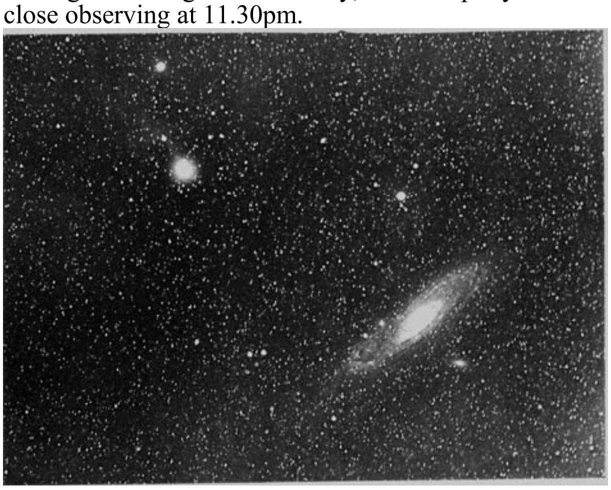
THE COMET'S TALE

Newsletter of the Comet Section of the British Astronomical Association

Number 27, 2007 December

Discovery of a New Comet in Andromeda

We have had very little decent weather for observing in London of late, but I make a practice of never missing an opportunity. Sunday, November 6th, was far from clear, and did not improve as the night deepened, so after looking at Jupiter and a few double stars and finding the seeing unsatisfactory, I made up my mind to close observing at 11.30pm.



17P/Holmes photographed by Barnard on 1892 November 10

Ever since the temporary star appeared in M31, I have taken an observation of that nebula at every chance I have had in case any further outbreak took place, and on Sunday night it occurred to me to try whether I could see the small comes to μ Andromedae under such conditions. On swinging the telescope round from β I caught something nebulous in finder and mistook it for M31. Going to the eyepiece of reflector I recognised at once that it was not the nebula and called out involuntarily, "What is the matter? there is something strange here." My wife heard me and thought something had happened to the instrument, and came to see. I recognised at once that it was a new comet, but before I could get more than a rough position clouds hid it. I said to my wife: "This is coming end on, and will be big fellow, and I must get a position before I leave if possible." I wrote at once to Mr Maunder, Mr Maw, and Mr Kidd of Bramley, and posted, and then got clearer sky, and with Slade micrometer made it immediately preceding Σ72, the interval of passing the centre being 1m 10s at a single trial.

Having only restricted sky room, I was unable to make a second measure or see if motion was perceptible. I measured the diameter of the nebulosity as exactly five of the one minute divisions of the micrometer. As these are calculated for a 6-feet focus, and my focus is 78.5 inches, the estimated diameter is rather over than under the mark, but I consider the milky state of the sky somewhat reduced apparent diameter, and that probably 5' is exact. The position in declination is very close also, as both comet and star travelled accurately on wire. As regards R.A., the difference did not exceed 1m 10s I am sure, but it may have been 1s less.

On Monday morning I wrote the Astronomer Royal, but as I omitted to say I saw the Andromeda nebula at the same time, he very naturally at first thought I had blundered. My friend Mr Kidd, with whom I have corresponded for years, and to whom I am indebted for much counsel and kindness, also suspected a mistake, but on Monday evening he saw the comet with the naked eye, as did also Mr Bartlett of Bramley. I wrote again to Greenwich, and being now satisfied of the reality of the discovery, they took measures to spread necessary information. Mr Maw accepted the matter at once and wrote to congratulate me.

It is unnecessary for me to enter into any particulars of further observations because they are sure to be furnished by those with better and more exact appliances, at any rate as regards position; but perhaps my impressions of change, when seen a second time on November 14th, at 10.45, may have some value, because no one but myself and Mrs Holmes appears to have seen it for some days after its first appearance with any telescopic means. On the 14th the nucleus was much less distinct and much less bright, the boundary of the nebulosity was much less well defined and less perfectly circular and far more like a nebula. The intrinsic brilliancy was less, but the diameter largely increased. Only getting a look at it betwixt clouds and showers, I was not able to measure, but by comparison with the half-field of Slade micrometer I estimated the diameter at from 8' to 9'.

It will be a pleasure to learn that others have had better weather than myself, and gathered a large number of facts for our instruction.

Edwin Holmes

(*The Observatory* No 195, 1892 December)

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The Section newsletter is now free to all BAA Members who make contributions to the work of the Section. The cost for other postal subscribers is £5 for three years, extended to four years for those who contribute to the work of the Section in any way, for example by submitting observations or articles. **Renewals should be sent to the Director and cheques made payable to the BAA.** Those due to renew should receive a reminder with this mailing. You can also download the newsletter (in colour) from the Section web page and in future this will be the only option for non BAA subscribers.

Section News from the Director

Dear Section member,

I will be in Antarctica from early January to late February or early March, hence I have compiled this edition of the newsletter to get to you just after the New Year. These days location does not make much difference and I should be in just as good email contact as when I am in the UK. I won't however have much darkness, although I will at least have sunsets. Only towards the end of my stay will the sun be far enough below the horizon to see stars, and even then there will be a full moon low to the north.

Comet 2006 P1 (McNaught) proved to be an outstandingly great comet, although more spectacular from the Southern Hemisphere. Richard Miles was able to make photometric observations in broad daylight, setting a standard for others to follow. This was followed by 2007 F1 (LONEOS), which would under other circumstances have attracted more attention. In October 17P/Holmes exploded into view, presenting one of the most unusual comets on record. Finally 8P/Tuttle looks to be on track to reach naked eye brightness at the end of the year. Who knows what the New Year will bring!

One certain fact is that the all sky surveys are getting deeper and deeper. They are therefore more likely to pick up incoming comets and give a long period of notice for future potentially great comets. They are however still not covering the entire sky and there is a chance for amateur discoveries. I wonder who will make the last one?

Despite my editorial in the last edition many contributors are still not using the standard naming convention for image files and this has proved to be a nightmare with comet Holmes. Using the correct format only takes a little more time for the observer, but the observer not using it takes up a lot of time for me. So please, when submitting observations it is very helpful if you can use **exactly** the right format for example 2007x1_20071203_observer.jpg or 17p_20071115_observer.jpg. DO NOT use c2007x1 as the comet name, DO NOT give the date as 07Jan03, DO NOT use DSCN0003.jpg and finally DO add your name. The image should include details of the identity of the comet, time of observation, orientation, scale bar, exposure, telescope, observer etc. Similar comments apply to photographic observations – please mark the north point on the slide, and if it is a wide-field view, with the comet barely, visible please indicate the identity of some bright stars in the field.

Visual observers please double check that you are correctly using the ICQ format by looking at the observations file http://www.ast.cam.ac.uk/~jds/2007obs.obs on the Section web page and comparing your format with what is used here. Note that I delete leading zeroes from the day and month, however they are preferred by the ICQ. Numbered comets don't have any leading zeros (so 17 not 017) nor does the magnitude (so 3.5 not 03.5).

It has been a very busy period for comet observing, particularly with 17P/Holmes and I would like to thank everyone who has submitted observations or made contributions since the last newsletter. The quality of imaging is outstanding and the reproduction of selected images in the newsletter rarely does justice to the originals. Without visual observations it would be impossible to produce the comprehensive light curves that appear in each issue of *The Comet's Tale*. Observations from groups that currently do not send observations to the BAA would be much appreciated as they make a valuable addition to the analyses.

I'm sorry that it is no longer possible to produce the newsletter twice a year. It takes up much of my time just keeping the web pages up to date, and I have little time to spare for other tasks, including correspondence. Similar constraints apply to keeping the image archive up to date, a task that is made more complex when the file names require editing. I am however making slow progress on the reports on the comets of 1999 and 2000 and I hope to complete the first of these in the near future, with the second being a target for my time in Antarctica.

I regret to report the death of Miss Mary Hilsden, who was a Section member around a decade ago. She was not an observer, but did come along to meetings.

I have not given the usual list of observers and comets this time. In part the sheer number of observers of comets 2006 P1 and 17P make it a rather long, and perhaps uninteresting list (but would readers like to see this list?), and also with many observers using CCD imaging rather a large number of comets are under observation. What I would like to see are more UK observers making visual observations of some of the intermediate comets of between 9th and 12th magnitude. Sadly there is something of a decline in such observations, perhaps under the impression that CCD observations reign supreme. There is however still a significant difference between magnitudes reported by CCD and visual observers. In order to maintain historic continuity, particularly for periodic comets I foresee a need for visual observations for years to come.

Best wishes for the New Year,

Jonathan Shanklin

Tales from the Past

This section gives a few excerpts from past RAS Monthly Notices and BAA Journals.

150 Years Ago: The annual report to the RAS notes of vague references to two comets, one seen on the coast of Peru the previous August and another visible from Panama early in January. The report thought that the former might also have been observed from Beeston Observatory near Nottingham. It appealed for observations of the comets, however rough they might be. [*Somewhat surprisingly neither object seems to be included in Kronk's Cometography.]* There was a report of comet Brorsen, which is now known as 5D/Brorsen. It had been missed in 1851 "though sought for on all available opportunities at Cambridge and elsewhere", but was recovered as a new comet by Dr Bruhns at Berlin on March 18. Professor Challis observed the comet with the Northumberland refractor at Cambridge and noted "It now appears that the elements of the orbit computed from the observations of 1846, which extended over only two months, were considerably in error, and that the comet escaped detection in 1851, probably from the inaccuracy of the sweeping ephemeris".

The Northumberland refractor

100 Years Ago: [*In the previous issue I suggested the possibility of a typo in the date for return of Halley's comet*] A Note apologises for the error in the previous Journal (not the fault of the writer of the Notes) whereby the years for the predictions by Angstrom and Pontecoulant's were given the wrong way round, although the fractions were correct. The Author of the Note [*Crommelin ?*] says "It is now certain that Pontecoulant's date is very nearly right, though he has made a serious mistake in his value of the perihelion distance at the next return, which should be 0.59, not 0.69, as his figures indicate. David Ross, a Member of the Victoria Branch was awarded the 55th Donohoe Medal of the Astronomical Society of the Pacific for his discovery of an unexpected comet on 1906 March 17. Dr Holetschek of Vienna had noted the apparent lengthening of a comets' tail at the time of passage of the earth through the plane of the comet's orbit and deduced that comet tails were much longer than formerly supposed, as was being shown by photography. Mr Crommelin delivered his promised lecture on Halley's comet at the February meeting. He predicted a great display from the comet. The President was certain that this would occur, and that there would not be a let down such as that which followed a prediction made at a BAA Meeting in 1899 for an extraordinary display from the Leonids. The President also looked forward to Mr Crommelin settling the debate as to whether the comet of 1066 was Halley's. The lecture was published in full in the Journal. Barnard noted in Astronomische Nachrichten that a plate exposed at Mount Wilson on 1905 July 25 showed the trail of a comet. [*Gary Kronk was able to link the position with comet 1906 B1 (Brooks), discovered on 1906 January 27 and gives details in Cometography III*]. At the March meeting Mr Crommelin commented on the possibility of comet families. The comets of 1843, 1880, 1882 and 1887 all had accordant elements and were supposed to have broken up and spread to a wider and wider extent. [*These particular comets are all members of the Kreutz group of comets*]. Mr Lynn published a paper on "Three remarkable comets", being Newton's (1680 V1), Halley's and Encke's. He commented that understanding the changing period of 2P/Encke was one of the pending problems of astronomy. He also suggested that the inscription on the Bayeux Tapestry should be read "isti mirantur stellam" and that Pope Calixtus III never issued a bull against the comet of 1456. Mr Crommelin reproduced some poetry from "The Gentleman's Magazine" showing the change of opinion following the recovery of Halley's comet:

In 1758 October:

Comet, that came in eighty-two,
Would come, it was foretold, anew,
Late in the last or soon this year,
That sees, tho' late, none such appear.

For tho' philosophers may sing
That calculation proves the thing,
Pray, let them tell us how they show
That this their calculation's true.

But in 1759 May:

Hah! there it flames, the long expected star,
And darts its awful glories from afar,
Punctual at length the traveller appears,
From its long journey of near fourscore years.

Lo! the reputed messenger of fate,
Arrayed in glorious but tremendous state,
Moves on majestic o'er the heavenly plain,
And shakes forth sparkles from its fiery train.

O for the tube, with philosophic eye,
To trace the shining wand'rer through the sky.

Ye sons of science, from your high abodes
Descry its oblique path, and mark its nodes,

Pursue the steps of the sagacious sage,
And be this wiser than the former age.

The June Journal has a letter from John Tebbutt suggesting that Mr Crommelin had made a couple of mistakes in his lecture. Mr Crommelin agreed that he had the date wrong for the first photograph of a comet, which was of 1881 K1, but disagreed that it had been a conspicuous object in Europe, so his paper needed no correction on this point. In a note from HCO Circular 128 Professor Pickering decried the unnecessary duplication of effort in computing cometary orbits after he had received four essentially identical ones for comet 1907 L1 [*Much later identified as 41P/Tuttle-Giacobini-Kresak*], when there were many asteroids needing orbit computation. At the July meeting Mr Maunder commented on the possibility of 1907 L2 (Daniel) becoming a naked eye object towards the end of August. A letter from David Ross complains of poor weather preventing him from comet searching and that Mr Grigg had been fortunate to discover a most interesting comet early in April. He said that like a Flying Dutchman it resembled more or less the comet that was expected to strike the Earth some time in March, but it did not come near enough. [*Can anyone throw any light on this expectation?*] A letter from Mr Denning notes that he has compiled a list of all naked eye comets seen since 1850 [*Perhaps in answer to Mr Crommelin's assertions ?*] and that the aggregate was 59, roughly one a year. He himself had seen 105 comets from Bristol in the last 40 years. The annual Section report notes that six comets had been discovered during the session, but only two were observed by Members. The October Journal notes the death of Professor Kreutz, who had taken a special interest in cometary investigations, publishing a paper on the system of comets of 1843, 1880 and 1882. Prediscovery images of 1904 H1 (Brooks) had been found by Mrs Flemming on seven plates taken at Arequipa in 1903 May and June, bringing the observed arc to 753 days. Spectra of Daniel's comet were recorded at Gottingen, showing hydrocarbon and cyanogen. In Astronomische Nachrichten Herr Kopff of Konigstuhl concludes that the tail of 1903 M1 (Borrelly) deviated noticeably from the plane of the comet's orbit, which could scarcely be produced by solar action alone. At the December meeting Mr Crommelin commented on 1907 L2, saying that it was the brightest seen from Europe since the Great Comet of 1882, although he knew that Mr Denning disagreed. It had been necessary to get up at 3am to see it, but many had done so. He thought that the authorities at Kiel made it a rule not to send details to the Southern Hemisphere in the cases where a comet was better placed for northern observers. In this case there wasn't much difference, but the Australians hadn't been notified and had had to discover it for themselves!

50 Years Ago: At the January meeting Mr Noon looked forward to 1956 R1 (Arend-Roland), however Dr Merton commented "Comets do not always live up to expectations. Don't boast about this one until it starts to show us something to really look at." A paper on Samuel Pepys' astronomical entries in his diary includes an entry on 1665 March 1: "To Gresham College (Royal Society) where Mr Hooke read a second very curious lecture about the late comet [*1664 W1*]; among other things proving very probably that this is the very same Comet that appeared before in the year 1608 [1P/Halley was visible in 1607] and that in such a time it will appear again which is a very curious opinion, but all will be in print." At the end of January meting Dr Waterfield reported "that he had found a painting of Donati's comet in his favourite pub. It was painted from Bankside, a few hundred yards west of the old Anchor Inn, and shows the comet lying above the dome of St Paul's [*Presumably the same illustration as shown on the front cover*]. The interesting point is that the present comet will have much the same relation to St Paul's if viewed from the Anchor Inn during the week following Easter. I can strongly recommend the site, not only from the point of view of the comet and St Paul's, but also on account of the excellent beer available." Dr Merton reported that he had had a visit from a lady of eighty-one who was anxious to see the comet, as she had seen the comet of 1882 when she was six years old. Dr Waterfield commented that it was interesting that whilst the coma of a comet has a greater extent visually, the tail of a comet extends to a much greater length photographically. He suggested that this was because the coma faded off indefinitely whilst the tail had sharply defined lateral margins. Comet 1956 R1 came into view in mid April and was extensively reported. [*In 1996 Mike Hendrie published the definitive paper recording the observations of the comet in BAAJ 106 (6)*] Photographs of the comet were shown at the annual Exhibition meeting. [*Interestingly at that time there were as many exhibits from individuals as there were from Sections.*] The comet had been observed by the New Zealand and French Antarctic Expeditions [*I have observed a number of comets from Antarctica myself, beginning with the first observation of comet Halley from the continent*]. Mike Hendrie was the first to report an observation from the UK. Dr Steavenson ranked the comet second to the daylight comet of 1910. He also commented "Some of the visitors to the Cambridge Observatories were evidently disappointed in the view they obtained during twilight; but they would have been well rewarded if they had waited another half-hour." The annual reported noted that only three comets had been observed during the year. Four periodic comets had been recovered, three from predictions made by BAA computers in the Handbook, most notably comet 27P/Crommelin, which had also been recovered by Michael Hendrie, but who hadn't been able to confirm the recovery until after the official announcement by Ludmilla Pajdusakova at Skalnate Pleso. The October journal records that Clive Hare, a fifteen year old schoolboy independently found comet Mrkos on August 3.1 and was the first to see it from the UK. [*Michael Hendrie also collated reports of this comet in the paper mentioned above*.]

Observing program “T3”: Finding comets in the asteroid population

Gianluca Masi, Raul Behrend, Luca Buzzi, Claudio Cremaschini, Sergio Foglia, Gianni Galli and Maura Tombelli

(also to appear in the Minor Planet Bulletin)

An observing program to find comets in the asteroidal population is presented. No additional instruments than those normally used for minor planet observations are necessary. The involved people periodically receive an observing planner by email and the observing results are shared over the internal mailing list, this being a vital step to confirm possible cometary features of minor planets and NEOCP objects as soon as possible, eventually with the collaboration of professional astronomers.

The “T3” project is an observing program with the main purpose of discovering cometary objects “hidden” in the asteroidal population and having a Tisserand parameter with respect to Jupiter (Tj) less than 3. According to Levison (1996), Tj = 3 is approximately the boundary between asteroidal and cometary orbits; minor bodies with T < 3 are under Jupiter’s gravitational influence and they could be cometary nuclei of the Jupiter Family Comet class. Hence the name of the project.

As mentioned, the goal of the project is to observe nearly all the objects having Tj < 3 but reported as asteroidal in appearance, for example at the time of discovery. Most of the professional surveys looking for minor planets do not check their images and their discoveries are usually classified as asteroids; further observations can address the final physical classification and its eventual agreement with the dynamical view. Gianluca Masi serves as principal investigator of this project.

As soon as the program started, it provided a positive result: on 2005 December 7 and 29, CCD images of asteroid 2005 SB_{216}, obtained and checked by S. Foglia, showed that the object, listed in a preliminary database of “T3” targets, showed a Full Width at Half Maximum (FWHM) larger than that of the stars around. On 2006 February 4, L. Buzzi confirmed the observations, as well as – few days later - F. Bernardi, D. Tholen, J. Pittichova (IfA, University of Hawaii), who used the 2.24-m telescope of the University of Hawaii. The following day, IAUC 8668 and MPEC 2006-C48 were issued with what was the first discovery of the “T3” observing team. The latter was officially presented at the Meeting on Asteroids and Comets in Europe (MACE), held in May, 2006 in Vienna. After that, many people joined the program and now there are observers all around the world.

The evaluation of the FWHM of candidates against that of the stars in the same field-of-view is a promising technique, which has been intensively used by G. Masi over the last years (see, for example, IAUC 8104) and during his PhD work.

Thanks mainly to S. Foglia, special software has been developed to extract all the objects with Tj < 3 from the MPCOrb.dat file, with some constraints on their magnitude and elongation from the Sun. A text-format file is created including all the data of interest for each object (see below) and sent through a special mailing-list (hosted at the Geneva Observatory by R. Behrend) by the coordinator (L. Buzzi). So, observers can choose which targets are suitable for their equipment and location.

Also, objects listed on the Minor Planet Center’s Near Earth Object Confirmation Page (NEOCP) are suitable to be T3 targets. Usually on a daily basis, a message is sent to the mailing-list by S. Foglia with the NEOCP objects possibly on a cometary orbit. In these cases, the discovery of cometary features is a time-critical event because an object does not usually stay too long on the NEOCP and a MPEC is issued by the MPC as soon as a reasonable orbit is obtained from the available observations. If cometary fingertips are found, these findings are included in the IAUC.

Observing Planner

Usually twice a month (sometimes more frequently) the Observing Planner (OP) is distributed as a text-format file over the mailing list by the coordinator. It contains the following information: asteroid catalogue number, name or designation; the MPC orbit code (that reveals the dynamical type of orbit); an observing status flag that will be equal to 1 if no cometary feature was detected in the last two weeks, 2 if no cometary feature was detected in the last month, 3 if no cometary feature was detected prior to the last month, 9 if there are special notes (listed at the end of the OP) about the possible cometary feature. This flag is maintained by the coordinator in the “T3” database using feedbacks from observers about their positive or negative observations.

Thanks to A. Morbidelli (Observatoire de la Cote d’Azur, France) it is possible to include in the OP the sum of ‘Outer Main Belt’ and ‘Jupiter Family’ NEO's source region probability (Bottke W. F. Jr et al 2002). Perihelion date, Tisserand parameter respect to Jupiter Tj, number of observed oppositions, semi-major axis, eccentricity, inclination, current sky position and magnitude, apparent motion, geocentric and heliocentric distances, elongation from Sun are also reported in the OP. Thanks to G. Matarazzo and R. Serpilli (Italy) it was possible to include the Minimum Orbital Intersection Distance (MOID) with Jupiter for the minor planets involved in the OP.

Observing Technique

One must take at least two or more series of images for each object (under good seeing for the observer’s location) in order to obtain the highest Signal to Noise Ratio (SNR) possible (at least 10, the more the better, in order to avoid false detections, always possible with the average seeing at many amateur observing sites). Also, it is important to choose the right integration time, to limit the trailing effects, which would make the final images difficult to judge. All the good, collected frames have to be calibrated (with bias and dark frame subtraction and flat-field normalization), and then (using Astrometrica, CCDsoft and similar software) stacked according to the apparent motion of the asteroid. If the cometary appearance is not obvious by visual inspection of the resulting image, it is necessary to measure the FWHM of the object. If its value is at least 25% greater than that of stars (obviously stacked with a zero motion) of similar SNR and possibly close to the target - to limit optical effects – then it is a probable detection of a coma. Obviously, in order to make reliable assumptions about the presence of this feature, the results from the different series of images must be very similar. We're also testing different approaches to reveal cometary features to be used as possible, independent confirmation of the FWHM measurement.

Astrometry for every observed object must be obtained in the traditional way and sent, as usual, to the MPC. In the case when a cometary feature is found, the observer must send a message to the MPC and CBAT and also send a message to the mailing list for independent confirmation in a short time period (if the cometary feature is suspicious, one must send an e-mail only to the mailing-list); a copy of the measures, together with the FWHM of the object, FWHM of the comparison stars and the SNR of the object should be reported in the message to the mailing list. The last step is eventually taken by the coordinator: once some confirmations are received, he may inform professional astronomers for the definitive report to the MPC.

Negative reports are also very useful for planning future observations, because notes will be added on the database and made available to the people involved in the project via the OP.

Interested observers will find additional information and how to join the T3 Observing Program at http://asteroidi.uai.it

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Professional Tales

Many of the scientific magazines have articles about comets in them and this regular feature is intended to help you find the ones you've missed.

Search for Cometary Activity in Three Centaurs *O. Lorin and P. Rousselot* Proceedings of the XVIIIemes Rencontres de Blois

We have searched for evidence of a dust coma around three Centaurs [(60558) Echeclus (or 174P/Echeclus), 2000 FZ_{53} and 2000 GM_{137}] and two trans-Neptunian objects [(28978) Ixion and (29981) 1999 TD_{10}]. Despite the recent discovery of a coma around (60558) Echeclus, none of these objects, observed with a 3.5- and an 8-m telescope, presents any evidence of cometary activity at the time of observation.

Cometary diversity and cometary families *J. Crovisier* Proceedings of the XVIIIemes Rencontres de Blois

Comets are classified from their orbital characteristics into two separate classes: nearly-isotropic, mainly long-period comets and ecliptic, short-period comets. Members from the former class are coming from the Oort cloud. Those of the latter class were first believed to have migrated from the Kuiper belt where they could have been accreted in situ, but recent orbital evolution simulations showed that they rather come from the trans-Neptunian scattered disc. These two reservoirs are not where the comets formed: they were expelled from the inner Solar System following interaction with the giant planets. If comets formed at different places in the Solar System, one would expect they show different chemical and physical properties. In the present paper, I review which differences are effectively observed: chemical and isotopic compositions, spin temperatures, dust particle properties, nucleus properties... and investigate whether these differences are correlated with the different dynamical classes. The difficulty of such a study is that long-period, nearly-isotropic comets from the Oort cloud are better known, from Earth-based observations, than the weak nearly-isotropic, short-period comets. On the other hand, only the latter are easily accessed by space missions.

Volatile Loss and Retention on Kuiper Belt Objects *E.L. Schaller and M.E. Brown* (To appear in:

Astrophysical Journal)

Recent discoveries have shown that the very largest Kuiper belt objects - Eris, 2005 FY9 and Sedna - are coated in methane, and may contain other volatile ices as well. New detailed observations show that even within this class of volatile-rich bodies unexpected differences exist in their surface compositions. 2005 FY9, a body approximately 60% the size of Pluto, with a reflectance spectrum similarly dominated by methane, has a surface depleted in molecular nitrogen by at least an order in magnitude with respect to Pluto. We find that the existence this new class of volatile-rich objects, the lack of volatiles on most Kuiper belt objects, and even the otherwise peculiar surface of 2005 FY9 can be explained as a consequence of atmospheric escape of volatile compounds. While previous studies of the surface compositions of objects in the Kuiper belt have found no explainable patterns, atmospheric escape appears to provide a first-order explanation of the range of surface spectra seen on bodies in the outer solar system.

Transneptunian Object 2003 UB313 as a Source of Comets *A.S. Guliev* Solar System Research, 41, 46 (2007 February)

The possibility of interrelation between long-period comets and 2003 UB313, a recently discovered large Kuiper Belt body, is investigated. For this purpose, 78 objects crossing the plane of motion of this body at distances from 37.8 to 97.6 AU have been selected from 860 long-period comets. The overpopulation of comets with this characteristic is also considered. The plane of motion of 2003 UB313 is compared with the orbital planes of other objects in number of comet crossings in the specified distance interval or in some parts of it. A statistically significant overpopulation of elliptic and intermediate comets with the corresponding orbital nodes has been established. Recently discovered and absolutely faint comets show the best effect in this sense. The same is also true for comets with osculating eccentricities e < 1. A similar result is also obtained for comets with ``original" a1 > 0.010000. It is hypothesized that the 2003 UB313 family is present among the 78 comets. Four of them have aphelion distances from 37.8 to 97.6 AU. An ellipticity is traceable in the distribution of some of the 78 distant nodes. This may be considered as a further argument for the suggested hypothesis. Generally, the body 2003 UB313 may be assumed to play a prominent role in injecting observable comets from the transneptunian region.

The Fundamental Role of the Oort Cloud in Determining the Flux of Comets through the Planetary System *V.V. Emel'yanenko, D.J. Asher, and M.E. Bailey* (To appear in Monthly Notices of the Royal Astronomical Society)

A model of the Oort cloud has been developed by accounting for planetary, stellar and Galactic perturbations using numerical symplectic integrations covering 4.5 Gyr. The model is consistent with the broad dynamical characteristics of the observed cometary populations injected from the Oort cloud into different regions of the Solar system. We show that the majority of observed high-eccentricity trans-Neptunian objects, Centaurs and short-period comets have visited the Oort cloud (a > 1000 au) during their dynamical history. Assuming from observations that the near-parabolic flux from the Oort cloud with absolute magnitudes H10 <7, perihelion distances q <5 au and a>104 au is approximately 1 comet per year, our calculations imply a present Oort cloud population of ~5 x 1011 comets with H10<10:9. Roughly half this number has a>104 au. The number of comets reaching the planetary region from the Oort cloud (a>1000 au) is more than an order of magnitude higher per unit perihelion distance immediately beyond Neptune than in the observable zone q < 5 au. Similarly, the new-comet flux from the Oort cloud per unit perihelion distance is a few tens of times higher in the near-Neptune region than in the observable zone. The present number of high-eccentricity trans-Neptunian objects (q>30 au and 60< a<1000 au) originating from the Oort cloud is in the approximate range 1-3x1010, depending on details of the initial model. A substantial fraction of these have a>200 au and/or q>40 au, and they are found mostly to originate from initial orbits with 25<q <36 au. Similarly, the number of Centaurs produced from the Oort cloud, where we define Centaurs to have 5 <q< 28 au and a<1000 au, is smaller by a factor of 20-30. About 90 per cent of these Centaurs have a>60 au. Objects that have visited the Oort cloud represent a substantial fraction of the Jupiter-family comet population, achieving short-period orbits by a process of gradual dynamical transfer, including a Centaur stage, from the outer Solar system to near-Earth space. A similar mechanism produces Halley-type comets, in addition to the well-known diffusion process operating at small perihelion distances.

The Cambridge-Conference Network (CCNet)

CCNet was an electronic network devoted to catastrophism, but which included occasional information on comets. It has become devoted to greenhouse warming scepticism, however there have been a few comet related items. To subscribe, contact the moderator Benny J Peiser at <b.j.peiser@livjm.ac.uk>. The electronic archive of the CCNet can be found at http://abob.libs.uga.edu/bobk/cccmenu.html

Extraordinary Claims *David Morrison* NEO News (08/17/07)

NEO News is an informal compilation of news and opinion dealing with Near Earth Objects (NEOs) and their impacts. These opinions are the responsibility of the individual authors and do not represent the positions of NASA, the International Astronomical Union, or any other organization. To subscribe contact dmorrison@arc.nasa.gov. For additional information, please see the website http://impact.arc.nasa.gov.

Recent press attention has been directed toward two new science papers involving NEOs. These are: "The Origin of Life in Comets" by Napier et al. (published in the current issue of The International Journal of Astrobiology) and "Comet May Have Exploded over North America" by Kennett et al. (discussed on the National Science Foundation website). Each of these papers makes extraordinary claims about the role of NEOs in the origin and evolution of life. However, these extraordinary claims are not backed up by compelling evidence. This edition of NEO News briefly discusses some reasons to be skeptical of these results. (Note that these criticisms represent my own personal opinion only, although I have profited from discussing them with several colleagues).

1. **The origin of life in comets** *W.M. Napier, J.T. Wickramasinghe & N.C. Wickramasinghe* (The International Journal of Astrobiology)

Abstract: Mechanisms of interstellar panspermia have recently been identified whereby life, wherever it has originated, will disperse throughout the habitable zone of the Galaxy within a few billion years. This re-opens the question of where life originated. The interiors of comets, during their aqueous phase, seem to provide environments no less favourable for the origin of life than that of the early Earth. Their combined mass throughout the Galaxy overwhelms that of suitable terrestrial environments by about 20 powers of ten, while the lifetimes of friendly prebiotic environments within them exceeds that of localised terrestrial regions by another four or five powers of ten. We propose that the totality of comets around G-dwarf sun-like stars offers an incomparably more probable setting for the origin of life than any that was available on the early Earth.

Critique

This paper concludes that it is a factor of a trillion-trillion (10^{24}) more likely that life arose in comets than on terrestrial planets like the Earth. However, this "incomparably more probable" number is arrived at only by a series of assumptions, some not very secure.

Although reported as a relative probability of origin of life, this number is derived primarily from an estimated ratio of the volume of all solar-system comets to the very limited volume of water-saturated clays at the surface of the Earth. To associate this ratio of volumes with the probability of life, one must make several assumptions:

1. Life formed in clay (This is just one of many possibilities)

2. Comets contain lots of clay (But the scientists who publish data from the Deep Impact mission do not refer to clay, but to a variety of silicates.) This assumption that Earth has very little clay while comets are full of clay is the key to their argument.

3. Comets maintain liquid water (and wet clay) throughout their interior volumes over millions of years, or more. (The evidence for past water activity in comets is usually ascribed to very short-lived radioactive heating at the dawn of the solar system, not a persistent situation.)

4. Life needs only water and clay and organics to form (no mention is made of energy sources.)

5. Life once formed in comets and frozen there survives for hundreds of millions of years, perhaps even to the present (neglecting that it may be killed by lack of nutrients or of energy, or by cosmic ray irradiation.)

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2. **Comet May Have Exploded Over North America 13,000 Years Ago** presented at AGU meeting 2007 May 23

New scientific findings suggest that a large comet may have exploded over North America 12,900 years ago, explaining riddles that scientists have wrestled with for decades, including an abrupt cooling of much of the planet and the extinction of large mammals. The discovery was made by scientists from the University of California at Santa Barbara and their colleagues. James Kennett, a paleoceanographer at the university, said that the discovery may explain some of the highly debated geologic controversies of recent decades.

The period in question is called the Younger Dryas, an interval of abrupt cooling that lasted for about 1,000 years and occurred at the beginning of an inter-glacial warm period. Evidence for the temperature change is recorded in marine sediments and ice cores. According to the scientists, the comet before fragmentation must have been about four kilometres across, and either exploded in the atmosphere or had fragments hit the Laurentide ice sheet in northeastern North America. Wildfires across the continent would have resulted from the fiery impact, killing off vegetation that was the food supply of many of larger mammals like the woolly mammoths, causing them to go extinct. Since the Clovis people of North America hunted the mammoths as a major source of their food, they too would have been affected by the impact. Their culture eventually died out.

The scientific team visited more than a dozen archaeological sites in North America, where they found high concentrations of iridium, an element that is rare on Earth and is almost exclusively associated with extraterrestrial objects such as comets and meteorites. They also found metallic microspherules in the comet fragments; these microspherules contained nano-diamonds. The comet also carried carbon molecules called fullerenes (buckyballs), with gases trapped inside that indicated an extraterrestrial origin. The team concluded that the impact of the comet likely destabilized a large portion of the Laurentide ice sheet, causing a high volume of freshwater to flow into the north Atlantic and Arctic Oceans. "This, in turn, would have caused a major disruption of the ocean's circulation, leading to a cooler atmosphere and the glaciation of the Younger Dryas period," said Kennett. "We found evidence of the impact as far west as the Santa Barbara Channel Islands."

Critique

This hypothesis is based on finding possible extraterrestrial chemical signatures (such as iridium and metallic microspherules) at more than a dozen archaeological sites in North America. But the proposed interpretation involving impact from a large comet is both internally inconsistent and is at odds with geological evidence.

They suggest an impact on North America 12,900 years ago by a 4-km-diameter comet. Something that large would not have been slowed significantly by its passage through the atmosphere. The explosion of roughly 10 million megatons would thus have made a crater at least 50 km across. Such a large crater formed on land this recently would be the most obvious impact feature on the planet. Yet it is not there, and one can't just wish it out of existence. The ejecta should also be obvious, yet that too is not found. This is a fundamental contradiction.

Note also that impact by a 4-km comet or asteroid is extremely rare: for an asteroid the average interval is about once per 10 million years, for a comet as much as once per billion years. Yet this event is supposed to have happened 12,900 years ago. Normally in science, extraordinary claims require extraordinary levels of evidence.

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Origin Of Life In Comets: A Reply To David Morrison from *the authors*

The points raised in David Morrison's critique are already rebutted in our paper and we can only assume that he has not read it properly.

All hypotheses about the origin of life are speculative, and it is true that there are several ideas about life's origins other than the clay one. However Morrison errs in assuming that clay in comets is essential to our hypothesis. The key point is that whatever mainstream mechanisms we consider -- RNA world, lipid world, clay world etc -- the conditions in which these are claimed to operate are replicated as well or better in liquid cometary interiors as on the early Earth. We used the "clay origin" hypothesis as an exemplar, not as a unique proposition. Thus we state: "Mechanisms discussed in the literature (such as the clay world of Cairns-Smith) work as well or better in liquid cometary interiors as they do in the harsh conditions of the early Earth, while in terms of total mass and surface area available, stability of environment, nutrient concentration, and the generation and protection of chirality, comets are overwhelmingly favoured". And again: "Similar considerations apply to other proposed prebiotic pathways, such as those of the PAH, lipid or peptide worlds".

So what are the requisite conditions for the various current hypotheses about life's origins, and are they met in cometary interiors? Liquid water, organics and in all probability a solid substrate -- preferably a colloidal suspension which gives lots of surface area per gm -- are wanted. None of these is unreasonable for a cometary interior. We also need to generate and maintain chirality in biomolecules, easily done through the action of gamma-ray radiogenic photons inside a comet, hard to do on the surface of the Earth or in free space.

Spitzer mid-infrared observations of the Deep Impact experiment on 9P/Tempel revealed the presence of carbonates and hydrated silicates, phyllosilicates (layered clay-type structures) which, in meteorites, are "usually attributed to formation by hydrothermal alteration inside a wet parent body". In addition, the mid-infrared emission (9--12 microns) from cometary material ejected by the impact is very well reproduced by a mixture of clays and organics, as we demonstrate in the paper. Perhaps even more to the point, there is a long-running literature showing that, in volatile-rich bodies such as comets, radiogenic heating would create liquid water interiors in moderately large comets. In bodies over 100 km across, this heat would be retained for tens of millions of years: this is down to simple thermodynamics, and one would have to invoke extraordinary circumstances to avoid the conclusion. We ourselves have shown that similar liquid water interiors must persist even in 10-20 km-sized comets for timescales of the order of a million years. There is as yet no evidence for hydrated minerals or aqueous processing in material recovered from 81P/Wild (the Stardust mission), which probably just means that the comet was too small to retain much radiogenic heat, or that the initial "lakes" in the comet's interior have not yet been exposed. Comets come in all shapes and sizes!

Another essential component of our hypothesis is that comet systems should be reasonably common around other stars. It is this huge abundance of comets which gives us the bulk of the factor 10^{24} -- roughly the volume of all the world's oceans compared to a cubic centimetre. Morrison objects that "no comets have been discovered yet around other stars". Detection of a comet around another star would be a remarkable feat indeed, but there is good circumstantial evidence for their existence and we give some relevant references. The formation of comets in protoplanetary nebulae is an intrinsic part of modern theories of planet formation, and there's an abundance of evidence for such dusty discs around other stars. It hardly seems likely that planetesimals -- including volatile-rich ones -- do not form in these discs (the formation environment of comets may even extend beyond this, to the denser regions of molecular clouds). Such huge probabilities give us also an extraordinary safety margin. Taking the clay world hypothesis (again as an exemplar), comets do not need to be "full of clay" for it to work: an extremely sparse colloidal suspension would still put the balance of probability overwhelmingly in favour of a cometary origin for life. Future work may indeed show that we are alone in having an Oort cloud etc, but until then we prefer not to adopt such a bizarrely pre-Copernican view.

Finally, Morrison quotes a press report on estimates by Bidle and colleagues that DNA would survive cosmic ray destruction for only a few hundred thousand years in space as "essentially ruling out interstellar pollination of life by comets". This was based on studies of Antarctic microbes as a function of age (the paper actually quotes a half-life of 1.1 million years). These claims are by no means secure: even in 8 million year-old samples Bidle et al find "....a metabolically active subset of the encased bacterial population or at least those capable of preferential protection of genomic DNA by an unknown mechanism" - essentially ruling out a simple half-life degradation argument. But in any event, interstellar panspermia mechanisms require only that microorganisms survive such destruction for about 50,000 years. Survival times of a million years will do very nicely.

Origin Of Life (And Clays) In Comets A comment from *Max Wallis*

Bill Napier's comment overlooks our identification of comet 81P/Wild as remnant of a primordially melted core, in presuming a refrozen interior lake. As I first argued, the interior of a comet melted by radionuclides Al-26 and Fe-60 in the first few Myr will be surrounded by km-thick icy layers, sealed by vapour which diffuses into the cold exterior. The comet does not collapse on the vapour/melt centre (strength >> gravity). Nor does the centre have a gravity minimum to hold a lake. Instead the interior is a homogeneous droplet-vapour mix. As it freezes (on the R [km] x 1 Myr timescale for 3 mW/cm.K conductivity), the vapour condenses on the ice-shell and leaves behind a hollow core.

81P/Wild could be such an extinct shell-core, after shedding the snowy outer layers and protective crust found by Deep Impact at comet 9P/Tempel. The rugged terrain, flat-bottom 'craters', 100 m pinnacles and cliffs with overhangs of 81P/Wild is very distinct morphology from the varied plains, mesas and erosion craters seen on 9P/Tempel and 19P/Borrelly. On the other hand, the clay minerals ejected from 9P/Tempel by Deep Impact are associated with the very friable, micron-sized particles, rather than fragments from a refrozen interior. If the clay particles were formed in situ, one must look to the near-surface pools or vapour-rich layer beneath the diurnally warmed crust (up to 330 K).

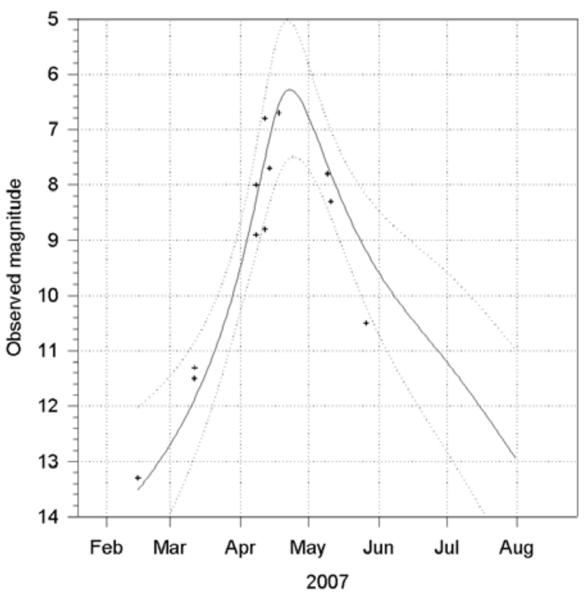
The silicate feature in cometary IR spectra has been known for decades. The significance of identifying silicates with clays is the requirement for an aqueous or near aqueous environment at some period. This surprises people who see cometary silicates as pristine condensates formed in the atmospheres of hot stars. But not those who know of the abundant evidence of aqueous alteration in carbonaceous chondrites.

Review of comet observations for 2007 January - 2007 December

The information in this report is a synopsis of material gleaned from IAU circulars 8788 – 8902, The Astronomer (2006 December – 2007 November) and the Internet. Note that the figures quoted here are rounded off from their original published accuracy. Lightcurves for the brighter comets are mostly from observations submitted to the Director. A full report of the comets seen during the year, including observations published in The Astronomer will be produced for the Journal in due course. I have used the convention of designating interesting asteroids by A/Designation [Discoverer] to clearly differentiate them from comets, though this is not the IAU convention.

Information that used to be published in the Observing Supplement can be found on the Section web pages and in the BAA Guide to Observing Comets. Reminders of the observing circumstances of forthcoming comets will however continue to appear in these pages.

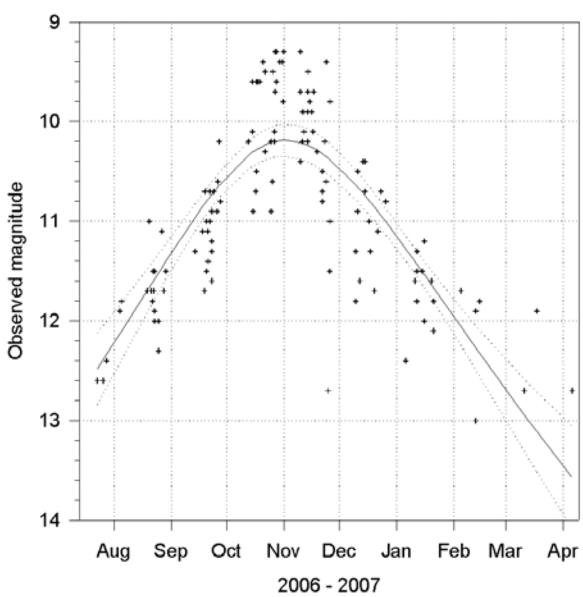
Comet 2P/Encke



2P/Encke put on a brief showing in the UK evening sky in late March and early April just before perihelion, when it was a binocular object in Pisces and Aries. After perihelion it was visible passing through the SOHO LASCO field and that of its successor, STEREO. STEREO imaged a disconnection event in the ion tail, and a NASA press release was issued in October.

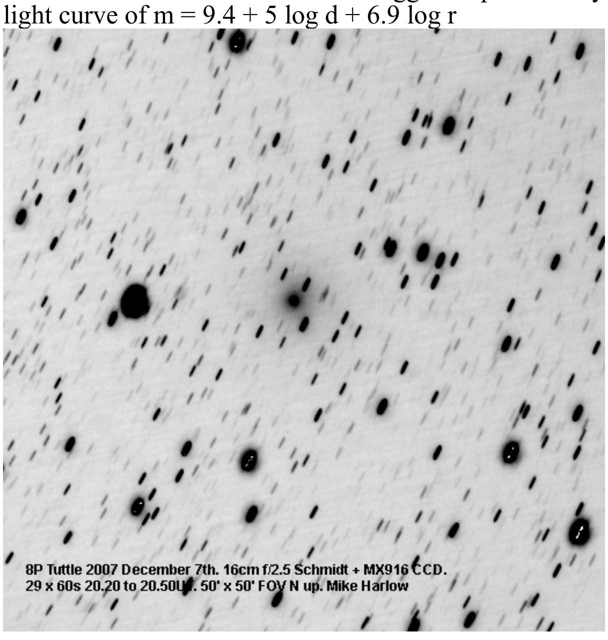
9 visual observations received so far suggest a preliminary light curve of m = 10.9 + 5 log d + 8.8 log r

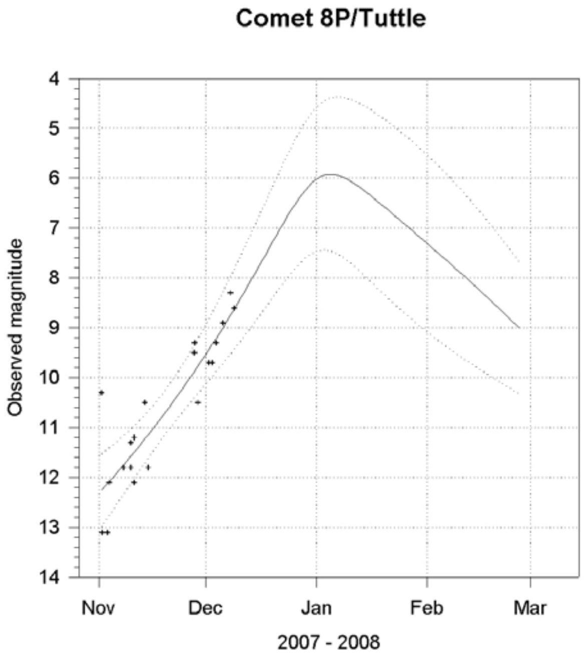
Comet 4P/Faye



4P/Faye behaved much as predicted and was at its brightest in early November 2006 at just brighter than 10th magnitude. By mid January 2007 it was around 12th magnitude and observers suggested that it had only faded a little further by April, when it was lost in the twilight.

127 observations received so far suggest a preliminary light curve of m = 9.4 + 5 log d + 6.9 log r





8P/Tuttle was recovered in April 2007, with delta T of +0.13 days compared to the prediction on MPC 54167. Observations in early November suggested that it had reached 13th magnitude. It quickly brightened and by early December was visible in large binoculars. Although on track to reach 6th magnitude in the New Year, it is a large and diffuse object and may not be as easy to see as the brightness suggests.

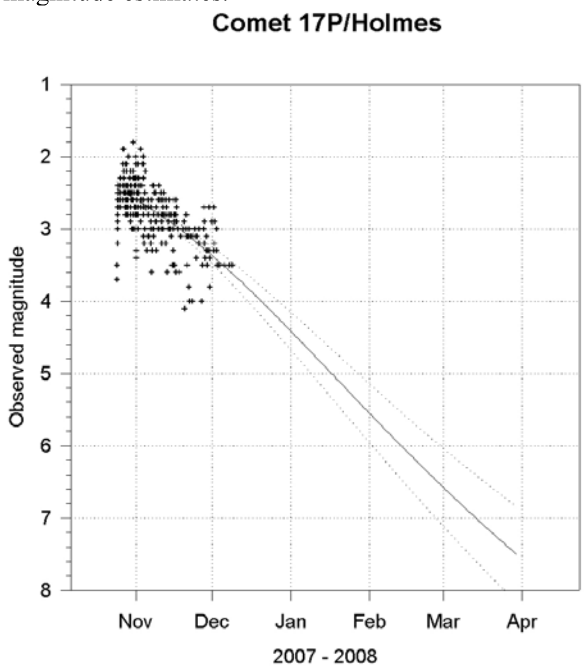
20 observations received so far suggest a preliminary light curve of m = 8.3 + 5 log d + 17.7 log r

17P Holmes coma changes. 2007 October 27.744 M.P. Mobberley

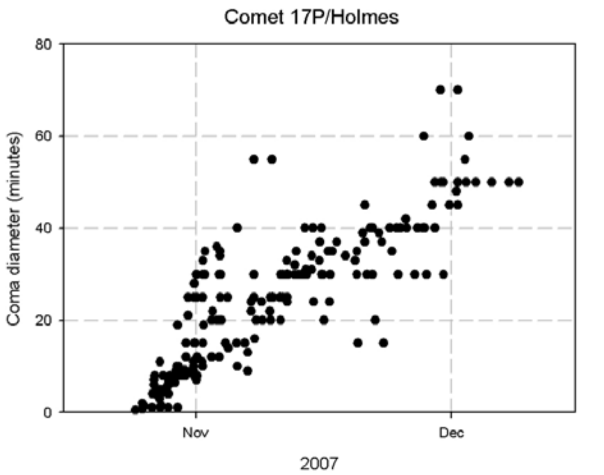
17P/Holmes was discovered by Edwin Holmes from London on 1892 November 6. He had been observing in poor conditions, and decided to have a look at the Andromeda galaxy with his 32cm reflector before stopping for the night. He found an unexpected object that wasn't M31. Other observers were initially skeptical, but the comet was soon confirmed. It remained bright for several weeks before slowly fading, and then underwent another outburst in mid January, which again brought it within naked eye range. At its eight following returns the comet was a faint object.

17P / Holmes superoutburst
2007 Nov 3rd 23:01 UT (mid) 15 x 20 secs stacked
245mm f/6.3 Newt + Canon 300D. M.P. Mobberley

It was reported in outburst by Spanish amateurs on 2007 October 24, when near opposition, but well past perihelion. The brightest estimates so far suggest that it reached 2.5. It is fading very slowly, and by early December was still 3rd magnitude, although it had expanded to 50' diameter. Assuming an inverse square law of brightness, the comet currently has an absolute magnitude of -2.8, one of the brightest values on record. Looking forward in time the comet will continue to fade slowly, but as the coma continues to expand, its surface brightness will also drop towards the sky background. This means that for observers in light polluted sites, it will become increasingly difficult to give accurate total magnitude estimates.



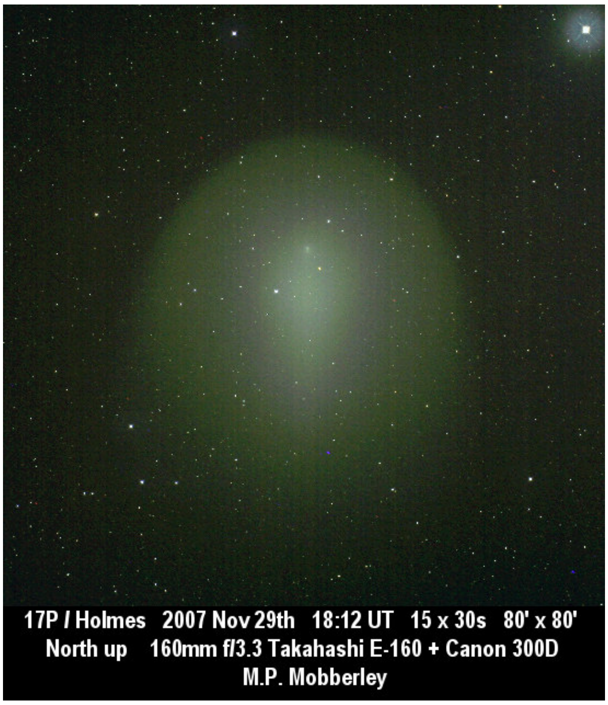
This is shown to some extent in the coma diameter estimates. Observers reported the faint gaseous coma until it was about 60' diameter, but then switched to reporting the outer dust coma, which expanded more slowly.



Observations with the Super-WASP wide-field imaging system at La Palma captured the start of the comet's outburst, and show that it brightened from magnitude 9.7 to 8.6 over 2.6 hours at a rate consistent with the linear expansion of an optically thick coma. Extrapolating backwards in time suggests that the outburst commenced on October 23.8.

17P / Holmes + Mirphak 2007 Nov 14th 18:05 UT 8 x 30s 160mm f/3.3 + Canon 300D 100' x 75' (N. up) M.P. Mobberley

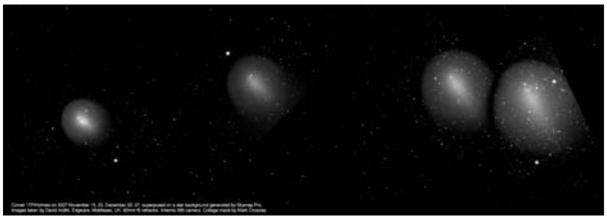
In CBET 1118 [2007 November 3] Z. Sekanina, Jet Propulsion Laboratory, reports that information on the appearance, morphology, and light curve of the comet allows one to make tentative conclusions on the nature of its megaburst from Oct. 23-24. The brightness data (calibrated by linking K. Kadota's pre- and post-outburst CCD magnitudes with the naked-eye estimates) suggest that, before the event, the comet had been active but fading with heliocentric distance (r) -- from late May following an r^(-n) law with n approximately equal 16. At the event's onset, most probably on Oct. 23.7 +/- 0.2 UT, the comet's total visual magnitude normalized to 1 AU from the earth was 15.3. This is about 30 times brighter than expected for the nucleus based on its diameter of 3.3 km, geometric albedo of 4 percent, and a phase law of 0.035 mag/deg (Lamy et al. 2000, BAAS 32, 1061; Snodgrass et al. 2006, MNRAS 373, 1590). The extremely steeply increasing brightness at the beginning of the megaburst suggests that the rate of dust injection into the coma accelerated with time, or the average particle size was then rapidly decreasing with time (perhaps as a result of runaway particle fragmentation), or both. Indeed, the reported constant rate in mag/hr (IAUC 8886) implies an exponential increase in the cross-sectional area of dust, neglecting the minor contribution from the molecular and atomic species (IAUC 8887).



17P / Holmes 2007 Nov 29th 18:12 UT 15 x 30s 80' x 80'
North up 160mm f/3.3 Takahashi E-160 + Canon 300D
M.P. Mobberley

The peak-brightness plateau was reached some 24 hours after the event's onset, with a normalized total magnitude of 1.4 +/- 0.2. The amplitude was thus very close to 14 magnitudes, or a factor of around 400000. The plateau brightness implies the presence in the coma of dust particles whose integrated cross-sectional area is 57 +/- 10 million km^2. For a particle-size distribution with an average diameter of 2 microns, the estimated mass of this dust cloud is 10^(14) g at an assumed bulk density of 1.5 g/cm^3. This is almost exactly the mass that Sekanina (1982, in *Comets*, ed. by L. L. Wilkening, University of Arizona Press, p. 251) found for a typical major pancake-shaped companion nucleus of the split comets. Recently, he pointed out (Sekanina 2007, Proc. SPIE 6694, p. 0I) that such companions appear to be jettisoned thick "talps" (layers), which were lately proposed to make up the nuclei of the short-period comets and for which a similar mass estimate was suggested (Thomas et al. 2007, Icarus 187, 4; Belton et al. 2007, Icarus 187, 332). The scenario of a complete disintegration of such an object in the coma of 17P/Holmes is also supported by the nearly symmetrical outer dust halo, expanding at an average (but possibly decreasing) rate of 0.5 km/s (based on fitting the halo measurements reported on a "Yahoo comet group" e-mail-list website by P. C. Sherrod) and implying the event's onset around Oct. 23.8. The halo, containing much of the ejecta's mass, is a projected cloud of microscopic dust grains originating from the cataclysmic breakup of the jettisoned layer upon its release. Only several sizable (tens of meters?) fragments of the layer survived the early phase and, as companions, began to recede from the primary nucleus at velocities of at least a few m/s, while continuing to fragment.

The expanding parallel streaks of light observed at position angles of 210-220 deg (essentially along the extended radius vector) are the tails consisting of microscopic dust particles released during and after the fragments' separation, after most dust was injected into the outer halo. Only one of these tails starts from the nucleus condensation, the other three (or more) appear to emanate from "nothing" as their parent bodies, the above-mentioned fragments, are too faint to observe. The parents' lateral momentum is carried by the dust in these "side" tails, whose southwest ends contain the smallest, submicron-sized particles with the highest radiation pressure accelerations (somewhat exceeding solar attraction). The disintegrating parent fragments may not be located right at the northeast tips of these "side" tails because of possible gaps due to the dearth of larger (low-acceleration) particles. If there are nonparallel streaks in this general region that are not processing artifacts, they must be of different nature. In any case, the inner dust halo appears to be associated with this later phase of the event and it thus differs dynamically from the outer halo. Geometry, including the fact that the comet is near its opposition with the sun, also affects the projection of dust motions onto the plane of the sky, making the north and east (i.e., sunward) boundaries of the outer halo sharper.



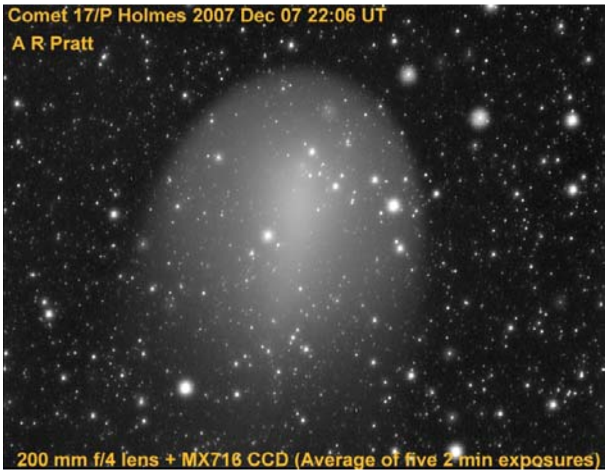
Collage of images to scale from David Ardetti

In summary, the enormous scale of the megaburst is a result of the fact that the jettisoned layer was extremely poorly cemented and disintegrated in a cataclysmic manner. Thus, one may expect a potential inverse relationship between the prominence of an outburst and the appearance of persistent companion nuclei. Except for the amplitude, the 17P event was similar to the outbursts of 29P/Schwassmann-Wachmann (e.g., in the shape of the light curve; cf., e.g., Beyer 1962, Astron. Nachr. 286, 219), which, likewise, has never been observed to split. On the other hand, the brightness in the outbursts experienced by comet 41P/Tuttle-Giacobini-Kresak in 1973 (e.g., Sekanina 1984, Icarus 58, 81) subsided very rapidly, suggesting a different mechanism (probably involving only gas). It will be interesting to see whether 17P is subjected to a second outburst in early January, as in 1892.

December 1 image from Alan Tough

An alternative suggestion for the cause of the outburst comes from Richard Miles, who suggests a chemical explosion from the decomposition of hydrogen peroxide, dissolved in liquid water in the comet's inner mantle. This theory assumes a very slow rotation of the comet's nucleus and suggests the possibility of a second outburst as the reservoir is replenished. Sekanina's theory on the other hand would suggest that the outbursts are more random events, and would give a much lower probability of a second outburst.

Further to CBETs 1111 and 1118, B. Gaillard, J. Lecacheux, and F. Colas, Paris Observatory, elaborate on observations of comet 17P obtained from Oct. 24 to Nov. 4 with the 1-m telescope at Pic du Midi Observatory. During this 10-day interval beginning just at the outburst, they have followed the evolution of dust streams and condensations inside the expanding "coma blob". The dust streams appear to come from cometary fragments that quickly recede from the nucleus, though such fragments remain below their detection threshold. Nevertheless, they have measured (with a 2000-km precision) the increasing distance from the nucleus of the well-defined head of these streams. Apparent velocities ranging from 50 to 100 m/s (projected on the sky) have been found for four of these stream heads, showing no trace of acceleration. The separation of the parent fragments from the nucleus is calculated to have occurred at different times between Oct. 23.7 and 24.8 UT, so the most probable scenario is that the comet outburst began a few hours before Oct. 24.0. Different discrete releases of dusty material took place over the two subsequent days, with a dominant event around Oct. 24.40 (cf. CBET 1111) being perhaps responsible for the final brightness rise of the comet, and undoubtedly for the obvious circular shell that continues expanding at 570 m/s. The measured dust streams are no longer fed by new material and will vanish via increasing dilution in the space. On the other hand, the pseudo-nucleus, which seemed inactive until Oct. 29, now is active again: its brightness, which was declining since Oct. 24, has stabilized, and a thin permanent dust trail is observed, perhaps announcing another outburst. [CBET 1123, 2007 November 7]

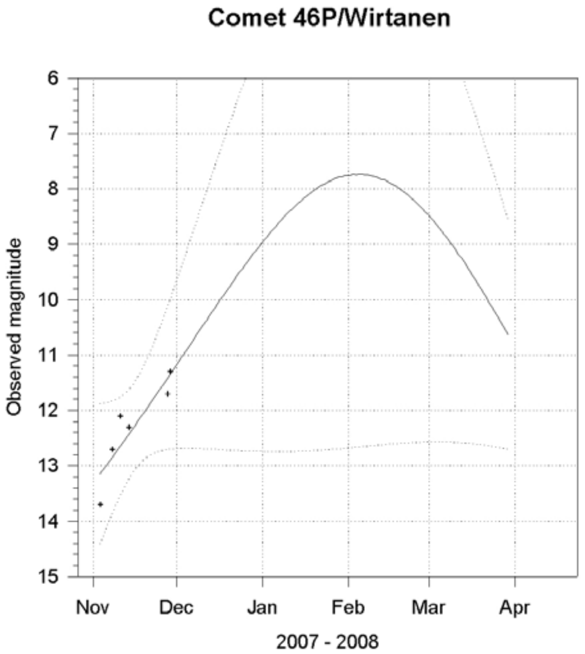


Edwin Holmes appears to have been something of a BAA "character". He was in his early 50s at the time of the discovery and died in 1919. The 1901 census records and internet information appear to suggest that he was Edwin A Holmes who was born in Sheffield and lived in Islington. The previous census of 1891 however gives Lambeth and Norwood for what appears to be the same gentleman. Something for a historian to track down!

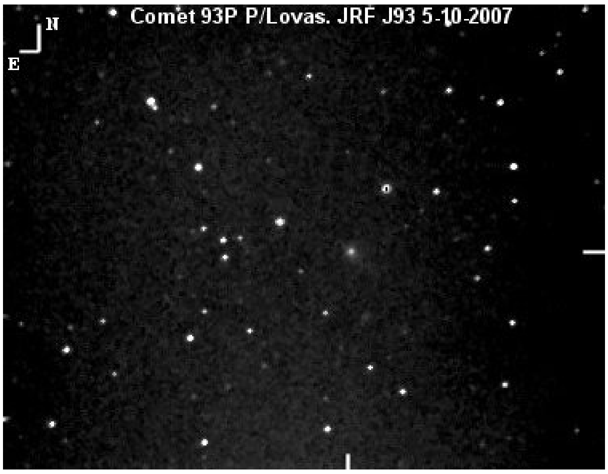
29P/Schwassmann-Wachmann This annual comet has frequent outbursts and over the past few years seems to be more often active than not, though it rarely gets brighter than 12m. Over the last decade it has generally been quite active, however after a few outbursts in the first third of the year it was fairly quiet in the second half of the year. It has just passed opposition in Auriga so remains well placed for observation in early 2008. The comet is an ideal target for those equipped with CCDs and it should be observed at every opportunity.

Some observations in early December suggest the occurrence of another outburst, with the comet reported at 13th magnitude.

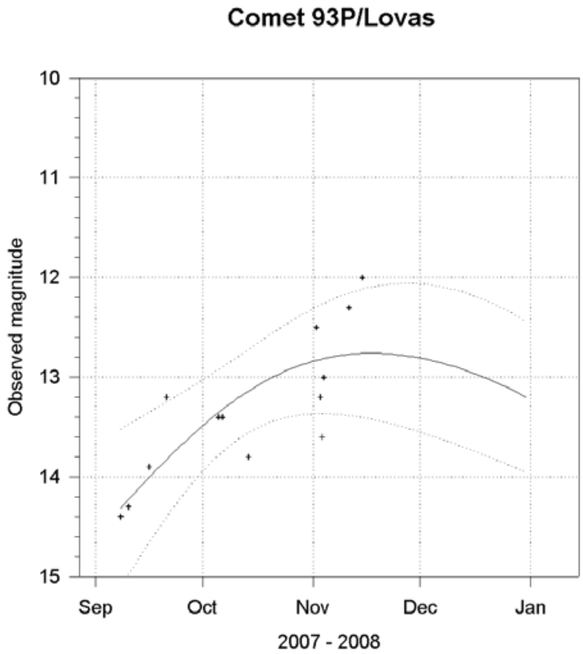
46P/Wirtanen was recovered by visual observers in November and had reached 11th magnitude by the end of the month. Further details are given in prospects for 2008. Previous returns suggest that it might be a magnitude fainter than shown above.



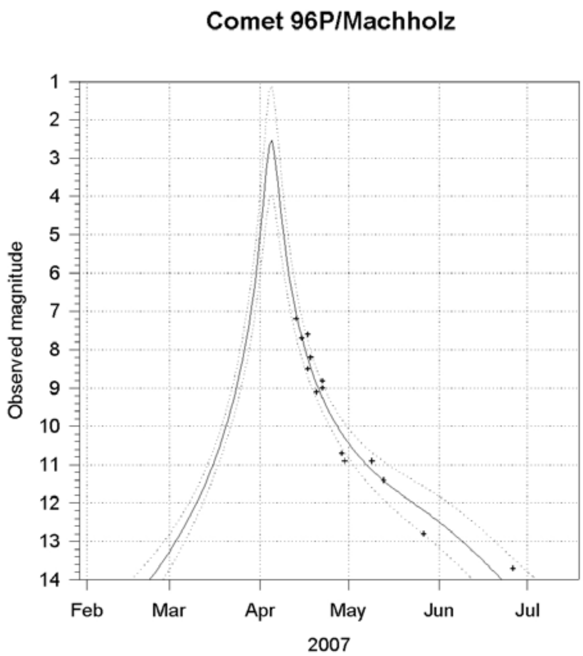
6 observations received so far suggest a preliminary light curve of m = 7.2 + 5 log d + 29.6 log r



93P/Lovas was discovered by Miklos Lovas of the Konkoly Observatory, Hungary, on a photographic plate exposed on 1980 December 5. There have been no recent changes to the orbit and this was its fourth observed return. It behaved much as expected and reached 12th magnitude.

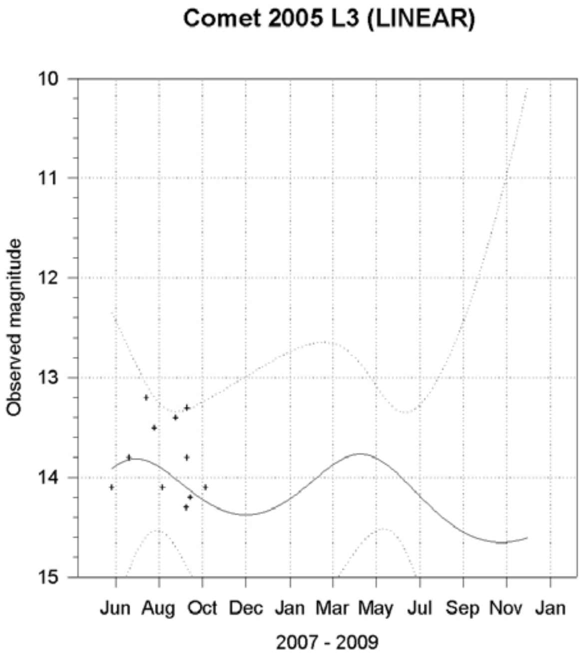


96P/Machholz was a prominent object as it passed through the SOHO LASCO C3 coronagraph in early April. Juan Jose Gonzalez recovered it after perihelion on April 13.2, estimating it at 7.2 in 25x100B and it faded quickly.



14 observations received so far suggest a preliminary light curve of m = 11.9 + 5 log d + 10.4 log r

2005 L3 (McNaught) is another comet discovered by Rob McNaught with the 0.5-m Uppsala Schmidt during the Siding Spring Survey. This one was found on June 3.68 and was 18th magnitude at discovery. It reaches perihelion at 5.6 AU in January 2008. As it is a distant object it is observable over two oppositions.

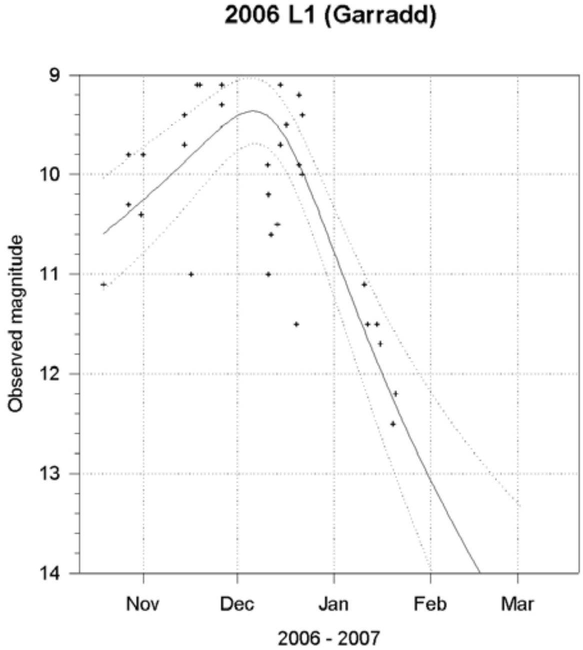


12 observations received so far suggest a preliminary light curve of m = 3.0 + 5 log d + 9.7 log r

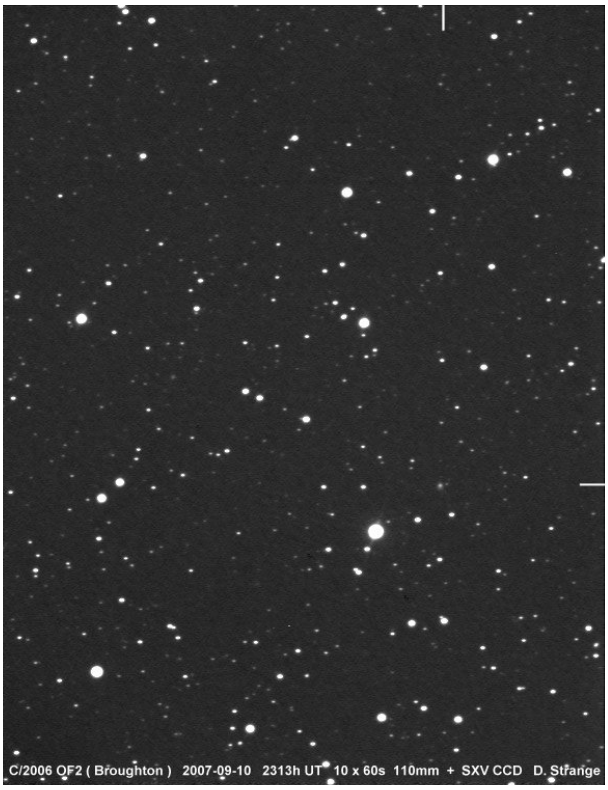
2005 YW (LINEAR) is one of the objects identified as a comet by the "T3" team. In a high eccentricity orbit, it was at perihelion at the end of 2006. Southern Hemisphere observers estimated it at around 12th magnitude in April, suggesting that cometary activity continued to strengthen after perihelion.

The cometary characteristics of **2006 HR$_{30}$ (Siding Spring)** seem to have been fleeting, and the object reverted to essentially asteroidal nature. Images by Martin Mobberley in 2006 December show it at around 14th magnitude and visual observers gave it a similar brightness early in 2007.

2006 L1 (Garradd) faded quite rapidly in 2007, and was not observed after January. The preliminary light curve from the 34 observations received so far is m = 6.7 + 5 log d + 15.8 log r

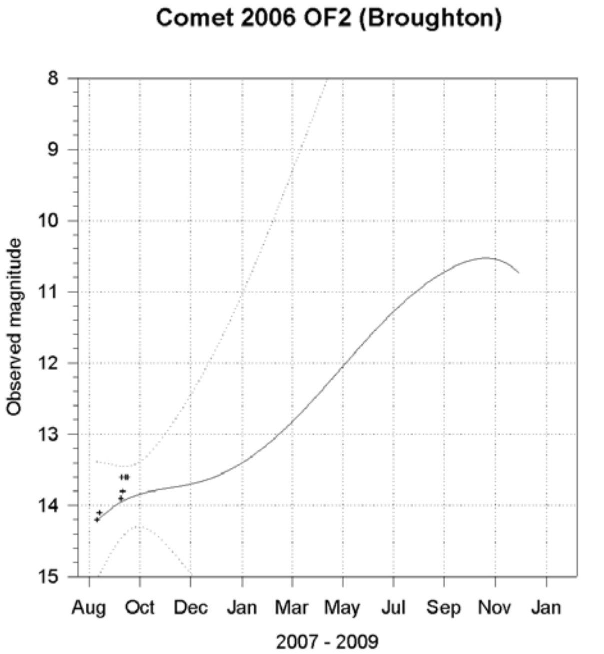


2006 OF$_2$ (Broughton) is slowly brightening, but is also sinking into the evening twilight. CCD observations made it 16th magnitude in 2007 May, and it was around 14th magnitude in August. Visual observers picked it up around this time, and it was approaching 13th magnitude in November. There is still considerable uncertainty as to how bright it will get when it reaches perihelion next year, as some observations in early December suggest that it is not brightening.

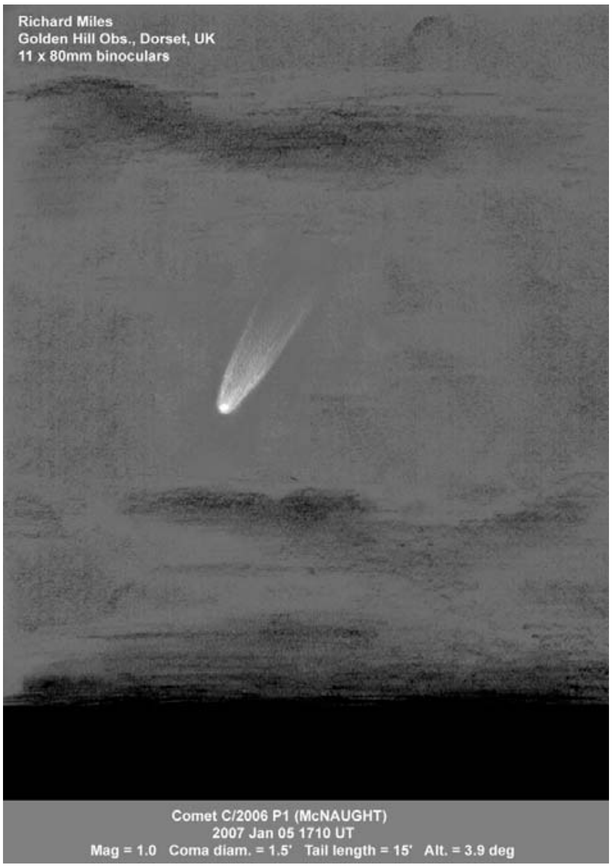


Brian Marsden notes on MPEC 2007-K71 [2007 May 31] that the "original" and "future" barycentric values of

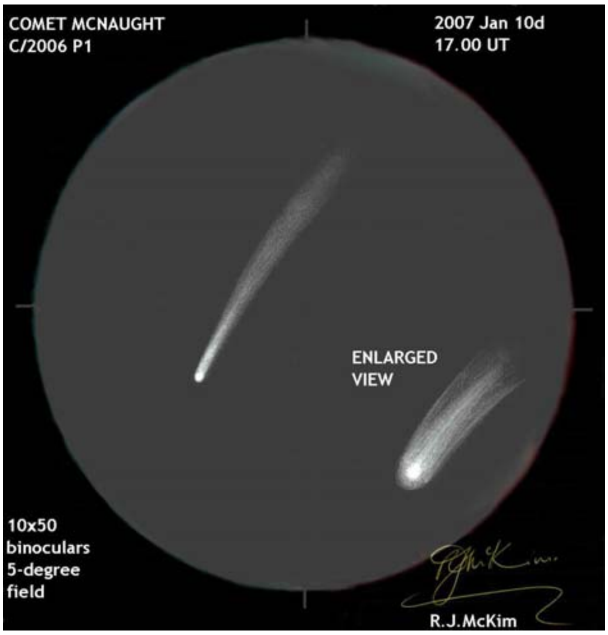
1/a are +0.000014 and -0.000672 (+/- 0.000008) AU^-1, respectively. The small "original" value suggests that this is a "new" comet from the Oort cloud on its first pass through the inner solar system.



14 observations received so far suggest a preliminary light curve of m = 6.5 + 5 log d + 7.0 log r

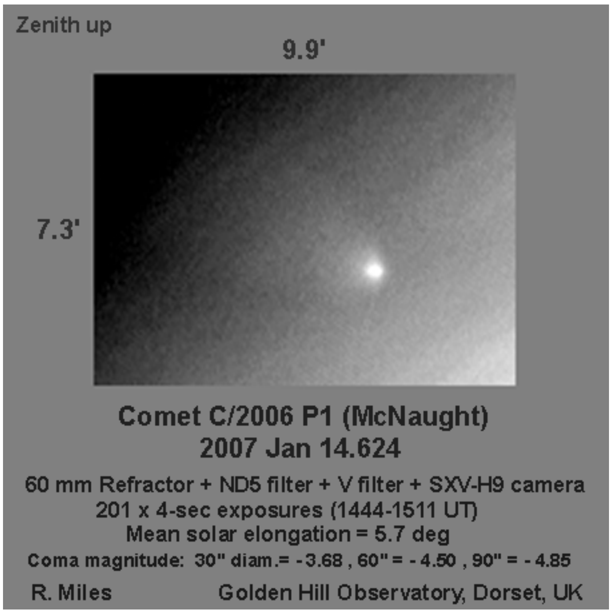


2006 P1 (McNaught) A Great Comet may appear once a decade, and we have been fortunate in recent years with comets such as Hyakutake and Hale-Bopp. Comet McNaught joins these, though nobody seriously expected the spectacle that graced the skies of the Southern Hemisphere in January. It reached perihelion at 0.17 AU on 2007 January 12.8 and became one of the best comets of recent times. It exceeded even my optimistic predictions in the last issue.



Jamie Cooper, 2007 January 10

David Moore was able to observe the comet from Dublin on the evening of January 1st, estimating it at about 1st magnitude when allowance is made for extinction. Haakon Dahle imaged the comet on January 3 from Fjellhamar, Norway (1s exposure, taken with a Nikon D70 SLR (300mm f/5.6 lens, ISO 800). Nick James imaged the comet on the morning of January 4 from Chelmsford and estimated it at 2.0: from the CCD image. I viewed it on the morning of January 8, estimating it at -1.4, with the comet remaining easily visible until the Sun was 5 degrees below the horizon. Rob McNaught reported a telescopic daylight sighting from Australia on January 9. I attempted daylight observation with the Northumberland and Thorrowgood refractors at Cambridge University Observatory on January 10, but failed to see the comet. It was probably fainter than -3. It was widely observed across the UK on January 10, with magnitude estimates between -1 and -2. The tail was very prominent. Clouds came in during an observation on January 11, however I provisionally estimated the comet at -2.0:, with a 2 degree tail, although as the sky was brighter the comet appeared fainter than on the previous day.



Globally, there were many reports of daylight sightings around January 13/14. Richard Miles made daylight photometric measurements of the comet from the UK on January 14, when it was -4.85. It was visible in the SOHO LASCO C3 field from January 12 to 15 and in the STEREO SECCHI HI-1A field from January 11 to 18. The STEREO images led to the discovery of a neutral iron tail from the comet. A few UK observers saw the tail striae around January 18 - 21, before the moon became too bright. The peak brightness of the comet is estimated to have been around -5.5. The enhancement due to forward scatter was around 2 magnitudes. It was significantly brighter post perihelion than expected from the pre-perihelion behaviour.

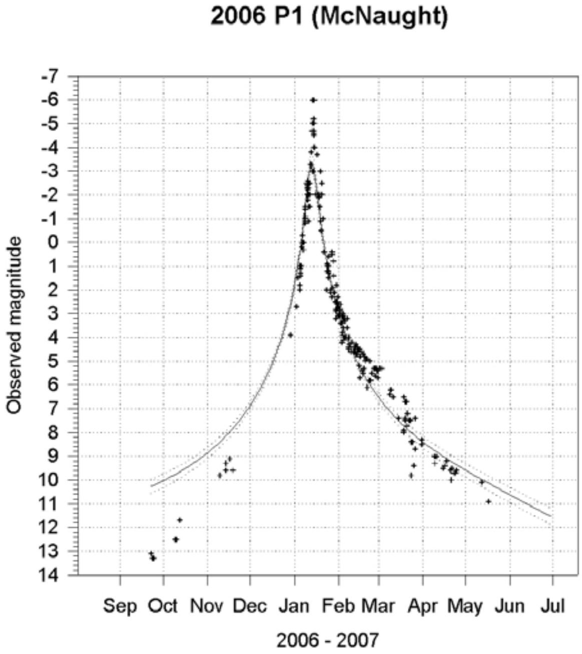
Rolando Ligustri, Italy, 2007 January 19

Southern hemisphere observers had the best view of the fantastic tail structure, which was highly reminiscent of the multi-tailed comet of de Cheseaux (1743 X1). ESO observed the comet with the NNT and made observations of sodium in the coma along with spiral jets. Several northern hemisphere observers were able to image (and see) the striations, including Nick James from light polluted Chelmsford.

Morton Henderson, 2007 January 20

Helen Taylor, King Edward Point, South Georgia, 2007 January 20

Terry Lovejoy, 2007 January 21



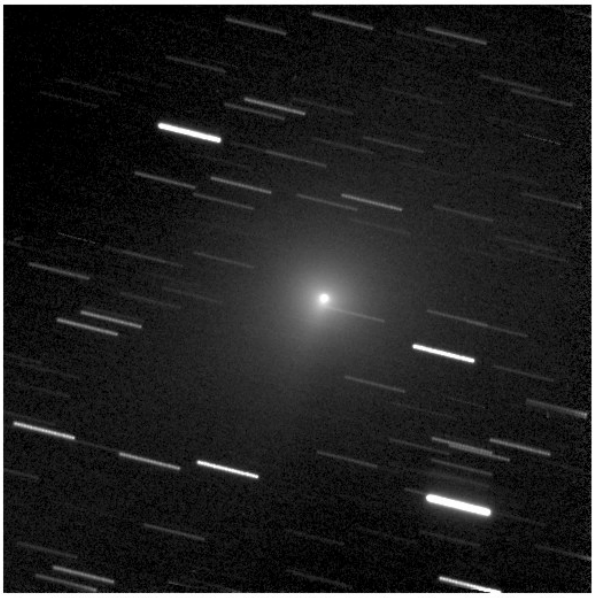
175 observations received so far suggest a preliminary light curve of m = 4.4 + 5 log d + 9.7 log r

2007 January 26

Brian Marsden notes on MPEC 2007-E02 [2007 March 2] that the "original" and "future" barycentric values of 1/a are +0.000037 and +0.000497 (+/- 0.000003) AU^-1, respectively. The small "original" value suggests that this is a "new" comet from the Oort cloud on its first pass through the inner solar system.

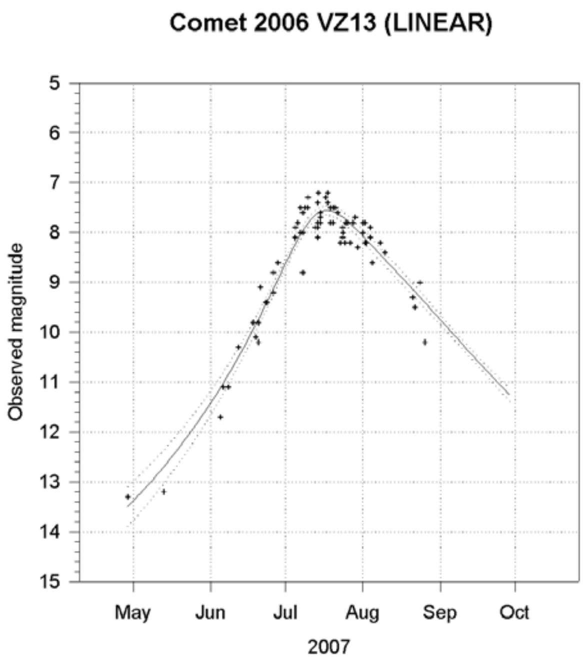
2006 S5 (Hill) will be at perihelion at 2.6 AU in 2007 December, and could reach 13th magnitude around the time of perihelion. A few observations in November suggest that it was this bright and should remain so into January or February.

2006 VZ$_{13}$ (LINEAR) This unusual object, of 20th magnitude, originally classed as an Amor asteroid, was discovered by LINEAR on November 13.13. [MPEC 2006-W03, 2006 November 16] It has a period of 40 years, a retrograde orbit and perihelion was at 1.33 AU in 2007 September. Aphelion is at 22 AU. Richard Miles noted that his astrometric images appeared slightly softer than stellar images.



Comet C/2006 VZ13. 2007 July 6. 22:21 UTC. 20x25s unfiltered ST9XE + C11. FOV 12'.4x12'4, N up. Nick James.

CK06V13Z C2007 07 06.93095 18 05 23.77 +69 05 01.8 13.8 N 970



Richard Miles suggestion was confirmed by Carl Hergenrother using the University of Arizona's 1.54-m Kuiper reflector at the Catalina station on December 1st and 2nd. The new orbit is parabolic, with perihelion at 1.02 AU in mid August 2007. The comet came into visual range in 2007 June and reached 8th magnitude in July. The BAA imaged the comet with the Liverpool telescope during the Exhibition Meeting on June 30.

Cédric Bemer notes that the Earth passes 0.005 AU inside the comet orbit on 2008 May 27.1 (solar longitude 66 degrees) and that there may be a possibility of a meteor shower. The radiant is around RA 330 +16. Interestingly Peter Jenniskens lists the gamma Delphinid shower, which has a broadly similar orbit and is active from June 1 - 20 from a radiant around RA 320 +12. Jenniskens gives a possible outburst on 2013 June 11.

85 observations received so far suggest an uncorrected preliminary light curve of m = 8.2 + 5 log d + 11.1 log r

2006 W4 (P/Hill) = 1993 D1 Following further observations in 2007 September and December, and the publishing of new elements on MPEC 2007-X14 [2007 December 3], S. Foglia, R. Matson, and M. Tombelli identified images of the comet on two UK Schmidt plates from 1993. The linked orbit has a period of 16.5 years. It will probably be numbered 195.

2006 WD$_4$ (Lemmon) This unusual asteroid, of 20th magnitude, was discovered by the Mt Lemmon Survey with the 1.5m reflector on November 20.33. [MPEC 2006-W61, 2006 November 22, 2-day orbit]. It is in a retrograde orbit with a period of over 300 years and perihelion is at 0.5 AU in April 2007. Aphelion is near 100 AU.

The object was confirmed as a comet in May 2007, when remote observations by Ernesto Guido and Giovani Sostero showed clear evidence of a coma. The comet remains relatively close to the Sun and is poorly placed for observation. It will brighten by a further magnitude to mid May and is best seen from tropical latitudes. The latest orbit gives perihelion at 0.6 AU in late April 2007 and a high eccentricity retrograde orbit.

Ernesto and Giovani provide the following background to their confirmation:

Here is the story. It was clear since its very discovery, that 2006_WD4 was a good candidate to be a comet, since even its preliminary orbital elements were pretty suspicious:

Apparently, the object didn't show any significant cometary feature till the end of December, when it was lost in the Sun glare (we now know from CBET 952, that some astronomers imaged it with a 2.2m scope under good seeing from Hawaii on Dec.25.4, possibly detecting some traces of a very small coma). We tried its recovery at the end of April, when 2006_WD4 was emerging from the solar conjunction, by means of a robotic scope of the RAS network located near Brisbane. However, due to the bad weather conditions, we could get it only on April 30.8: blinking two series of stacked images, just a few arcmin away from the predicted position, a faint fuzzy "something" was moving with the expected speed and PA. When we performed the co-adding of all the frames we had, a small spiral-like coma emerged (perhaps similar to what is observed frequently on 29P/Schwassmann-Wachmann shortly after one of its outbursts):

The central condensation appeared pretty sharp (m2 close to 15.3-15.4), surrounded by a faint halo, spanning on average almost 20 arcsec (m1 ~14.2). We wanted to collect a second night of observations, but on May 1 the weather wasn't good enough, so we alerted a few other southern fellow observers asking for some follow-up. Finally we get it again remotely from MPC#E26 on May 2.8; at that time the observing conditions were less favourable compared to a couple of days before (high humidity) anyway an oval coma some 12 x 18 arcsec was detected, with m1 and m2 similar to those found on April 30.8. The preliminary Afrho parameter we derived from our observations, seems to point toward a comet of an overall modest activity (~30 cm), if we consider that we observed it just a few days after perihelion (r~ 0.6 AU). This sounds to be compatible with the fact that it might have "switched-on" effectively only close to the Sun.

We are grateful to H. Sato, M. Mattiazzo and A. Hale, that from time to time reminded us through this mailing-list about the opportunity to perform a check on this interesting target.

We also wanted to thank H. Raab and M. Nicolini for, respectively, their amazing software "Astrometrica" and "Astroart": without their effort, this and most of other cometary confirmation we did would have been simply impossible.

Brian Marsden notes on MPEC 2007-K73 [2007 May 31] that the "original" and "future" barycentric values of 1/a are +0.002247 and +0.001790 (+/- 0.000002) AU^-1, respectively. The large "original" value suggests that this is not a "new" comet from the Oort cloud.

A few observations were made in June, suggesting it was then 13th magnitude.

2006 XA$_1$ (LINEAR) An apparently asteroidal object of 18th magnitude, discovered by LINEAR on December 9.20 and rediscovered by them on 2007 January 8 and posted on the NEOCP was found to be cometary by numerous CCD observers including Ernesto Guido and Giovanni Sostero. It reached perihelion at 1.8 AU in 2007 July.

Brian Marsden notes on MPEC 2007-E03 [2007 March 2] that the "original" and "future" barycentric values of 1/a are +0.003833 and +0.004455 (+/- 0.000024) AU^-1, respectively. The large "original" value suggests that this is not a "new" comet from the Oort cloud and that it has visited the inner solar system before.

A few observations were made in the spring, suggesting that it reached 13th magnitude.

2006 XG$_{16}$ (P/Spacewatch) Carl Hergenrother detected cometary activity in the asteroid 2006 XG16, which was discovered by Spacewatch on 2006 December 10.41. Images taken with the 1.54-m Catalina telescope on 2007 January 27 and 28 showed a coma and tail on the 18th magnitude object. It was then near perihelion and has a period of 6.9 years.

Meyer Group SOHO comets 2007 A6, C10, F4, J1, K12, R10 were discovered with the SOHO LASCO coronographs and have not been observed elsewhere. They were sungrazing comets of the Meyer group.

Kracht Group SOHO comet 2004 J20 was discovered with the SOHO LASCO coronographs and has not been observed elsewhere. It was a sungrazing comet of the Kracht group.

Recent Evolution of the Kracht Group of Comets *Matthew Knight et al.* AAS DPS meeting, October 2007

The Kracht group contains 29 comets discovered in SOHO images from 1996-2005 with perihelion distances of 7-11 solar radii and inclinations of 12-15 degrees. Unlike the much more populous Kreutz sungrazing group, many Kracht comets are observed to survive perihelion, and as many as five may have been observed on two apparitions, with periods ranging from 4.8-5.8 years. Kracht comets tend to arrive in clusters followed by many months devoid of comets before another cluster arrives. Ohtsuka et al. (2003) and Sekanina and Chodas (2005) have shown that the Kracht group represents an evolutionary stage of the Machholz complex, which has evolved over many centuries and also includes 96P/Machholz, the Marsden group of comets, and the Arietids.

Here we explain the recent evolution of individual members of the Kracht group as a series of cascading fragmentations of a few large comets (causing the temporal clusters) which have had somewhat different orbital histories since splitting from each other within the last hundred years or so (causing the gaps between temporal clusters). We use dynamical simulations to search for possible fragmentation scenarios and to estimate the rate at which the orbital elements evolve due to the gravitational influence of the planets. We predict that 8 of the 19 fragments seen since 2002 may be observable in upcoming perihelion passages, including five that should reappear before the end of 2008. If observed, two of these will have been seen at three perihelion passages, allowing a rough estimation of the mass loss due to erosion.

SOHO Kreutz group comets 2004 A4, B11, E5, 2005 B5, B6, 2006 A8, 2007 A4, A5, B4, B5, B6, C3, C4, C5, C6, C8, C9, C11, C13, D4, D5, E4, E5, F2, F3, F5, G2, H4, H5, H6, H7, H8, H9, J2, J3, J4, J5, J6, J8, J9, J10, J11, J12, K7, K8, K9, K10, K11, K13, K14, K15, K16, K17, K18, K19, K20, K21, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, M4, M6, M7, M9, M10, N4, N5, N6, N7, N8, O3, O4, Q4, Q5, Q6, Q7, Q8, Q9, R6, R7, R8, R9, S3, S4 were discovered with the SOHO LASCO coronographs and have not been observed elsewhere. They were sungrazing comets of the Kreutz group and were not expected to survive perihelion. Some of these comets show no tail at all and it is possible that some supposed observations of Vulcan were actually tiny Kreutz group comets. 1155 SOHO members of the group have now been discovered. SOHO has discovered 1416 confirmed comets, though some await orbit determination.

A/2001 SS$_{287}$ [LINEAR] A 19th mag asteroid discovered by LINEAR on 2001 September 27.41 has a perihelion distance of 1.07 AU and a period of 6.13 years in a typical Jupiter family comet orbit. Perihelion was on 2001 October 20.75.

Following recovery in 2007 the orbit was refined to give perihelion distance at 1.06 AU on 2007 September 1.7 and a period of 5.85 years. It can pass 0.07 AU from the Earth and 0.1 AU from Jupiter.

2007 A1 (184P/Lovas) Comet P/1986 W1 was accidentally discovered on Catalina Sky Survey images taken with the 0.68-m Schmidt telescope on January 9.07 by R. A. Kowalski. Confirming images were taken with the Mt. Lemmon 1.5-m reflector and also following posting on the NEOCP. The indicated correction to the prediction by S. Nakano in the 2006 Comet Handbook (and in The Comet's Tale) is Delta(T) = +18.6 days.

2007 A2 (P/Christensen) Eric Christensen discovered a 19th magnitude comet during the Mount Lemmon Survey on January 10.41. Following the IAUC announcement it was linked to asteroid 2006 WY182. It has an elliptical orbit with period of 16 years and was near perihelion at 2.8 AU.

2007 A3 (185P/Petriew) The recovery of P/2001 Q2 was announced in the IAUC on January 14, although details of the recovery by Filip Fratev had been posted on the comets mailing list on January 12. The comet was 16th magnitude at recovery, with an indicated correction of Delta(T) = -0.04 day to the predictions on MPC 51822 (and in The Comet's Tale).

2007 A7 (SOHO) was a non-group comet discovered in C2 images by Luciano Cane on 2007 January 10.

2007 B1 (P/Christensen) Eric Christensen discovered a 19th magnitude comet during the Catalina Sky Survey on January 17.27. Following posting on the NEOCP it was confirmed by several observers including Giovanni Sostero. It has an elliptical orbit with period of 14 years and was near perihelion at 2.4 AU at discovery.

2007 B2 (Skiff) Brian Skiff discovered an 18th magnitude comet with the LONEOS 0.59-m Schmidt on January 23.39. The preliminary orbit gives perihelion at 2.7 AU in 2008 October. The comet could reach 13th magnitude around the time of perihelion. An improved orbit by Hirohisa Sato gives a slightly more distant perihelion at 3.0 AU in 2008 August.

Brian Marsden notes on MPEC 2007-V49 [2007 November 6] that the "original" and "future" barycentric values of 1/a are +0.001709 and +0.001792 (+/- 0.000005) AU^-1, respectively. The large "original" value suggests that this comet has made a previous visit to the inner solar system.

2007 B3 (186P/Garradd) Gordon Garradd discovered an 18th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on January 25.70. The preliminary orbit suggested that the comet was at perihelion at 4.0 AU in 2006 March, however the latest elliptical orbit gives perihelion at 4.3 AU in 2008 March and a period of 11 years.

Maik Meyer found some prediscovery observations in archive imagery from 1996 and 1975, which lead to numbering of the comet.

Maik notes: *I managed to find this comet in three DSS images after playing around with orbits and finding the anchor point with the 1996 images. It should be visible in a plate of 1995, but was not seen. Also I could not find it in some NEAT images. In the 1975 images the comet is quite bright, probably due to the slow motion.*

The appearance is almost the same in the two different plates, although at a different position. I have taken the position of the center of the short trail. The 1996 image is involved with a star. Here I could only measure the end of the trail.

Hirohisa Sato has computed a new orbit linking the apparitions. Subsequently to Maik's identification, Gareth Williams identified a comet, reported by Russell Eberst in 1978 from UK Schmidt plates taken at Siding Spring in 1977 and designated as 1977 O1 as being the same comet. With observations at three returns the comet was numbered 186P. The brightness of the object does seem rather more variable than expected for such a distant object, so it may be subject to occasional outbursts, much as 29P/Schwassmann-Wachman.

Seiichi Yoshida notes that: *The perihelion distance is large at 4.3 A.U., and the orbit is almost circular with an eccentricity of 0.12. Kenji Muraoka's calculation revealed that this orbit does not change significantly for 200 years in the 20th and 21st centuries.*

It reaches 17.5 mag at best based on the brightness at the discovery in 2007 January. The brightness in 1996 February was similar, however, the comet was unexpectedly bright at 15.5 mag in 1975 May and June. It seems to have been a temporary outburst, as the comet returned to its normal brightness in 1977 July at 18 mag.

This comet is similar to 111P/Helin-Roman-Crockett; large perihelion distance, almost circular orbit, and a record of unexpected brightening in temporary outburst.

2007 C1 (P/Christensen) Eric Christensen discovered a 19th magnitude comet with the 0.68-m Schmidt during the Catalina Sky Survey on February 9.28. Following posting on the NEOCP it was confirmed by Giovanni Sostero and E Guido. The orbit given on the discovery IAUC & MPEC was parabolic, although a suggestion was given that it might be elliptical. Further observations and a calculation by Hirohisa Sato showed that it did have an elliptical orbit. The latest orbit gives a period of 6.5 years, with perihelion at 2.1 AU in early March.

2007 C2 (P/Catalina) A 19th magnitude asteroidal object discovered by the Catalina Sky Survey on February 9.14 and posted on the NEOCP has been found to show cometary characteristics by several observers including Giovanni Sostero and E Guido. There are numerous prediscovery observations, the oldest by the Catalina Sky Survey on 2006 October 19. The comet reaches perihelion in early September at 3.8 AU and has a period of 19 years.

2007 C7 (SOHO) was a non-group comet discovered in C2 images by Hua Su on 2007 February 2.

2007 C12 (SOHO) was a non-group comet discovered in C2 images by Hua Su on 2007 February 8.

2007 D1 (LINEAR) A 19th magnitude asteroidal object discovered by LINEAR on February 17.28 and posted on the NEOCP was shown to have a coma and tail. The orbit given on the discovery IAUC & MPEC was a low inclination parabola, with the comet near perihelion at 2.6 AU. The next orbits to be issued were dramatically different, and have a higher inclination and perihelion at 8.8 AU in 2007 June. Calculations by Hirohisa Sato allow the possibility of a hyperbolic orbit, which was confirmed by subsequent orbits.

Brian Marsden notes on MPEC 2007-W67 [2007 November 26] that the "original" and "future" barycentric values of 1/a are +0.000054 and +0.000749 (+/- 0.000004) AU^-1, respectively. The small "original" value suggests that this is a "new" comet from the Oort cloud.

2007 D2 (Spacewatch) A 20th magnitude object discovered by Spacewatch on February 17.46 and posted on the NEOCP was shown to have a coma and faint tail by other observers. The comet is in a retrograde orbit and was at perihelion at 1.2 AU in November 2006. It will fade.

2007 D3 (LINEAR) A 19th magnitude asteroidal object discovered by LINEAR on February 20.09 and posted on the NEOCP has been shown to have a coma and tail. The orbit given on the discovery IAUC & MPEC shows it to be a distant object, and the latest orbit gives perihelion at 5.2 AU in 2007 May.

Brian Marsden notes on MPEC 2007-K10 [2007 May 18] that the "original" and "future" barycentric values of 1/a are +0.001286 and +0.001381 (+/- 0.000029) AU^-1, respectively. The large "original" value suggests that this comet has made a previous visit to the inner solar system.

A/2007 DN_{41} [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on February 23.45. It has a period of 5.4 years and perihelion was at 0.88 AU in late January 2007. [MPEC 2007-D64, 2007 February 23, 0.2-day orbit]. In the current orbit it can approach to around 0.2 AU of Jupiter and 0.002 AU of the Earth. This type of orbit is typical of Jupiter family comets. The object is very small, with an absolute magnitude of 26.7. It was found just after closest approach to the Earth, whilst at a distance of less than 0.02 AU.

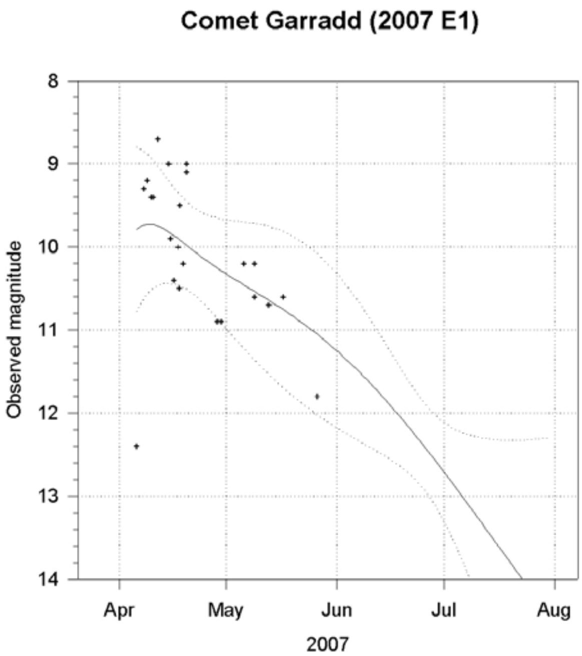
A/2007 DA_{61} [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on February 25.15. It has a period of 100 years, an orbital inclination of 75 degrees and is near perihelion at 2.6 AU. [MPEC 2007-D73, 2007 February 26, 1.5-day orbit]. There have been no recent planetary approaches.

2007 E1 (Garradd) Gordon Garradd discovered an 15th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on March 13.72. It was confirmed by numerous CCD observers. The comet reached perihelion at 1.3 AU in late May, and was predicted to reach 13th magnitude. Visual observations in early April made it significantly brighter than this at up to 9th magnitude, with a large, very diffuse coma.

Calculations by Hirohisa Sato showed that if it moved in a long period elipse, the period must be greater than 200 years. The latest orbit gives an eccentricity of 0.98 and a period of over 500 years.

Brian Marsden notes on MPEC 2007-K74 [2007 May 31] that the "original" and "future" barycentric values of 1/a are +0.015359 and +0.016098 (+/- 0.000087) AU^-1, respectively. The large "original" value suggests that this comet has made a previous visit to the inner solar system.

21 observations received so far suggest a preliminary light curve of m = 6.9 + 5 log d + 25.9 log r



2007 E2 (Lovejoy) Terry Lovejoy discovered a 10th magnitude comet on March 15.73, using a Canon 350D DSLR with 200mm f2.8 lens. Sixteen 90s stacked images showed the comet with strong central condensation and a green 4' coma. Visual estimates put it slightly brighter. The comet was near perihelion at 1.1 AU, but was approaching the Earth and brightened for another month, perhaps reaching 7th magnitude in late April. This was the first comet discovery with a DSLR.

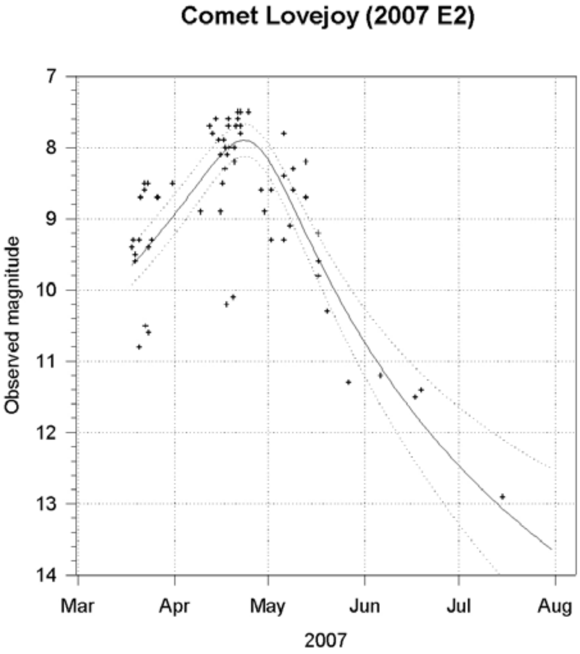
Terry provided this information to the comet mail list:
I use 2 Digital SLR cameras to image the sky, and then process the images using IRIS then examine them using the blink technique on a computer monitor. After a very intense search effort in 2006 without success (one near miss with 2006M4), I had wound back my efforts in 2007 (partly because of 2006P1 and partly because of fatigue!). March 15 was only the second time this year I had done any searches in the morning sky. While downloading images from the camera on March 15 I noticed a cometary object at the edge of 16 raw images centred at RA 20h57m DEC -51d 18m made between 17h22m and 17h46m UT. Normally, the raw unprocessed images show only the brightest objects so I was very surprised that this could be an undiscovered comet. At first I though it was simply a bright deep sky object, but after processing the intense telltale green hue and generally morphology strongly suggested comet. Additionally, when I blinked the processed images it showed small but clear motion. Astrometry quickly revealed no known object in that location. At this point I was very sure I had something :)

The following day there was an agonising wait for comet rise (about midnight from my location) and I notified a number of people for follow-up observations. John Drummond being located further east had the first opportunity to see the comet. Sure enough John phoned me to confirm the existence of the comet around 11pm local time. It's the first time I have spoken to John and what a way to introduce yourself! Dan Green contacted me late on March 16 UT to advise me that the comet had been announced, but as per standard procedure the comet would not be named until an orbit was calculated and it was determined the comet was not an existing named one.

All told I estimate I have examined about 1000 image fields since late 2004, which would equate to about 1000 hours (it takes me 10 minutes to actually examine an image, but there are other time consuming tasks like setup/development/identifying suspect objects, etc). Unfortunately I don't keep records on time taken and images examined.

Rob McNaught informs me that unusually cloudy weather has severely hampered coverage of the Siding Springs survey. Additionally, I also checked SWAN this morning and the last posted image is February 18. Moonlight probably explained why visual observers hadn't got to the comet first.

Juan Jose Gonzalez observed it on April 13.2 estimating it at 7.8 in 7x50B. Thereafter it faded quite rapidly.



64 observations received so far suggest a preliminary light curve of m = 9.1 + 5 log d + 7.6 log r

Brian Marsden notes on MPEC 2007-K75 [2007 May 31] that the "original" and "future" barycentric values of 1/a are +0.000617 and +0.000816 (+/- 0.000036) AU^-1, respectively. The large "original" value suggests that this comet has made a previous visit to the inner solar system.

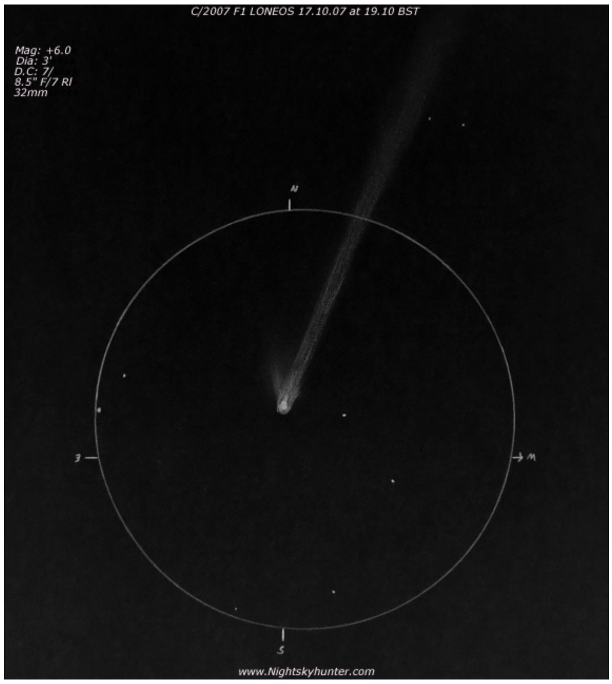
2007 E3 (187P/LINEAR) Eric Christensen recovered comet 1999 J5 (P/LINEAR) in images taken on March 9 during the course of the Mount Lemmon Survey, with additional images taken by R A Kowalski on March 10. The indicated correction to the prediction on MPC 54170 is Delta(T) = -0.8 day.

A/2007 EJ [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on March 9.14. It has a period of 5.5 years and perihelion was at 0.94 AU in late January 2007. [MPEC 2007-E35, 2007 March 10, 0.9-day orbit]. In the current orbit it can approach to within 0.15 AU of Jupiter and 0.05 AU of the Earth. This type of orbit is typical of Jupiter family comets.

A/2007 EP$_{88}$ [Siding Spring] This Aten asteroid was discovered from Siding Spring with the 0.5m Uppsala Schmidt on March 15.52. It has a period of 0.7 years and perihelion was at 0.09 AU in mid December 2006. [MPEC 2007-F19, 2007 March 16, 1-day orbit]. In the current orbit it can approach to within 0.15 AU of the Earth. It is estimated at 1.3km diameter.

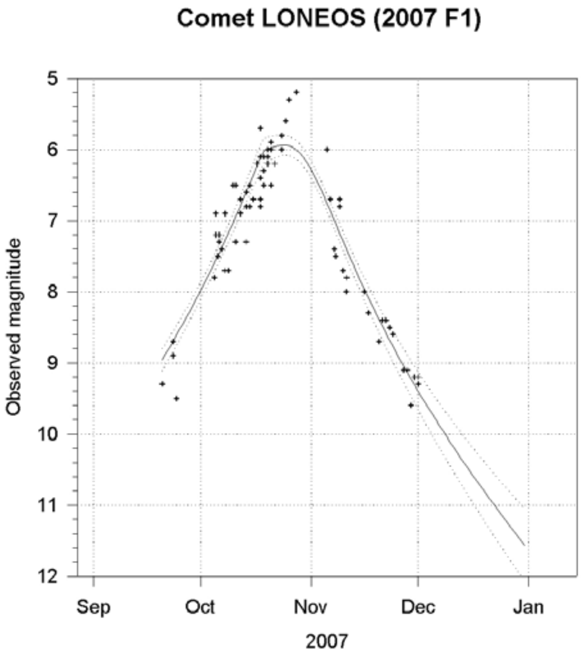
2007 F1 (LONEOS) A 19th magnitude asteroidal object discovered by LONEOS on March 19.26 with the 0.59m Schmidt, and posted on the NEOCP was shown to have cometary characteristics by many observers including Peter Birtwhistle and Giovanni Sostero et al. The latest orbit gives perihelion at 0.4 AU in late October. The comet became a binocular object around this time.

Images by Michael Jaeger and Gerald Rehman on September 14 suggest that it was around 11th magnitude, roughly a magnitude brighter than expected. Within a week a few visual observations were suggesting that it might have brightened to 9.5.



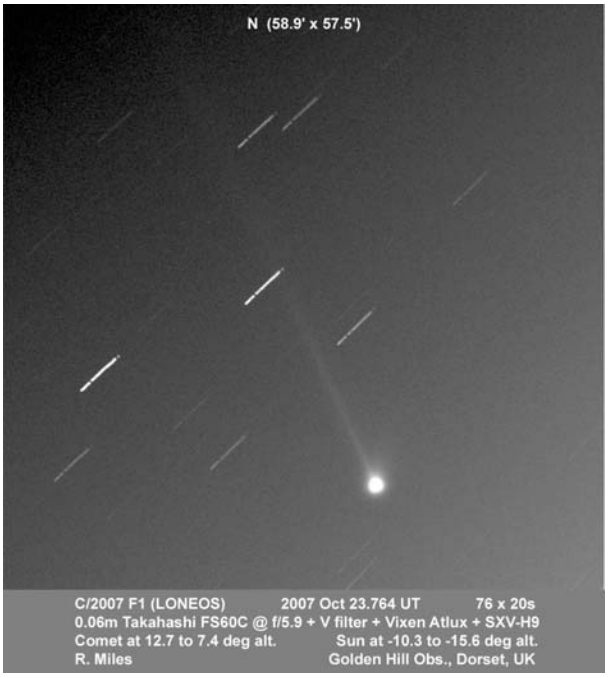
Martin McKenna, 2007 October 17

Martin McKenna, observing from Northern Ireland on the evening of October 3 with a 22cm Dobsonian, estimated the comet at around 7.5, noting that it was strongly condensed with a 3' coma. I observed it on October 15.77 with 20x80B, noting a strongly condensed coma and a total magnitude of 6.7.



After perihelion it faded fairly quickly and by mid November was 8th magnitude. The observations are best fitted by a linear light curve, peaking before perihelion. The 64 observations received so far suggest a preliminary light curve of m = 6.3 + 5 log d + 0.0508 (dT – 10.3)

Brian Marsden notes on MPEC 2007-K76 [2007 May 31] that the "original" and "future" barycentric values of 1/a are +0.000679 and -0.000184 (+/- 0.000075) AU^-1, respectively. The large "original" value suggests that this comet has made a previous visit to the inner solar system. Brian Marsden further notes on MPEC 2007-V97 [2007 November 13] that the non- gravitational parameters are A1 = +1.44 +/- 0.17, A2 = +0.5613 +/- 0.0779.

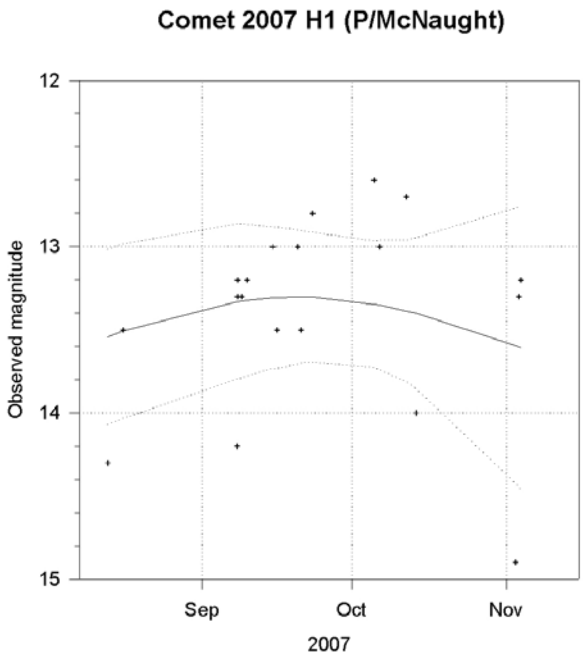


A/2007 FD_1 [Steward] This sun-skirting asteroid was discovered from the Steward Observatory, Kitt Peak with the 0.9m reflector on March 16.47. It has a period of 4.5 years, a highly eccentric orbit and perihelion was at 0.06 AU in late December 2006. [MPEC 2007-F34, 2007 March 19, 2-day orbit]. It would have been in the SOHO/STEREO coronagraph field between December 14 and 27, but if asteroidal would have been fainter than 12th magnitude. In the current orbit it can approach to within 0.12 AU of the Earth.

A/2007 FL_1 [Catalina] This unusual asteroid was discovered during the Catalina Sky Survey with the 0.7m Schmidt on March 17.46. It has a period of 5.7 years and perihelion is at 1.15 AU in mid May 2007. [MPEC 2007-F41, 2007 March 19, 2-day orbit]. In the current orbit it can approach to within 0.2 AU of Jupiter and 0.13 AU of the Earth. This type of orbit is typical of Jupiter family comets.

2007 G1 (LINEAR) A 19th magnitude asteroidal object discovered by LINEAR on April 10.38 and posted on the NEOCP was shown to have a coma and tail by amateur observers Giovanni Sostero & Ernesto Guido, A. Lepardo, Rolando Ligustri and Peter Birtwhistle. The latest orbit gives perihelion at 2.6 AU in mid November 2008. This orbit suggests that the comet might come within visual range in March 2008, reaching 12th magnitude for southern hemisphere observers near the time of perihelion and remain visible into 2009.

Brian Marsden notes on MPEC 2007-K77 [2007 May 31] that the "original" and "future" barycentric values of 1/a are +0.000167 and +0.000086 (+/- 0.000131) AU^-1, respectively. The relatively large "original" value suggests that this comet has probably made a previous visit to the inner solar system.



2007 H1 (P/McNaught) Rob McNaught discovered a 16th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on April 17.79. It was confirmed by several amateur CCD observers. Further observations showed that it has a period of 7.0 years. The comet reached perihelion at 2.3 AU in mid August, and was closest to the Earth in September.

19 observations received so far suggest a preliminary light curve of m = 9.0 + 5 log d + [10] log r

2007 H2 (Skiff) Brian Skiff of the Lowell Observatory discovered an 18th magnitude comet on CCD images taken by himself with the 0.59-m LONEOS Schmidt telescope on April 19.26. It was confirmed by numerous CCD observers. The comet passed perihelion at 1.4 AU in mid February.

2007 H3 (P/Garradd) Gordon Garradd discovered a 17th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on April 22.51. It was confirmed by N. Teamo and Sebastian Hoenig using a 0.41-m f/8 reflector at Punaauia, Tahiti. Prediscovery images from March were found in Siding Spring observations. The comet reached perihelion at 1.8 AU in mid August, and has a period of 6.5 years.

2007 J7 (188P/LINEAR-Mueller) Rob McNaught recovered comet P/1998 S1 with the 0.5-m Uppsala Schmidt at Siding Spring on May 13 and Jim Scotti independently recovered it with the Spacewatch 1.8-m f/2.7 reflector at Kitt Peak on June 26.5. The indicated Delta(T) correction to the prediction on MPC 51824 is +0.03 day. The comet was numbered following recovery.

A few observations suggested that it was 14^{th} magnitude in October.

2007 JA_{21} (LINEAR) A rather unusual looking asteroidal orbit on MPEC 2007-J52 [2007 May 12] was followed within 24 hours by an IAUC giving a cometary designation and a note that the MPEC was premature. The object, discovered by LINEAR on May 11.30, was at perihelion at 5.4 AU in 2006 November and moves in a near perpendicular orbit.

Brian Marsden notes on MPEC 2007-O22 [2007 July 19] that The "original" and "future" barycentric values of 1/a are +0.000104 and +0.000030 (+/- 0.000033) AU^-1, respectively. The relatively large "original" value suggests that this comet may have made a previous visit to the inner solar system.

2007 K1 (Lemmon) A 20th magnitude asteroidal object discovered by the Mt Lemmon Survey on May 18.44 with the 1.5m reflector, and posted on the NEOCP was shown to have cometary characteristics by many observers including Peter Birtwhistle and Giovanni Sostero et al. It is a very distant object, not far from perihelion at 9.2 AU.

Brian Marsden notes on MPEC 2007-O23 [2007 July 19] that The "original" and "future" barycentric values of 1/a are +0.002530 and +0.002528 (+/- 0.000084) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 K2 (P/Gibbs) Alex Gibbs discovered a 19th magnitude comet on Catalina Sky Survey images taken with the 0.68m Schmidt on May 21.15. The comet was not far from perihelion at 2.3 AU and has a period of about 19 years.

2007 K3 (Siding Spring) An apparently asteroidal 19th magnitude object found by Gordon Garradd during the course of the Siding Spring Survey with the 0.5m Uppsala Schmidt on May 23.43 was found by Rob McNaught to show a coma a couple of nights later. The comet reaches perihelion at 2.1 AU in April 2008. It might reach 14th magnitude around the time of perihelion.

2007 K4 (Gibbs) Alex Gibbs discovered an 18th magnitude comet on Catalina Sky Survey images taken with the 0.68m Schmidt on May 25.32. The comet was near perihelion at 3.5 AU.

2007 K5 (Lovejoy) Terry Lovejoy discovered a 13th magnitude comet on May 26.34, using a Canon 350D DSLR with 200mm f2.8 lens. Twelve 90s stacked images showed the comet as circular, 1' across, with a clear blue-green color but no tail. Hirohisa Sato calculated several preliminary orbits. The comet was just past perihelion at around 1.1 AU, and it is in an orbit with a period around 300 years. Terry provides the following information on the discovery

This particular comet (designated C/2007K5) was found as a small faint but still rather obvious blue-green haze in my images from the evening of May 26. My initial estimate is mag 13, but I admit I have not attempted more precise photometry and visually the comet could well be brighter. Interestingly the discovery was made during a bright waxing moon and in the evening sky where moderate light pollution prevails. On the evening I had both cameras (a Canon 300D + Canon 350D) mounted the usual way with the 300D pointed towards -18 declination and the 350D pointed towards declination -11. This allows me to image 13 degree wide sweep of sky from west to east. Some 12 individual starfields were covered with both cameras, with 12 subexposures of 90 seconds for each starfield.

The following day, I downloaded the images from my 300D and ran them through the usual automated processing steps (IRIS is used for this). This processing step outputs 2 images per starfield effectively separated by 10 minutes so that moving objects like comets can be identified. By 'blinking' the 2 images one can see objects like asteroids and comets bobbing backwards and forwards. On examining the first image I almost immediately noticed a moving small hazy object with a distinctive blue green colour typical of many comets. I knew I had something for sure, and notified a number of other for confirmation of a possible comet.

Confirmation came on May 28 when both John Drummond and I made follow-up observations, which were then sent to Dan Green at CBAT. Further follow-up was obtained on May 29 by Rob McNaught before an official circular (IAUC 8840) announced the new comet as C/2007 K5. Interesting, C/2007 K5 required less than 20 hours of actual searching in contrast to the estimated 1400 hours for C/2007 E2.

The comet itself appears to be quite faint, and will probably remain that way, but a comet none-the-less. Further astrometry is required to calculate an orbit and once this is done the comet will be named.

2007 K6 (McNaught) Rob McNaught discovered an 18th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on May 27.80. The comet reached perihelion at 3.4 AU in early July.

Brian Marsden notes on MPEC 2007-P28 [2007 August 10] that the "original" and "future" barycentric values of 1/a are +0.005141 and +0.005184 (+/- 0.000073) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 M1 (McNaught) Rob McNaught discovered a 19th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on June 16.71. The comet reaches perihelion at 7.5 AU in 2008 August. Hirohisa Sato notes that the orbit may be a long period ellipse.

Rob notes: *This object resulted from southerly winds forcing me to survey in the north, looking in a small area unsurveyed in the last month! Every one is pleasing, but I'm not going to lose sight of the fact that this is a team effort using some great software (in recent years largely down to Ed Beshore and Eric Christensen). Steve Larson's group, as with some others, have all been enthusiasts, committed to the project and discovery. Thus the naming policy adopted within the group; the observer/discoverer gets a personal credit in the naming. Having a survey name by default would certainly take much of the shine off the discovery process for me, and I think for most people it is both an incentive and a motivation.*

Our current funding will go thru to the end of 2008, but after that there is no guarantee of funding for the project in general or the Uppsala telescope. Any possible new project might involve a different telescope, *different location, different people and different naming policy. Still, I've had a great innings and a few more before the end of next year would be most pleasing!*

Brian Marsden notes on MPEC 2007-Q24 [2007 August 26] that the "original" and "future" barycentric values of 1/a are +0.000352 and +0.000381 (+/- 0.000205) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 M2 (Catalina) A 20th magnitude asteroidal object discovered by the Catalina Sky Survey on June 20.19 and posted on the NEOCP was found to show cometary characteristics. The comet reaches perihelion in 2008 December at 3.5 AU.

Brian Marsden notes on MPEC 2007-W68 [2007 November 26] that The "original" and "future" barycentric values of 1/a are +0.000603 and +0.000979 (+/- 0.000036) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 M3 (LINEAR) A 17th magnitude asteroidal object discovered by LINEAR on June 21.31 and posted on the NEOCP was found to show cometary characteristics. The comet reaches perihelion in 2007 September at 3.5 AU.

Orbit computations by Hirohisa Sato suggested a long period ellipse with a period of around 1000 years and this was confirmed by further observations.

Brian Marsden notes on MPEC 2007-Q25 [2007 August 26] that The "original" and "future" barycentric values of 1/a are +0.006249 and +0.006082 (+/- 0.000047) AU^-1, respectively.

2007 M5 (SOHO) was a non-group comet discovered in C2 images by Bo Zhou on 2007 June 25. It has an unusually small perihelion distance of 0.0011 AU. If the orbit is correct this means that it would have hit the sun.

2007 M8 (SOHO) was a non-group comet discovered in C2 images by Hua Su on 2007 June 25.

2007 N1 (191P/McNaught) Rob McNaught discovered an 18th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on July 10.73. The comet reached perihelion at 2.0 AU in 2007 September and has a period of around 6.6 years. Images from August and November 2000 were found in archival LONEOS and NEAT observations by Syuichi Nakano in early September and it was given the designation 2000 P3 for this return. Following publication of the identification on MPEC 2007-R04 further images from September and December 2000 were found in the NEAT archives by Maik Meyer and Reinder Bouma.

2007 N2 (189P/NEAT) Comet P/2002 O5 was recovered serendipitously by LINEAR in New Mexico in astrometry from July 15.23 and following accidental posting on the NEOCP was confirmed by G. Lombardi and E. Pettarin at Farra d'Isonzo, Italy and F. Fratev and E. Mihaylova at Plana, Bulgaria. It was around 16th magnitude. The correction to the predictions on MPC 51823 is Delta(T) = -0.36 day.

2007 N3 (Lulin) An apparently asteroidal object of 19th magnitude, discovered by Quanzhi Ye, a student at Sun Yat-sen University (Guangzhou, China), on images acquired by Chi Sheng Lin (Institute of Astronomy, National Central University, Jung-Li, Taiwan) with the 0.41-m f/8.8 Ritchey-Chretien reflector in the course of the Lulin Sky Survey, was found to show marginal cometary appearance in CCD images taken by J. Young with the Table Mountain 0.61-m reflector. The retrograde orbit gives perihelion at 1.2 AU on 2009 January 10.

The comet should become visible to UK observers in early 2009, and may be 6th magnitude in 2009 February. It will remain visible until early May. Quanzhi Ye has also discovered a number of SOHO comets. This is the first discovery of a comet from Taiwan and the observatory is a non- professional one. The Lulin Sky Survey is a co-operative project between China and Taiwan.

Brian Marsden notes on MPEC 2007-S50 [2007 September 25] that The "original" and "future" barycentric values of 1/a are +0.000347 and +0.000114 (+/- 0.000141) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 O1 (LINEAR) A 17th magnitude asteroidal object discovered by LINEAR on July 17.23 and posted on the NEOCP was found to show cometary characteristics by several groups including the Remanzacco and several other Italian groups, and by Peter Birtwistle in the UK. The comet was just past perihelion at 2.9 AU.

2007 O2 (190P/Mueller) Comet P/1998 U2 was recovered by L. Buzzi and F. Luppi, Varese, Italy on 2007 July 26 on CCD images obtained with a 0.60-m reflector. Peter Birtwhistle made confirming CCD observations on July 27. The indicated correction to the predictions on MPC 51823 is Delta(T) = +0.3 day.

2007 P1 (McNaught) Rob McNaught discovered a 19th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on August 7.72. The initial orbit suggested that the comet was at perihelion at 0.6 AU in March this year. At this time it would have been around 11th magnitude, but poorly placed for visual observation. It might however have been visible in the SOHO SWAN images. This is the 50th comet discovered from Siding Spring.

A/2007 PA$_8$ [LINEAR] This unusual asteroid was discovered by LINEAR with the 1.0m reflector on August 9.21. It has a period of 5.2 years and perihelion is at 0.88 AU at the end of February 2008. [MPEC 2007-P35, 2007 August 11, 2-day orbit]. In the current orbit it can approach to within 0.25 AU of Jupiter and 0.01 AU of the Earth. This type of orbit is typical of Jupiter family comets.

2007 Q1 (Garradd) Gordon Garradd discovered a 19th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on August 21.65. The preliminary orbit suggests that the comet was at perihelion at 3.0 AU in 2006 December.

2007 Q2 (P/Gilmore) An apparently asteroidal object, found by Alan Gilmore on CCD images taken with the Mount John University Observatory 1-m reflector on

August 22.58, was shown to have a coma and tail after posting on the NEOCP. The comet was near perihelion at 1.8 AU and has an elliptical orbit with period around 13 years.

Rodney Austin comments on the comet mailing list:
As a little bit of an aside to this discovery. This is second official discovery of a comet from Mt John, not counting the independent discovery by Alan Thomas of Comet Barbon in 1966; (a miscommunication between Mt John and the Carter Observatory in Wellington saw Alan miss out on getting co-credit).

The first official discovery was by Mike Clark (P/Clark) in 1973. At that time I was working at Mt John myself, and was off duty that evening – comet hunting (!) only about 100 metres away from the building where Mike was busy taking plates for the Bamburg Observatory patrol. He found the comet on inspecting his plates the following day. He started looking VERY closely at his plates after just missing the discovery of the SN in NGC 5253 the previous year.

I have been in touch with Alan Gilmore who says that he was as surprised as everyone else over this one.

2007 Q3 (Siding Spring) An apparently asteroidal object discovered by Donna Burton with the 0.5-m Uppsala Schmidt telescope in the course of the Siding Spring survey on August 25.76, was shown to have a cometary appearance after posting on the 'NEOCP' webpage. The comet will reach perihelion at 2.3 AU in October 2009. It could reach 10th magnitude around the time of perihelion, and will become visible to northern hemisphere observers in autumn 2009. At discovery it was over 7 AU from the Sun.

Brian Marsden notes on MPEC 2007-U59 [2007 October 23] that The "original" and "future" barycentric values of 1/a are +0.000309 and +0.000412 (+/- 0.000152) AU^-1, respectively. The large "original" value suggests that this comet has probably made a previous visit to the inner solar system.

2007 R1 (P/Larson) Steve Larson discovered an 18th magnitude comet on September 4.37 in images taken during the Mt Lemmon survey with the 1.5m reflector. The comet has a period of around 15 years and perihelion was at 4.4 AU in 2007 August.

2007 R2 (P/Gibbs) A R Gibbs discovered an 18th magnitude comet on September 10.41 in images taken during the Catalina Sky Survey with the 0.68m Schmidt. The cometary nature was confirmed following posting on the NEOCP. The comet has a period of around 6.4 years and was just past perihelion at 1.5 AU.

2007 R3 (P/Gibbs) Alex Gibbs discovered a 19th magnitude comet on September 14.29 in images taken during the Catalina Sky Survey with the 0.68m Schmidt. The cometary nature was confirmed following posting on the NEOCP. The comet has a period of around 8.9 years and was at perihelion at 2.5 AU in July.

2007 R4 (P/Garradd) Gordon Garradd discovered an 18th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on September 14.61. The cometary nature was confirmed following posting on the NEOCP. The comet has a period of around 14 years and was near perihelion at 1.9 AU.

2007 R5 (P/SOHO) A Kracht II group comet reported from SOHO C2 imagery by Bo Zhou on September 10.76 is the return of the comet predicted by Sebastian Hoenig, confirming the identity 1999 R1 = 2003 R5. The time of perihelion is September 11.3, in exact agreement with the prediction. Following the precedent of comets 1P, 2P and 27P a suggestion is that the comet should be re-named comet Hoenig. An alternative view is that others have also suggested possible linkages between the SOHO comet groups, eg Rainer Kracht, Brian Marsden and Maik Meyer and that deciding on who should get precedence will be difficult. The comet should have been numbered 192, but was not. A linked orbit for the three returns was published on MPEC 2007-S16, in which Brian Marsden comments that:
The orbit is from C2 observations only. The current C3 observations increasingly deviate to more than 0.5 arcmin west and almost 1 arcmin north of the computed position by the end of the sequence. This disagreement between C2 and C3 may have implications for the accuracy of previously derived SOHO orbits.

One reason being given for the failure to number the object is that it may not be a comet, despite its cometary designation. Demonstrating that the light curve is non-asteroidal may be one solution, and clear evidence of a coma or tail would certainly confirm it.

According to the linked orbit by S. Nakano the comet will approach Earth in 2035 at 0.27 AU, in 2038 at 0.19 AU and in 2043 at 0.30 AU.

A/2007 RV_{19} [LINEAR] This unusual asteroid was discovered by LINEAR with the 1.0m reflector on September14.12. It has a period of 5.9 years and perihelion was at 1.18 AU at the end of 2007 August. [MPEC 2007-R85, 2007 September 15, 1-day orbit]. In the current orbit it can approach to within 0.4 AU of Jupiter and 0.19 AU of the Earth. This type of orbit is typical of Jupiter family comets, although it has shown no sign of cometary activity.

2007 S1 (P/Zhao) Haibin Zhao at the Purple Mountain Observatory, discovered an 18th magnitude comet on CCD images obtained with the 1.04-m f/1.8 Schmidt telescope at XuYi Station on September 17.79. This was confirmed after posting on the NEOCP, and additional prediscovery observations were found in LONEOS observations by Tim Spahr. The comet has a period of about 7.4 years and reaches perihelion at 2.5 AU in December.

2007 S2 (Lemmon) A 19th magnitude asteroidal object discovered by the Mt Lemmon Survey on September 25.49 with the 1.5m reflector, and posted on the NEOCP has been shown to have cometary characteristics by two observers, whilst others have provided astrometry. The provisional orbit makes it a distant object near perihelion at 6.2 AU, however Brian Marsden noted that it was probably of intermediate or short period.

Independent orbit computations by Hirohisa Sato and Kenji Muraoka suggest an orbital period of around 60 years, with perihelion at 5.7 AU in summer 2008. This was confirmed, with the latest orbit giving a period of around 44 years and perihelion at 5.5 AU in September 2008.

2007 T1 (McNaught) Rob McNaught discovered a 13th magnitude comet on images taken for the Siding Spring Survey with the 0.5-m Uppsala Schmidt on October 9.42. The latest orbit shows that the comet will reach perihelion at 1.0 AU in December. Visual observers are currently estimating the comet at around 10th magnitude, and it will brighten a little further. It is not well placed for observation from the UK, although Peter Birtwistle was amongst those reporting confirming observations.

7 observations received so far suggest a preliminary light curve of m = 8.2 + 5 log d + 9.6 log r

2007 T2 (P/Kowalski) Richard Kowalski discovered a 17th magnitude comet on October 9.51 in images taken during the Catalina Sky Survey with the 0.68m Schmidt. The cometary nature was confirmed following posting on the NEOCP. The comet has a period of around 5.4 years and was just past perihelion at 0.7 AU.

2007 T3 (192P/Shoemaker-Levy) Rob McNaught recovered comet P/1990 V1 (=1990o = 1990 XV) on October 12.45 as an 18th magnitude object with a small coma. The indicated correction to the orbital elements on MPC 51824 is Delta(T) = +4.5 days. The comet will only brighten a little and is clearly several magnitudes fainter than at its discovery apparition.

Seiichi Yoshida notes: *Kazuo Kinoshita's calculations reveal that the orbital elements of this comet have not changed much since 1939.*

It was discovered about two months after perihelion passage in 1990. That was probably because it had been located in the southern sky until that time.

Maybe this comet tends to be brightest after perihelion passage. If so, the comet may brighten rapidly after this, and may reach 14.5 mag in February.

However, it was not discovered in September or October in 1990 when it must have been observable and bright. So maybe a temporary outburst occurred in 1990 November.

2007 T4 (P/Gibbs) Alex Gibbs discovered an 18th magnitude comet on Catalina Sky Survey images taken with the 0.68m Schmidt on October 12.46. The comet passed perihelion at 2.0 AU in July and will fade. It has a period of around 12 years.

2007 T5 (Gibbs) Alex Gibbs discovered another 18th magnitude comet the following night on October 13.46, on Catalina Sky Survey images taken with the 0.68m Schmidt. The comet reaches perihelion at 4.0 AU in 2008 May and moves in a long period ellipse of about 300 years.

2007 T6 (P/Catalina) An apparently asteroidal object of 18th magnitude, found with the 0.68m Schmidt during the Catalina Sky Survey on October 13.47 and posted on the NEOCP was found to show a coma and faint tail on images taken by J W Young with the Table Mountain 0.61-m f/16 Cassegrain reflector. The comet was at perihelion at 2.2 AU in August and has a period of around 10 years. The comet has also been identified with asteroid 2007 TU149 by S Nakano.

2007 U1 (LINEAR) A 19th magnitude asteroidal object discovered by LINEAR on October 19.41 and posted on the NEOCP was found to show cometary characteristics by several observers including the Remanzacco group. The comet is predicted to reach perihelion at 3.3 AU in 2008 August.

2007 U2 (193P/LINEAR-NEAT) Comet P/2001 Q5 was recovered by K. Sarneczky and L. L. Kiss with the 2.3-m reflector at Siding Spring on October 21.45. The indicated correction to the prediction on MPC 54167 is Delta(T) = -0.5 day.

2007 V1 (P/Larson) Steve Larson discovered a 17th magnitude comet on November 8.31 in images taken during the Catalina Sky Survey with the 0.68m Schmidt. The comet has a period of around 11 years and perihelion is at 2.7 AU in 2007 December.

2007 V2 (P/Hill) BAA Member, Rik Hill discovered a 19th magnitude comet on November 9.30 in images taken during the Mt Lemmon survey with the 1.5m reflector. The comet has a period of around 8 years and perihelion was at 2.8 AU in 2007 July.

A/2007 VJ_8 [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on November 5.26. It has a period of 5.8 years and perihelion was at 1.12 AU in mid November. [MPEC 2007-V46, 2007 November 6, 1-day orbit]. In the current orbit it can approach to within 0.1 AU of Jupiter and 0.13 AU of the Earth. This type of orbit is typical of Jupiter family comets.

A/2007 VA_{85} [LINEAR] This highly unusual asteroid was discovered by LINEAR with the 1.0m reflector on November 4.09. It has a retrograde orbit with a period of 7.6 years and perihelion was at 1.09 AU at the end of July. [MPEC 2007-V73, 2007 November 9, 5-day orbit]. In the current orbit it can approach to within 0.25 AU of Jupiter and 0.14 AU of the Earth. The object has the shortest known retrograde orbit and has shown no sign of cometary activity.

A/2007 VA_{188} [LINEAR] This unusual asteroid was discovered by LINEAR with the 1.0m reflector on November 12.08. It has a period of 6.6 years and perihelion was at 1.10 AU at the end of October. [MPEC 2007-V112, 2007 November 14, 2-day orbit]. In the current orbit it can approach to within 0.25 AU of Jupiter and 0.14 AU of the Earth. This type of orbit is typical of Jupiter family comets.

A/2007 VE_{189} [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on November 11.49. It has a period of 6.2 years and perihelion is at 1.10 AU in late November. [MPEC 2007-V115, 2007 November 15, 3-day orbit]. In the current orbit it can approach to within 0.1 AU of Jupiter and 0.12 AU of the Earth. This type of orbit is typical of Jupiter family comets.

A/2007 VW_{266} [Mt Lemmon] This very unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on November 12.38. It has a period of 12 years, moves in a retrograde orbit and perihelion is at 3.35 AU in 2008 August. [MPEC 2007-W59, 2007 November 19, 7-day orbit]. It can approach within 0.9 AU of Jupiter.

2007 W1 (Boattini) Andrea Boattini discovered an 18th magnitude comet on November 20.48 in images taken during the Mt Lemmon survey with the 1.5m reflector. The preliminary orbit gives perihelion at 0.7 AU in 2008 June.

For visual observers in the UK, the comet may become visible in mid March but is rather far south. It will be lost again towards the end of April, when it may be visible in binoculars. It is poorly placed for UK observation around the time of perihelion, but may be recovered in late July, possibly as a binocular object. Southern Hemisphere observers have a better view, and should be able to view it through perihelion, when it may be 6th magnitude.

2007 W2 (P/LINEAR) Comet P/2000 B3 was recovered by L. Buzzi and F. Luppi on CCD frames taken with a 0.60-m f/4.64 reflector at Varese, Italy on November 17.07. The indicated correction to the prediction on MPC 54167 is Delta(T) = +0.16 day.

2007 W3 (LINEAR) A 20th magnitude asteroidal object discovered by LINEAR on November 29.32 and posted on the NEOCP has been found to show cometary characteristics by several observers including E. Guido and G. Sostero. The comet is predicted to reach perihelion at 1.8 AU in 2008 June. It is an intrinsically faint comet and may not get within visual range.

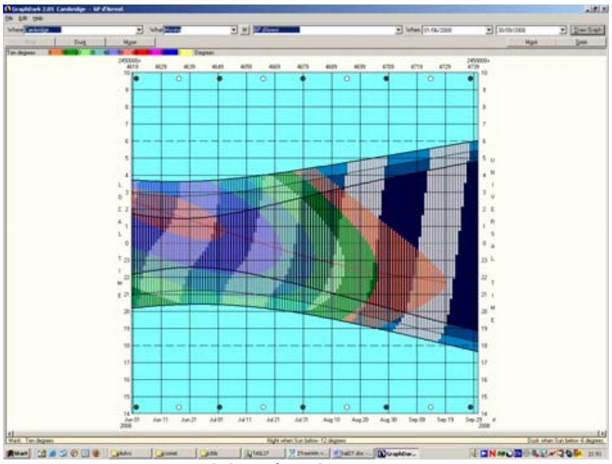
A/2007 WW$_3$ [Mt Lemmon] This unusual asteroid was discovered from Mt Lemmon with the 1.5m reflector on November 19.35. It has a period of 5.5 years and perihelion was at 1.09 AU in late October. [MPEC 2007-W32, 2007 November 19, 0.1-day orbit]. In the current orbit it can approach to within 0.4 AU of Jupiter and 0.10 AU of the Earth. This type of orbit is typical of Jupiter family comets.

A/2007 XJ$_{16}$ [Steward] This unusual asteroid was discovered at the Steward Observatory, Kitt Peak with the 0.9m reflector on December 5.38. It has a period of 5.6 years and perihelion was at 1.04 AU in early August. [MPEC 2007-X50, 2007 December 10, 1-day orbit]. In the current orbit it can approach to within 0.5 AU of Jupiter and 0.06 AU of the Earth. This type of orbit is typical of Jupiter family comets.

For the latest information on discoveries and the brightness of comets see the Section www page: http://www.ast.cam.ac.uk/~jds or the CBAT headlines page at http://cfa-www.harvard.edu/cfa/ps/Headlines.html

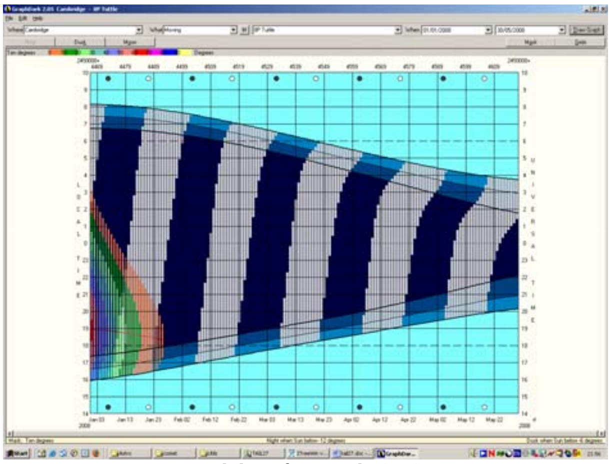
Comet Prospects for 2008

2008 is a fairly good year with five comets likely to come within binocular range. 8P/Tuttle may even be within naked eye range at the beginning of the year. There are a further nine comets that should be within visual range for larger telescopes and many more for the CCD observers. The version of Comet Prospects given here is slightly revised and updated from that which appeared in the December Journal.



Visibility of 6P/d'Arrest (UK)

6P/d'Arrest makes its 19th observed return, and it is a good one with the comet reaching perihelion when near opposition. It was first observed by La Hire in 1678 and only four other periodic comets (Halley, Tempel-Tuttle, Swift-Tuttle and Ikeya-Zhang) have a longer observational interval. At previous good returns it has reached naked eye brightness, but orbital perturbations have increased the perihelion distance over the past few returns and predictions suggest that it is unlikely to get brighter than 9^m at this return. It should come within visual range in June and reaches perihelion just after opposition in August. It heads south and will become invisible to UK observers, but Southern Hemisphere observers will be able to follow it as it fades out of visual range in October. It spends June and July in Aquila, but rapidly heads south in August and is in Microscopium by the end of the month.



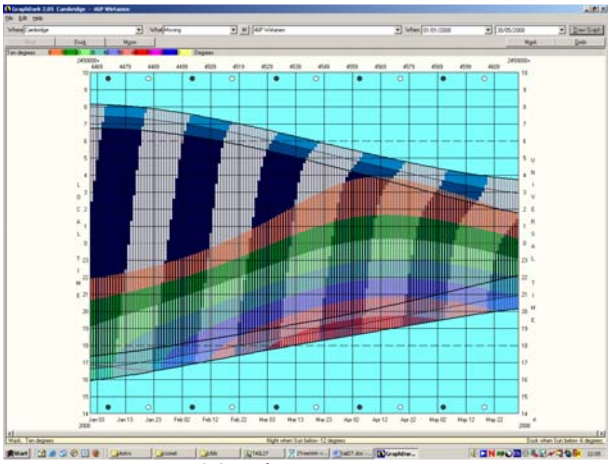
Visibility of 8P/Tuttle (UK)

8P/Tuttle is likely to be one of the brighter objects for visual observers in 2008, unless there is an exciting new discovery. It could be a binocular or even naked eye object at the beginning of the New Year as it makes a close pass of the Earth at 0.25 AU. It begins the year in Pisces, but is rapidly heading south and UK observers will lose it after the third week of January. Southern Hemisphere observers should be able to follow it for another three months. The comet was discovered by Pierre Mechain in January 1790 from Paris, but the available observations were insufficient to compute an elliptical orbit and it was lost until a comet was discovered by Horace Tuttle at Harvard, USA in February 1858. When an accurate orbit was computed it was found to be identical to Mechain's comet and it has been observed at every return since 1871 except for a very unfavourable one in 1953. The most favourable returns are those with a perihelion in December, January or February. The orbit is quite stable, due to the high inclination and the value of the argument of perihelion, and it intersects the earth's producing the

Ursid meteor shower which peaks on December 23. Rates at maximum are usually only 10 - 15 per hour, but strong displays of around 100 per hour occurred in 1945 and 1986; in both cases the parent comet was near aphelion.

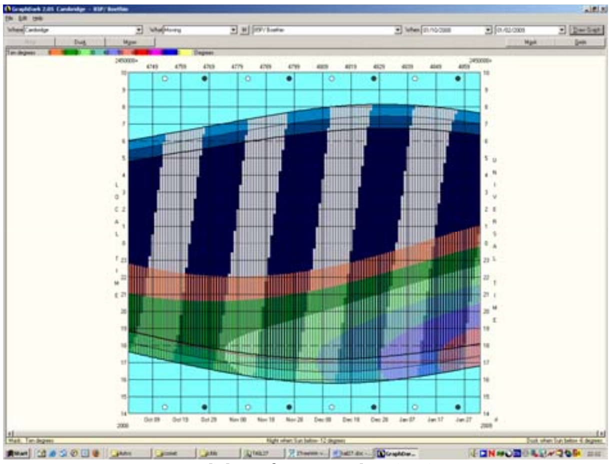
Alphonse Borrelly discovered comet **19P/Borrelly** in 1904 from Marseilles, France, during a routine comet search with a 160mm refractor. It was put into its discovery orbit by an encounter with Jupiter in 1889, which only made minor changes, and subsequent returns slowly became more favourable. Despite having had several further moderately close approaches to Jupiter the orbit has only changed a little and the comet will next approach Jupiter in 2019. This will be its 14th observed return, with two poor ones having been missed. At its best return in 1987
it reached 7.5^{m}. This is not a particularly good one, and it will remain close to the Sun until perihelion. It slowly emerges into the morning sky, and observations of the comet should be possible from July onwards as the comet fades from 11th magnitude.

29P/Schwassmann-Wachmann is an annual comet that has outbursts, which in recent years seem to have become more frequent and were more or less continuous in 2004. At many recent outbursts it has reached 12^{m}. It spends the first third of the year in Auriga before sinking into solar conjunction. It emerges into the morning sky of Gemini in August, and spends the last third of the year in Cancer. Unusually there is no opposition in 2008. The comet is an ideal target for those equipped with CCDs and it should be observed at every opportunity. It is again well placed this year and UK based observers should be able to follow it for much of the year.



Visibility of 46P/Wirtanen (UK)

Carl A Wirtanen discovered **46P/Wirtanen** at Lick in 1948. It is in a chaotic orbit, and its perihelion distance was much reduced due to approaches to Jupiter in 1972 and 84. It has been reported to outburst, but BAA data suggests that it was just rejuvenated after the perihelion distance was reduced. A December perihelion would give a close approach to the Earth, and as the present period is now less than 5.5 years this will be achieved in 2018, when the comet could reach 3rd magnitude. This is a relatively good return with the comet reaching 9th magnitude in the evening sky around the time of its February perihelion. The comet travels eastwards, not that far from the ecliptic, crossing to northern declinations in late January and crossing north of the ecliptic in early February. It should be possible to continue observations until May as it fades.



Visibility of 85P/Boethin (UK)

Leo Boethin discovered **85P/Boethin** visually with a 0.20-m reflector at Bangued, Abra, Philippines on 1975 January 4. The last return was the worst of the century and the comet was not recovered. The orbit is evolving in response to encounters with Jupiter and Saturn. The comet will pass 0.046 AU from Jupiter in May 2007, in an encounter which makes significant changes to the angular elements. The return at the end of 2008 is favourable and the comet could become visible in binoculars. It comes into visual range in August when it is near opposition, but initially remains too far south for UK observers, who should be able to pick it up in October. By then it is 10th magnitude and steadily brightens perhaps reaching 7th magnitude in the December evening sky. It is another near ecliptic comet and ends the year in Pisces.

Two periodic comets for 2009 come into visual range by the end of the year, however the second is poorly placed. Of these, **144P/Kushida** was discovered by Yoshio Kushida (his second discovery within a month) on Technical Pan 6415 film exposed on 1994 January 8.8 with an 0.10-m, f4.0 patrol camera at Yatsugatake South Base Observatory, Japan. The comet was 13^{m}, diameter 1-2' with a strong central condensation. It proved to be a short period comet with a period of 7.4 years and was found at a favourable opposition. With an aphelion just outside the orbit of Jupiter, it belongs to the Jupiter family of comets, and its most recent close approach to the planet before discovery was just over 1 AU in 1960. A similar approach followed in 1995 on the outbound leg of its post discovery revolution. The comet was moved into something close to its present orbit in a close encounter with Jupiter in 1782. Since then encounters have been more distant and there have only been slow changes in the elements. This is a favourable apparition and the comet could reach 11th magnitude by the end of the year.

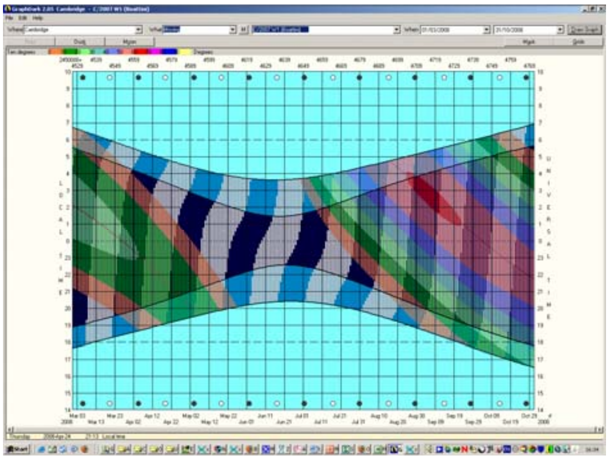
2003 K2 (P/Christensen) An object discovered by the Catalina sky survey on 2003 May 26.18 was quickly confirmed as cometary. It passed perihelion at 0.55 AU in April, but was intrinsically faint. It was visible in SWAN imagery and at brightest probably reached 10th magnitude; it seems likely that it was the same object as reported in SWAN imagery between April 5 to 19, but which was not confirmed visually due to low elevation and poor elongation from the Sun. An orbit by Marsden gives the period as 5.75 years, however the observed arc is relatively short. It should be recovered by Southern Hemisphere astrometric observers by October, but it will remain poorly placed for northern observers until after perihelion.

With sky surveys getting ever deeper, long period comets are being discovered a considerable time from perihelion, and several are likely to be visible in 2008. Some two months after John Broughton discovered asteroid **2006 OF_2 (Broughton)** it was found to show a coma, not altogether surprisingly given the provisional highly eccentric orbit. It should emerge from solar conjunction in 2008 June as a 12th magnitude object and peak at 11th magnitude in November. It is circumpolar for Northern Hemisphere observers when brightest during the autumn of 2008 and will remain visible until 2009 May.

2006 Q1 (McNaught) may reach 11th magnitude in July 2008, when it is at perihelion, however it is then a Southern Hemisphere object. By December, when it becomes visible from the UK, it will have faded to 13th magnitude.

2007 G1 (LINEAR) reaches perihelion at 2.7 AU in mid November 2008. The comet might come within visual range in March 2008, reaching 12th magnitude for Southern Hemisphere observers near the time of perihelion and remain visible into 2009.

2007 N3 (Lulin) reaches perihelion early in 2009, but should be observable by Southern Hemisphere observers during their 2008 winter at around 12th magnitude. UK observers will have to wait until the new year and it may reach 6th magnitude in February.



Visibility of 2007 W1 (Boattini) (UK)

2007 W1 (Boattini) will be best observed from the Southern Hemisphere and should reach 6th magnitude around the time of perihelion. From the UK it will be best seen in early May, when it may have reached 8th magnitude, as it sinks into the evening twilight prior to perihelion. It will be a little brighter when it emerges into the morning sky in July, but fades quite rapidly.

The other periodic and parabolic comets that are at perihelion during 2008 are unlikely to become brighter than 13th magnitude or are poorly placed. Ephemerides for these can be found on the CBAT WWW pages. 25D/Neujmin has not been seen since 1927. 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 2009, 85P/Boethin will still be visible as a binocular object at the start of year and 2007 N3 (Lulin) is well placed in February. Reaching 9th magnitude over the summer, 22P/Kopff is the brightest of the periodic comets returning to perihelion, whilst 81P/Wild and P/Christensen (2003 K2) should both reach 10th magnitude.

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.

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Jonathan Shanklin

Comet	T	q	P	N	H_1	K_1	Peak mag
McNaught (2005 L3)	Jan 16.0	5.59			3.0	9.7	14
8P/Tuttle	Jan 27.0	1.03	13.6	11	7.3	15.0	5
46P/Wirtanen	Feb 2.5	1.06	5.44	9	8.1	13.7	9
110P/Hartley	Feb 3.5	2.49	6.89	3	8.0	15.0	14
P/Tichy (2000 U6)	Feb 7.3	2.14	7.34	1	13.5	10.0	19
44P/Reinmuth	Feb 18.3	2.11	7.07	9	10.5	15.0	15
P/Kowalski (2006 F1)	Feb 19.9	4.12	10.1	0	8.0	10.0	17

193P/LINEAR-NEAT (2007 U2)	Feb 20.5	2.16	6.74	1	12.0	10.0	18
194P/LINEAR (2007 W2)	Feb 26.2	1.71	8.04	1	15.5	10.0	18
186P/Garradd (2007 B3)	Mar 20.5	4.26	10.6	2	7.5	10.0	17
113P/Spitaler	Mar 23.4	2.13	7.09	3	12.5	5.0	16
26P/Grigg-Skjellerup	Mar 23.7	1.12	5.31	18	12.0	40.0	13
D/Denning (1894 F1)	Apr 2.9	1.67	9.87	1	10.5	10.0	15 ?
16P/Brooks	Apr 12.6	1.47	6.14	15	9.0	15.0	13
139P/Vaisala-Oterma	Apr 19.4	3.40	9.60	2	7.0	15.0	17
Siding Spring (2007 K3)	Apr 21.8	2.05			9.5	10.0	14
124P/Mrkos	Apr 27.2	1.47	5.75	3	13.1	15.0	14
11P/Tempel-Swift-LINEAR	May 4.6	1.55	6.31	5	15.0	10.0	19
183P/Korlevic-Juric (2006 Y1)	May 9.1	3.89	9.56	1	13.0	10.0	17
LINEAR (1998 VS_{24})	May 18.3	1.06	4.85	1	16.5	5.0	18
173P/Mueller	May 18.5	4.21	13.6	1	7.5	10.0	16
86P/Wild	May 20.0	2.30	6.91	4	8.5	15.0	15
146P/Shoemaker-LINEAR	May 21.4	1.42	8.08	2	15.0	10.0	18
148P/Anderson-LINEAR	May 22.7	1.70	7.07	2	17.0	5.0	20
Gibbs (2007 T5)	May 24.4	4.05			8.0	10.0	17
P/LINEAR (2003 KV_2)	May 24.7	3.42	9.60	1	11.0	10.0	19
180P/NEAT (2006 U3)	May 26.7	2.47	7.53	2	11.0	10.0	16
79P/du Toit-Hartley	May 28.4	1.23	5.28	4	14.0	15.0	15
LINEAR (2007 W3)	Jun 2.8	1.78			12.0	10.0	15
Spacewatch (2006 U6)	Jun 5.5	2.50			8.0	10.0	14
51P/Harrington	Jun 19.4	1.69	7.13	6	10.0	20.0	16
15P/Finlay	Jun 22.6	0.97	6.50	13	12.0	10.0	13
Boattini (2007 W1)	Jun 26.5	0.87			9.5	10.0	6
McNaught (2006 Q1)	Jul 3.8	2.76			5.0	10.0	11
33P/Daniel	Jul 20.4	2.17	8.10	9	10.5	20.0	20
19P/Borelly	Jul 22.3	1.35	6.85	13	7.0	12.7	13
P/LONEOS (2001 R1)	Aug 5.2	1.35	6.45	1	14.0	10.0	17
LINEAR (2007 U1)	Aug 7.2	3.33			9.0	10.0	16
McNaught (2007 M1)	Aug 12.2	7.47			6.0	10.0	19
6P/d'Arrest	Aug 15.0	1.35	6.54	18	10.0	20.0	9
Skiff (2007 B2)	Aug 20.9	2.97			6.0	10.0	13
P/Larson (2007 R1)	Aug 25.6	4.35	14.8	0	8.0	10.0	17
P/Larsen (1997 V1)	Aug 27.4	3.27	10.9	1	9.0	10.0	16
61P/Shajn-Schaldach	Sep 6.1	2.11	7.05	6	10.0	10.0	15
D/Giacobini (1896 R2)	Sep 9.9	1.53	6.66	1	10.0	10.0	11 ?
Broughton (2006 OF_2)	Sep 15.7	2.43			5.5	10.0	11
147P/Kushida-Muramatsu	Sep 23.0	2.76	7.43	2	14.0	10.0	20
7P/Pons-Winnecke	Sep 26.6	1.25	6.36	22	10.0	15.0	15
187P/LINEAR (2007 E3)	Oct 6.3	3.69	9.40	1	9.0	10.0	17
P/LINEAR (2001 CV_8)	Oct 11.3	2.16	7.66	1	13.0	10.0	18
172P/Yeung	Oct 12.8	2.24	6.58	2	13.0	10.0	18
25D/Neujmin	Oct 15.0	1.27	5.39	2	10.5	10.0	13 ?
P/NEAT (2001 J1)	Nov 6.8	0.94	7.67	1	16.0	10.0	16
P/Catalina (1999 XN_{120})	Nov 12.5	3.30	8.57	1	13.5	5.0	18
LINEAR (2007 G1)	Nov 16.2	2.65			5.5	10.0	12
150P/LONEOS	Nov 26.0	1.77	7.68	3	13.5	10.0	17
Catalina (2007 M2)	Dec 8.4	3.54			8.0	10.0	16
P/LINEAR-NEAT (2001 TU_{80})	Dec 9.6	1.94	7.02	1	14.0	10.0	17
85P/Boethin	Dec 16.4	1.15	11.5	2	6.5	20.0	7
57P/du Toit-Neujmin-Delporte	Dec 26.0	1.72	6.41	6	12.5	15.0	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. The date of return of D/Denning and D/Giacobini must be regarded as highly uncertain, whilst 25D/Neujmin has not been seen since 1927. Note: $m_1 = H_1 + 5.0 * \log(d) + K_1 * \log(r)$

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