris string of over 60 components as it passed close to the Earth in May 2006. Ephemerides for new and currently observable comets are published in the *Circulars*, Comet Section Newsletters and on the Section, CBAT and Seiichi Yoshida's web pages. Complete ephemerides and magnitude parameters for all comets predicted to be brighter than about 21^m are given in the International Comet Quarterly Handbook; details of subscription to the ICQ are available on the Internet. A section booklet on comet observing is available from the BAA Office.

22P/Kopff was discovered photographically by A Kopff at Konigstuhl Observatory in 1906, when it was around 11^m. The next return was unfavourable, but it has been seen at every return since then. Following an encounter with Jupiter in 1942/43 its period was reduced and the perihelion distance decreased to 1.5 AU. The following return was one of its best and it reached 8^m. The next return was unusual, in that it was 3^m fainter than predicted until perihelion, when it brightened by 2^m. It suffered another encounter with Jupiter in 1954, but this made significant changes only to the angular elements. 1964 was another good return and the comet reached 9^m. This will be another good return with the comet brighter than 13^m all year, although as the comet is at Southern declination, it will be best seen from the Southern Hemisphere. UK observers should pick it up as a binocular object of around 9^m in June, when it is at its brightest. It slowly fades, remaining in Aquarius, and will be around 12^{th} magnitude in November when it sinks into the evening twilight for northern observers.

67P/Churymov-Gerasimenko was discovered in 1969 September, by Klim Churyumov and Svetlana Gerasimenko on a plate taken for 32P/Comas Sola at Alma Ata observatory. It reached its present orbit after a very close encounter (0.05 AU) with Jupiter in 1959, which reduced the perihelion distance from 2.74 to 1.28 AU. At a good apparition, such as in 1982, when it approached the Earth to 0.4 AU and was well observed by the comet section, it can reach 9^{th} magnitude. This is not a particularly good apparition, as the comet remains at a relatively small elongation from the sun. There is however a short observing window in the early evening sky and it might be seen at around 12^{th} magnitude for the first few months of the year.

85P/Boethin was at a favourable perihelion in mid December and begins the year at around 8^{th} magnitude in the evening sky. It fades, reaching 13^{th} magnitude by the end of March, but remains favourably placed for observation. It had not been recovered by early September 2008, so the suggestions that it has become inert may be correct.

Ellen Howell discovered **88P/Howell** in 1981 with the 0.46-m Palomar Schmidt. It passed 0.6 AU from Jupiter in 1978, which reduced the perihelion distance, but the biggest change to its orbit occurred in 1585 when an encounter reduced q from 4.7 to 2.4 AU. The standard light curve is not a good fit to the observations and a better fit is obtained using a linear light curve that peaks a few weeks after perihelion, thus confirming the view that the comet is intrinsically brighter after perihelion. This return may see the comet reach 10th magnitude in late October, when it is on the borders of Scorpius and Ophiuchus.

116P/Wild was discovered on 1990 January 21.98 by Paul Wild with the 0.40-m Schmidt at the Zimmerwald station of the Berne Astronomical Institute at a photographic magnitude of 13.5. The comet was perturbed into its present orbit after a close approach to Jupiter in mid 1987. This time round the comet is quite well placed prior to perihelion, and may reach 11th magnitude.

144P/Kushida has a favourable apparition and the comet should be at its brightest at 11th magnitude at the beginning of the year. It slowly fades, reaching 13th magnitude in March.

169P/NEAT An asteroidal object discovered by NEAT on 2002 March 15.27 was found to show a tail in late July 2005 by two independent groups of observers. It had not shown a tail when observed two months earlier. The comet was linked to observations made by Spacewatch in 1998 and the DSS in 1989, and it was then numbered. How it will behave at this return is unknown, and in addition it is not particularly well placed during 2009. It becomes better placed in early 2010, but is then in southern skies.

2001 MD7 (P/LINEAR) has a reasonably favourable return and could reach 12th magnitude near the time of perihelion, coming into view for UK observers in August.

Following the discovery of **2003 A1 (P/LINEAR)** Brian Marsden noted that the object was probably of short period, and that its orbit was rather similar to that of comet D/1783 W1 (Pigott). Orbital calculations by Maik Meyer tended to confirm the identity of the object with D/1783 W1 and Nakano has computed a linked orbit, although the number of revolutions that it has made is uncertain. This apparition should help to confirm the identity. The comet could be 12th magnitude when it emerges into the morning sky in August and will slowly fade.

2003 K2 (P/Christensen) will remain poorly placed for northern observers until after perihelion. The orbit is not particularly well known, as it was only observed over a short arc at its discovery apparition. Emerging from conjunction at perihelion, it might come into view for UK observers in early February at around 10th magnitude and will quickly fade.

2006 OF$_2$ (Broughton) was at perihelion in the autumn of 2008 and slowly fades from 11th magnitude at the beginning of the year. Initially it is circumpolar for Northern Hemisphere observers and remains well placed in the evening sky, but will have faded to 13th magnitude by the end of March.

2006 W3 (Christensen) Eric Christensen discovered an 18th magnitude comet on November 18.40 during the course of the Catalina Sky Survey with the 0.68-m Schmidt telescope. Peter Birtwhistle was amongst those making confirming observations. It is a distant comet, but reaches perihelion near opposition and may reach 12th magnitude over the summer.

2007 G1 (LINEAR) was at perihelion at 2.7 AU in mid November 2008. The comet will start the year at 12th magnitude, but with a high southern declination will remain invisible from the UK. Southern Hemisphere observers will be able to follow it for several months as it slowly fades.

2007 N3 (Lulin) reaches perihelion early in 2009, and will start the year at around 8th magnitude. It quickly brightens and becomes better placed for viewing in the morning sky. It reaches its brightest of around 6th magnitude in late February when in Virgo, rapidly becoming visible in the evening sky. It remains well placed and is lost into the evening twilight in early May, by which time it has faded to 12th magnitude.

2007 Q3 (Siding Spring) was discovered during the Siding Spring Survey in August. For the first half of the year the comet is a Southern Hemisphere object, and just within visual range. After solar conjunction the comet will become visible to Northern Hemisphere observers in October and could reach 10th magnitude towards the end of the year.

The other periodic and parabolic comets that are at perihelion during 2009 are unlikely to become brighter than 13th magnitude or are poorly placed. Ephemerides for these can be found on the CBAT WWW pages. 18D/Perrine-Mrkos has not been seen since 1968. Searches at favourable returns in the intervening period have failed to reveal the comet and it is possible that it is no longer active.

Looking ahead to 2010 several comets will be visible. The highlight is the return of **103P/Hartley**, which makes a close approach to the Earth and could reach naked eye brightness. **81P/Wild** should become visible in binoculars at around 9th magnitude, whilst **2P/Encke** reaches 4th magnitude as it passes through the SOHO or STEREO fields.

Comets reaching perihelion in 2009

Comet	T	q	P	N	H_1	K_1	Peak mag
P/LINEAR (2002 CW_{134})	Jan 5.9	1.84	6.85	1	13.0	10.0	16
P/Christensen (2003 K2)	Jan 8.9	0.53	5.71	1	13.5	10.0	9
Lulin (2007 N3)	Jan 10.7	1.21			6.5	10.0	6
Gibbs (2008 G1)	Jan 12.1	3.99			9.5	10.0	19
68P/Klemola	Jan 21.0	1.76	10.8	4	6.8	15.0	13
195P/Hill (2006 W4)	Jan 21.1	4.44	16.5	1	8.5	10.0	18
P/LINEAR (2002 JN_{16})	Jan 25.1	1.78	6.49	1	14.5	10.0	19
144P/Kushida	Jan 26.9	1.44	7.60	2	10.0	15.0	11
P/LINEAR (2003 O3)	Jan 30.0	1.25	5.47	1	18.0	10.0	21
47P/Ashbrook-Jackson	Feb 1.0	2.80	8.34	8	5.0	15.0	14
202P/Scotti (2008 R2)	Feb 7.0	2.53	7.34	1	13.5	10.0	19
14P/Wolf	Feb 27.3	2.72	8.74	15	10.0	15.0	19
67P/Churyumov-Gerasimenko	Feb 28.4	1.25	6.45	6	9.5	10.0	12

Comet	T	q	P	N	H_1	K_1	Peak mag
59P/Kearns-Kwee	Mar 7.7	2.36	9.51	5	7.5	15.0	15
P/McNaught (2008 J3)	Mar 10.7	2.29	7.68	0	12.0	10.0	18
P/Van Ness (2002 Q1)	Mar 21.0	1.55	6.71	1	13.0	10.0	17
145P/Shoemaker-Levy	Mar 26.6	1.89	8.39	2	13.0	10.0	18
199P/Shoemaker (2008 G2)	Apr 9.8	2.94	14.6	1	10.0	10.0	16
P/LINEAR (2004 CB)	Apr 15.8	0.91	5.03	1	17.0	5.0	14
18D/Perrine-Mrkos	Apr 17.3	1.64	7.83	5	11.5	20.0	??
P/McNaught (2008 O2)	Apr 24.4	3.80	9.56		9.0	10.0	17
137P/Shoemaker-Levy	May 13.6	1.92	9.55	2	14.5	10.0	19
22P/Kopff	May 25.4	1.58	6.44	15	6.6	12.5	9
143P/Kowal-Mrkos	Jun 12.2	2.54	8.92	2	14.0	5.0	17
64P/Swift-Gehrels	Jun 14.3	1.38	9.34	5	9.0	20.0	13
P/LINEAR (2003 A1)	Jun 16.0	1.92	7.50	2?	6.0	15.0	12
P/LINEAR (2003 H4)	Jun 22.4	1.70	6.10	1	16.0	10.0	18
Garradd (2008 Q3)	Jun 23.5	1.81			10.0	10.0	13
Garradd (2008 P1)	Jul 2.6	3.64			7.0	10.0	15
Christensen (2006 W3)	Jul 6.5	3.13			5.0	10.0	12
77P/Longmore	Jul 7.8	2.31	6.83	5	7.0	20.0	15
116P/Wild	Jul 19.0	2.17	6.49	3	1.2	25.3	11
P/LINEAR (1999 XB_{69})	Jul 25.9	1.65	9.47	1	17.5	5.0	21
74P/Smirnova-Chernykh	Jul 30.3	3.56	8.53	5	5.0	15.0	15
24P/Schaumasse	Aug 9.6	1.21	8.29	10	7.6	24.2	11
89P/Russell	Aug 17.2	2.28	7.40	4	10.0	15.0	16
P/LINEAR (2002 T1)	Aug 25.5	1.31	6.96	1	18.0	10.0	19
P/LINEAR (2004 X1)	Sep 3.3	0.78	4.84	1	17.5	10.0	13
P/LINEAR (2001 MD_7)	Sep 9.0	1.22	7.83	1	12.0	10.0	12
Holmes (2008 N1)	Sep 25.3	2.78			9.0	10.0	16
Siding Spring (2007 Q3)	Oct 7.3	2.25			4.5	10.0	10
88P/Howell	Oct 12.5	1.36	5.49	6	4.7	24.9	9
127P/Holt-Olmstead	Oct 21.4	2.20	6.39	3	14.0	10.0	18
54P/de Vico-Swift-NEAT	Nov 28.4	2.17	7.37	4	10.0	15.0	16
169P/NEAT	Nov 30.3	0.61	4.21	4	16.0	5.0	12
100P/Hartley	Dec 6.1	1.98	6.30	4	8.9	15.0	16
P/McNaught (2004 K2)	Dec 15.5	1.55	5.50	1	15.0	10.0	19
P/Catalina (2005 JQ_5)	Dec 28.8	0.82	4.42	1	17.5	10.0	18

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. 18D/Perrine-Mrkos has not been seen since 1968. P/LINEAR (2003 A1) may be linked to P/Pigott, but this is not yet confirmed. A linear light curve for 88P/Howell, peaking several weeks after perihelion is a better fit to the observations, but the conventional parameters are given here.

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

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