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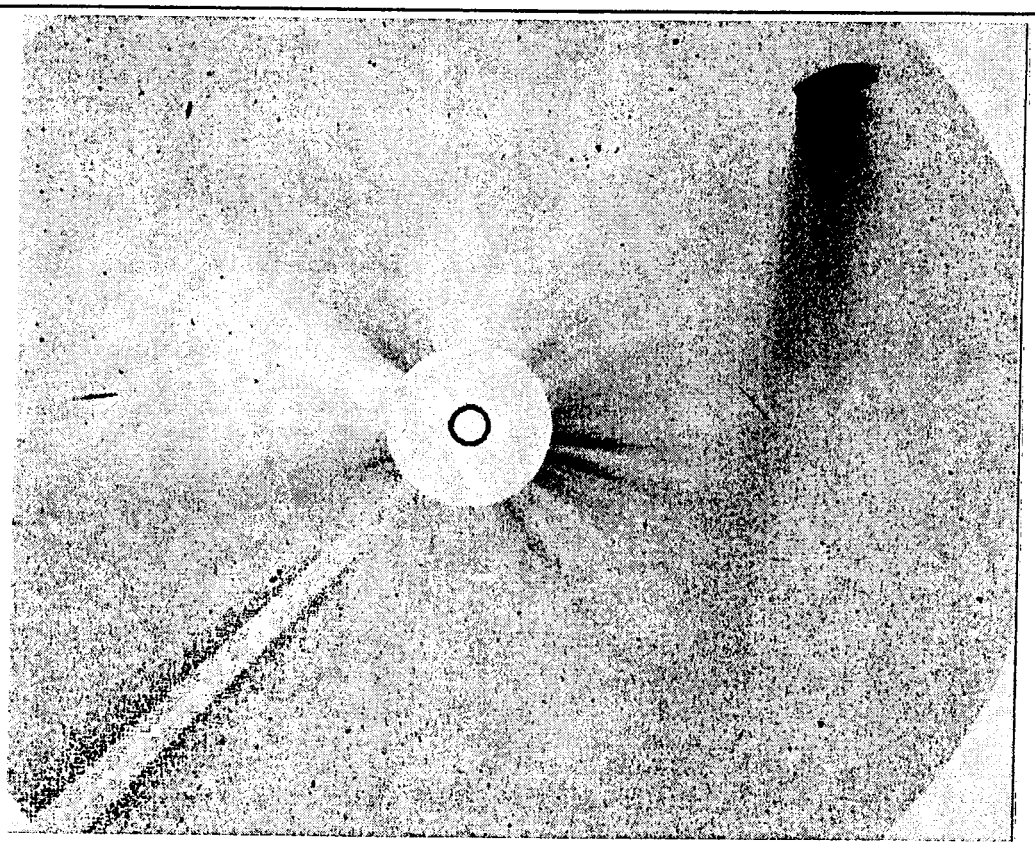

Image of comet C/2004 F4 (Bradfield) taken on 2004 Apr. 19.79 UT with the LASCO C3 coronagraph aboard the SOHO spacecraft. The strange shape of the comet results from the perspective as the comet rounded the sun near perihelion (T = Apr. 17.09 TT, q = 0.168 AU). The dust tail extends down past the bottom of the frame here in the original image.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY
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The International Comet Quarterly (*ICQ*) is a journal devoted to news and observation of comets, published by the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts. Regular issues are published 4 times per year (January, April, July, and October), with an annual *Comet Handbook* of ephemerides published normally in the first half of the year as a special fifth issue. An index to each volume normally is published in every other October issue (even-numbered years); the *ICQ* is also indexed in *Science Abstracts Section A* (and in the now-defunct *Astronomy and Astrophysics Abstracts*).

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Cometary observations should be sent to the Editor in Cambridge; all data intended for publication in the *ICQ* that is not sent via computer electronic mail should be sent on standard *ICQ* observation report forms, which can be obtained upon request from the Editor. Those who can send observational data (or manuscripts) in machine-readable form are encouraged to do so [especially through e-mail to ICQ@CFA.HARVARD.EDU], and should contact the Editor for further information. The *ICQ* has extensive information for comet observers on the World Wide Web, including the Keys to Abbreviations used in data tabulation (see URL http://cfa-www.harvard.edu/icq/icq.html). In early 1997, the *ICQ* published a 225-page *Guide to Observing Comets*; this edition is now out of print, but a revised edition is under preparation.

Most of the Observation Coordinators (OCs) listed below have e-mail contacts with the *ICQ* Editor; observers in the general area of such OCs who lack access to e-mail networks may send data to the OC for relay to the *ICQ* in electronic form.

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CORRIGENDA

• In the January 2004 issue, page 7, 'The Tale of Two Comets', second paragraph, first sentence *for* sixght *read* eight

• In the January 2004 issue, page 7, 'The Tale of Two Comets', third paragraph, second sentence *for* *r leq* 4 AU, *read* $r \leq 4$ AU,

• In the January 2004 issue, page 53, 'Index to the *ICQ*', first paragraph, first sentence, *for* p. I-1) for *read* p. I-1) and for

• In the January 2004 issue, page 54, 'IWCA III Raffle', *for* raffle this is open *read* raffle that is open

Letter to the Editor:
Call for CCD Observations of Comet 9P/Tempel

During the last apparition of comet 9P/Tempel in 2000, over 40 advanced observers joined the Small Telescope Science Program (STSP) of the NASA Deep Impact mission. Observers contributed broadband CCD images of the comet from which we extracted photometric measurements of the production rate of dust. As the comet returns to the inner solar system, we plan to re-launch the STSP beginning later this year.

The goal of the STSP is to provide continuous monitoring of 9P to help scientists understand the activity and dust environment of the comet before, during, and after the mission excavates a crater in the nucleus in early July 2005. The STSP is a collaborative effort among advanced observers, private observatories, and professional astronomers spread around the world to complement observations acquired at large telescopes. Many observers who control their own observing time can contribute to our goal for continuous coverage.

We are calling for photometric quality, broadband *R* images of 9P beginning in October 2004 and continuing through December 2005. Narrowband and spectroscopic observations are also welcome. We will cite contributions from observers in any publications. To learn more about the STSP, visit our website `http://deepimpact.astro.umd.edu/stsp`. For more information about the Deep Impact mission, visit `http://deepimpact.umd.edu` or `http://deepimpact.jpl.nasa.gov`.

We appreciate any assistance that observers can give to this program. Potential observers can contact us by e-mail: Stef McLaughlin (`stefmcl@astro.umd.edu`), Gary Emerson (`emerson@ball.com`), or Lucy McFadden (`mcfadden@astro.umd.edu`).

Stef McLaughlin (STSP coordinator, University of Maryland)
Gary Emerson (STSP advisor, Ball Aerospace)
Lucy McFadden (Deep Impact E/PO Manager, University of Maryland)

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Book Review/Essay:
Kronk's COMETOGRAPHY, Vol. 1*

COMETOGRAPHY: A CATALOG OF COMETS
Volume 1: Ancient-1799
Gary W. Kronk (Cambridge University Press, 1999), 563 pp. + xvi.
ISBN 052158504X. US$90.00 (hardbound).

In quickly leafing through this new book by Gary Kronk, one gets a first impression of awe at the amount of work that the author/editor has undertaken to produce such a volume. More in-depth reading of this first volume of *Cometography* enforces that impression: this is indeed the result of many earnest years of research by Kronk. It is, in fact, a much better attempt at descriptive chronicling of cometary apparitions than Kronk's first foray into the field in 1984 with the much shorter paperback monograph entitled *Comets: A Descriptive Catalog* (Hillside, NJ: Enslow Publishers), which I reviewed critically (in *Sky and Telescope* **69**, 418); the advice given to Kronk after that preliminary attempt at a comet catalogue was used well by him to make greatly needed improvements.

A journalist by training, Kronk has made a solid contribution to astronomy and history with his new *Cometography* series. The last serious attempt at producing a serious descriptive catalogue of historical cometary apparitions was S. K. Vsekhsvyatskij's *Physical Characteristics of Comets*, the long-out-of-print 1964 monograph that was translated (sometimes with mistakes) from the 1958 Russian version[1]; Vsekhsvyatskij had some cited references for each comet (something notably lacking in Kronk's 1984 book), which are vital for a comet catalogue, but such citations were all too few for serious researchers and indicated a limitation that Vsekhsvyatskij had in his access to historical materials. The inevitable comparison of any descriptive comet catalogue (the use of the word "cometography" in English dating back at least to John Bainbridge's 1619 treatise on one of the 1618 comets) must be to that of Alexandre Pingré, who published

*This essay-review supplements a shorter review that was published a couple of years ago (Green 2002, *J. Hist. Astron.* **33**, 78), where additional important points were made that will not be repeated here; I thank Brian G. Marsden for many helpful discussions and contributions to this essay from his own detailed reading of *Cometography*.

[1] see Churyumov 1996, *ICQ* **18**, 183

an impressive 2-volume French work in 1783 and 1784 entitled *Cométographie ou Traité Historique et Théorique des Comètes* (though it is not true, as Kronk claims, that "Pingré researched every comet that had ever been reported").

Limited access to literature

Unfortunately, there are notable shortcomings in Kronk's *Cometography* of which any serious user needs to be aware. It seems that Kronk never went to libraries further than about 400 km from his Troy, Illinois, home to view reference material — thus, no trips to the libraries in Europe and the northeastern USA that contain such rich collections of pre-19th-century comet literature. While historians would normally consider transcripted and translated publications of original manuscripts to be still primary sources, tracing the origins of material on comet observations can be complex enough that we might here consider a 'primary source' to be a contemporary source written by observers of a given comet, a 'secondary source' to be a source whose author looked at a primary source before writing/translating/transcribing words, and a 'tertiary source' to be a source whose author looked only at secondary sources.[2] These definitions would indicate that most of Kronk's sources were secondary or even tertiary, and the reader must be aware of this fact because it is possible for the dedicated researcher to access *much* more primary material than did Kronk for this book. Of course, for the really old (ancient and early-medieval) comets, original source material no longer exists, but much original European printed and manuscript material still exists in library archives for comets after 1450 A.D., and it would be good for any serious cataloguer of comets to spend considerable time accessing these original sources. One needs to be aware that transcription errors may have resulted from many handwritten copying acts over time, some of which is due to the development of written languages over time.[3]

But problems will inevitably arise from not looking at original literature — from missing important information to misunderstanding proper context. A book found rather frequently in rare-book libraries containing good astronomical collections is one published in 1619 that includes some carefully made positional measures (among other data) made at Wittenberg, Germany[4] — but Kronk was evidently unaware of it, mentioning only some seven European observers for comet C/1618 W1 (there were dozens of contemporary European tracts published on this comet). By not having ready access to Struyck's entire 1740 Dutch comet catalogue, Kronk missed (in his text for the comet of 1661) that the Dutch astronomer took seriously Halley's suggested identification of the 1532 and 1661 comets — Kronk says on page 349 that "the idea was ignored until" 1786. Of course, we now know that the 1661 comet is 153P/Ikeya-Zhang, and that the 1532 comet evidently is unrelated.

Concerning the 1402 comet, Kronk mentions a single Russian text (the *Nikonian Chronicle*) as a reference, where there are at least eight known Russian chronicles describing a 1402 comet. Many other descriptions of comets from the Russian chronicles were also missed by Kronk.[5] But more recent comets also have amazing amounts of missing information. Hevelius produced a most impressive book on the comet of 1664 (far exceeding in detail that by any other observers), and yet in the seven pages that Kronk devotes to this comet, besides a brief mention of Hevelius' publication, there is not more than a sentence about Hevelius' observations. Some early-American newspapers are now available via the World Wide Web, and some of these include interesting accounts of comets that Kronk has missed (*e.g.*, *The Pennsylvania Gazette* for comets in 1737, 1742, 1744, 1748, 1757, 1759, 1760, 1763, 1769, 1770, 1771, etc.). Holetschek's century-old collection of comet data has much information on 2P/Encke in 1795 that Kronk does not seem to know about.

Kronk lists three comets seen in the year 1491, but all his references are to east-Asian sources — even though a bright (or "large") 1491 comet was noted by several European authors, including Antoine Mizauldi (1549), M. Frytsch (1563), Johann Creat (1577), Thomas Hartman (1605), and Henry Eckstormius (1621). The well-known Nuremberg astronomer Bernard Walther had recorded a comet's location on the sky on 1491 Jan. 17 (published by Johann Schöner in a book of astronomical observations in 1544; see footnote 16 on page 63). As late as 1875, in *Les Comètes*, Amédée Guillemin noted a 1528 comet seen by Ambroise Paré (also not mentioned by Kronk), but which may have been the same as Peter Creutzer's 1527 object of observation.

And further problems come from relying too much on certain tertiary (or secondary) sources, such as Kronk's apparent lack of knowing that Hartmann Schedel was the author of the *Nuremberg Chronicle*.[6] For the comet of 396 AD, Kronk lists D. K. Yeomans' 1991 *Comets* book as a source, though Yeomans merely cites Ho Peng Yoke's 1962 catalogue; Kronk also strangely cites Vsekhsvyatskij's secondary/tertiary catalogue for comets such as C/1402 D1. Some sources cited by Kronk for some comets are curiously not mentioned by him for their descriptions of other comets — such as the 12th-century *Annals of Tigernach* for comet 1P/Halley in 1066, and a comet reported on 905 October 20 that appears in manuscripts C and D of the *Anglo-Saxon Chronicle*. Kronk indicates a lack of understanding as to how such compilations

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[2]It is true that one might consider the *earliest* extant text of a comet's apparition to be primary, but historically and scientifically these can be problems if the source was not contemporary, and transcribers and translators can not be counted upon to copy the original material entirely without error.

[3]for example, a discussion of the various forms of the Anglo-Saxon chronicles, from Anglo-Saxon and Latin to other forms of Old English can be found in M. T. Clanchy's 1993 monograph *From Memory to Written Record: England 1066-1307* (Oxford: Blackwell Publishers, pp. 211ff).

[4] *Cometa Per Bootem*, by A. Rhodii, on the third comet of 1618

[5]including, among others, text on the comets of 1106; 1P in 1145 1222, and 1301; 1264; 1266; 55P/1366 U1; and at least eight Russian chronicles discussing the comet of 1402. Numerous such Russian chronicles were translated by A. N. Vyssotsky (1949, *Medd. Från Lunds Astron. Obs.*, Ser. II, Nr. 126)

[6]not plural 'Chronicles', as Kronk puts it; and there was a Latin edition as well as the German edition that Kronk mentions on page 286, and indeed the only version listed in Kronk's bibliography on page 548 is the Latin title.

as the *Anglo-Saxon Chronicle* came about, with their varying texts resulting from different extant manuscripts being copied over the centuries at different locations, and his not accessing all of the texts (which, it should be noted, were collected conveniently by G. N. Garmonsway in his 1972 translation) has led to apparent omissions of some comets. Most of the first-millennium comets in the *Anglo-Saxon Chronicle* were probably taken from (copies of) Bede's 8th-century manuscripts — but Kronk's readers inherit no clue of this.

Glaring problems with Kronk's inability to access libraries with primary comet literature become most apparent with comets in the sixteenth century, during which time the sheer number of published books and tracts exploded onto the scene in Europe.[7] I'll cite some examples. For comet 1P/1531 P1, Kronk only mentions two contemporary European tracts for this apparition of Halley's comet — that by Apian and another by Johannes Schöner. There were numerous other tracts on the 1531 comet; in fact, Schöner published at least five different tracts in 1531 on the comet, and additional publications on the comet from 1531 include a 10-page booklet by A. Brelochs and much longer books by M. Krautwadel and F. Nausea. Very notably, the appearance of the 1531 comet encouraged Schöner to print a previously unpublished half-century-old manuscript on comets by Regiomontanus that would become one of the most important guides on observing comets for astronomers in late-medieval and early-modern Europe.

But a really big omission is Apian's *Astronomicum Caesareum* — one of the masterpieces of sixteenth-century astronomical printing, only mentioned by Kronk for the 1533 comet, because he consulted a translation for that one comet by Wolfgang Kokott that appeared in *Journal for the History of Astronomy*. All of Kronk's mentions (which are far from complete) of observations of comets in the 1530s appear to be from secondary or tertiary sources. Thus, he missed that A. P. Gasser published three tracts on comets in the 1530s, including one on the comet of 1532. Published in 1540, the *Astronomicum Caesareum* is a large folio book with several sections on such topics as instrument construction, with a lengthy section giving detailed observations of the positions on the sky of the five comets of the 1530s (all with diagrams depicting their tails pointing away from the sun with respect to the horizon). It is from the *Astronomicum Caesareum* that all orbit computers have gotten their best positional data for these comets. Kokott also published his lengthy thesis on these same five comets, containing detailed discussions of most of the published contemporary sources[8] — another important secondary reference that Kronk fails to mention.

Weak introduction

The problems in Volume 1 begin immediately with the introduction, before the text on individual comets even commences. Kronk starts his opening sentence saying that "comets have fascinated people for centuries" (not millennia?), then frustratingly saying that images of comets "have been found carved onto rock walls in North American and on islands in the Pacific" without telling us where or when. Kronk's statements on many points are rather inaccurate, as well — for example, where he states that the "two latest" catalogues of comets prior to this Volume 1 were Vsekhsvyatskij's 1964 book and Kronk's 1984 book; he means "descriptive catalogues", but lacking this qualifier might suggest to the reader that there were no on-going *Catalogues of Cometary Orbits* (by Marsden), or no recent catalogues of discovery observations of comets.[9] Later in the Introduction, Kronk says (page ix) that he "determined the criteria to be used for [assigning 'X/' designations to] the ancient and medieval comets" that had scant observational data, but — though he worked closely with Marsden on this — I understand it to be Marsden who determined the criteria; Kronk should have at least been more specific here. Kronk lists orbital elements for X/1491 B1 (page 292), despite his definition on page ix of 'X/' comets being "certain" comets that *lack* orbits, but Marsden (*Catalogue of Cometary Orbits 2003*, p. 8) notes that the existence of X/1491 B1 (and also X/1577 U1) is in doubt.

Kronk's book very much needs a scholarly introduction that explains the many problems that exist in interpreting old manuscripts and texts, and one that instructs the reader on how to access such materials for further individual research on particular comets. For example, there are few original manuscript copies of medieval chronicles extant (most of which reside in European libraries), and even less in the way of original ancient texts (the Babylonian clay tablets and some Chinese manuscripts being the chief such examples). But over the past couple of hundred years, much of this material has been collected into printed books (sometimes series of books) and articles in the literature, being thus more readily available to researchers. It would have been helpful if Kronk had explained this to the reader and had outlined how various manuscripts and treatises can be accessed.[10] One could point to other fine introductions and elaborations on old manuscripts, such as those provided by Lynn Thorndike in his 1950 book *Latin Treatises on Comets Between 1238 and 1368 A.D.* (University of Chicago Press), or that available in F. R. Stephenson's recent book, *Historical Eclipses and*

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[7] see, *e.g.*, J. de la Lande (1803), *Bibliographie Astronomique*, republished in 1970 in Amsterdam by J. C. Gieben; E. Zinner (1925), *Verzeichnis der astronomischen Handschriften des deutschen Kulturgebietes* (München: Verlag C. H. Beck); E. Zinner (1964), *Geschichte und Bibliographie der Astronomischen Literatur in Deutschland zur Zeit der Renaissance* (Stuttgart: Anton Hiersemann); G. Grassi (1989), *Union Catalogue of Printed Books of 15th, 16th and 17th Centuries in European Astronomical Observatories* (Vecchiarelli Editore, Manziana, Rome); V. F. Brüning (2000), *Bibliographie der Kometenliteratur* (Stuttgart: Anton Hiersemann, Verlag).

[8] *Die Kometen der Jahre 1531 bis 1539 und ihre Bedeutung für die spätere Entwicklung der Kometenforschung*, by W. Kokott (Stuttgart: Verlag für Geschichte der Naturwissenschaften und der Technik, 1994). See book review by Green 2000, *J. Hist. Astron.* **31**, 267-268.

[9] *e.g.*, Rudenko 1986, *ICQ* **8**, 117); or Maik Meyer's updated version at `http://www.comethunter.de/project.html`.

[10] The short answers are: one generally needs to visit old European or American academic or large public libraries that were founded prior to about 1800, as such libraries tend to have good collections of old transcribed manuscripts in printed form and also contemporary published comet tracts; no single library has everything, so time must be spent in numerous libraries; and much is now available on microfilm or microfiche. The best places in the U.S. for pre-1800 comet data are the New York Public Library and university libraries at Harvard and Columbia. There are dozens of European libraries with much old comet materials.

Earth's Rotation, regarding the assessment of old texts (his name is mis-spelled on Kronk's page x), or the absolutely remarkable 2002 book by Owen Gingerich, *An Annotated Census of Copernicus' DE REVOLUTIONIBUS* (Leiden: Brill).

In addition to describing what sorts of literature are available, how old the oldest surviving texts are for ancient and medieval manuscripts, how reliable they are, and how they can be accessed by the researcher, one might show how the researcher can determine some reliability criteria on his or her own. For example, many medieval chronicles that mention cometary apparitions also mention such events as solar and lunar eclipses, which have definite dates and areas of visibility, and so some idea of dating reliability can be ascertained. The older material regarding comets (or objects recorded as comet-like, which may have in fact been anything from meteoric fireballs to aurorae) is much more problematical, and this fact needs to be clearly accounted for in any descriptive catalogue of comets.

A table listing all ancient and medieval writings with comet information would be invaluable for a book such as Kronk's, providing such helpful data as authors, dates of initial inscription, dates of earliest known extant copies and their locations, language of original text, sources of translated texts (with translators, editors, dates of publication, publisher), and comments regarding completeness of text and overall content/subject type for each source. Future cometographers please take note. Indeed, many "modern" published translations (into English or French or German) of ancient and medieval texts are accompanied by scholarly introductions by the translators that discuss the extant copies of manuscripts and assess their reliability based on a variety of factors, including the oldest available copy of a given tract or chronicle, inconsistencies between various copies, evidence of copying from other manuscripts, problems with reading the manuscript handwriting, *etc.*

The advertising blurb on Kronk's book (provided both on the dust-jacket flaps and on the page immediately preceding the title page) states emphatically that "all the information in *Cometography* has been sourced directly from the original documents, including European monastic histories, Roman, Greek and Muslim texts, and Chinese, Japanese and Korean scripts". In reality, it seems unlikely that Kronk accessed many "original documents"; rather, he consulted transcribed or translated modern printed versions of older documents, many of which strictly should perhaps be called secondary sources (though some camera copies or facsimiles of original manuscripts certainly can be called original sources). Kronk acknowledges that he used various people to help him with sources in other languages, particularly Asian-language texts, though much has been available for some years in English translation regarding observations of comets in ancient China, Japan, and the Middle East.

Problems with historical context

In the introduction that Kronk provides us, he suggests that "the first great researcher of comets was Nicholaas Struyck", whose "1740 book *Inleiding tot de Algemeene Geographie, Benevens Eenige Sterrekundige en andere Verhandelingen* included some of the first well-researched accounts of comets". Actually, the correct title of Struyck's 320-page 1740 work on comets is *Inleiding tot de Algemeene Kennis der Comeeten, of Staarsterren*, though it was evidently published with the 176-page *Inleiding tot de Algemeene Geographie*.[11] Kronk seems to have missed the fact that Struyck's works were in Dutch and perhaps not so widely read, and that 17th-century Latin comet catalogues by Johannes Hevelius (1668) and Stanislav Lubienietz (1666, 1667) were not only much more extensive and impressive than the works by Struyck, but they were much more heavily cited by astronomers in the 17th and 18th centuries than was the work by Struyck cited in the 18th and 19th centuries. And it would be difficult to conclude that Struyck was the first great researcher of comets when one considers Tycho Brahe, Hevelius, Lubienietz, Edmond Halley, Isaac Newton, and others before Struyck.

The important point here is that each compilation over the centuries has necessarily been built on the shoulders of previous compilers of comet information. Hevelius and Lubienietz relied on published compilations by earlier authors such as Paul Eber (1531); Mizauldi; Benedict Marti von Bätterkinden (Aretius), Ludwig Lavater, Johannes Hebenstreit, and Erasmus Flock, each of whom published a comet catalogue within two years of the comet of 1556; Francesco Giuntini (1572); Christopher Ireneus (1578); Georgius Caesius (1579); Hartman; Elias Ehinger (1618); and Giovanni Battista Riccioli (1651) — to name a few. And Struyck and all others who came after him were profoundly influenced by Halley's first-ever catalogue of cometary orbits, originally published in 1705. Kronk provides no insight into such context regarding the issues of early-modern comet cataloguing. Another contextual misunderstanding appears with Kronk's claim that "one of the biggest breakthroughs in the understanding of comets came in the early 17th century when Johannes Kepler published his three laws of planetary motion"; Kepler had comets moving on straight-line trajectories through the solar system, and it wasn't until many decades later that Newton and Halley were able to apply Kepler's laws to comet orbits. Another historical problem in Kronk's introduction comes with his attempt to explain the acceptance of Aristotelian comet theory, where he neglects to put out Seneca's sometimes-very-modern views (which are now two millennia old and which were well known to scholars in medieval and early-modern times).

Kronk's inconsistent text length for comets (in which some important comets receive relatively little coverage, despite sometimes massive amounts of primary literature available, while other, less-important comets receive more space) represents a context problem, as well. I mentioned in the shorter review of Volume 1 that Kronk devoted only three pages to one of the three or four most important (and brightest) comets in recorded history — the comet of 1577 — while devoting 50 percent more space to the comet of 1106, which has so little useful data that no orbit can be computed! The scores of extant published European tracts on the comet of 1577 permitted Doris Hellman to fill up a Ph.D. thesis and a lengthy book, describing and listing them. And yet Kronk cites not a single one! All information that he got on the 1577 comet was from secondary and tertiary sources — all his sources for European observations being from the last

[11] An English translation of Struyck's 1740 and 1753 comet catalogues is currently being edited and prepared by the *ICQ* Editor for publication.

300 years. Kronk also missed numerous descriptions of this comet from middle-eastern sources, where it was observed in such places as Istanbul and Egypt.[12]

Kronk was evidently not aware that Nicolaus Bazelius (who was from Holland, not Germany) and Valentine Steinmetz wrote their own quite-well-known tracts on the comet of 1577, or that Tycho Brahe's published "precise observations" (Kronk's curious wording on page 317 of Brahe's data that were actually not better than $\sim 5'$ in uncertainty) were actually altered from the logbook data recorded by Brahe while observing (the original data being published in the nineteenth century by F. R. Friis, and again in J. L. E. Dreyer's *Opera Omnia*, which Kronk cites without explaining).

This problem with proper understanding of context (as a result of less-than-thorough research) is a theme that pervades Kronk's Volume 1. The author mentions that a comet reported for 1302 in a Russian chronicle was probably an observation of 1P/Halley in 1301, but Kronk missed some other Russian descriptions, and he evidently did not gather that the Russian year started in September, so that the date is not "probably off by one year" (as Kronk suggests). There is no mention in Kronk's *Cometography* of the comet of 729 appearing in the *Chronicle of Aethelweard*, though it was cited by Pingré. For the comet of 828, Kronk says "Pingré (1783) briefly noted that Georgius Fabricius reported a comet was seen during this year in Libra", but Pingré in fact lists *five* sources for this comet. Much of Kronk's writing is inconcise and rather sloppy, leading to additional contextual problems; for example, he mentions that a Russian text stated that "there appeared a serpent in the skies" in 1028, and Kronk adds that "Pingré (1783) briefly mentioned this as well" — whereas Pingré gave no quote, mentioned nothing about "a serpent", and in fact called it a comet.

And Kronk's discussion (page 417) of Marsden's 1973 prediction of the return of comet 109P in 1981 misses the point that the 1973 prediction was based entirely on 1862 observations; Kronk's account of the history of predictions for 109P is also messed up on pages 20-21, in terms of what was done before the comet returned and what was done afterwards (the reference to Hasegawa should instead be to Marsden — Marsden first made the suggestion in a 1968 letter to Hasegawa, and Hasegawa then mentioned the 188 comet as a possible identification — but Marsden did *not* know how many revolutions had occurred). Likewise, the paragraph on orbital work performed during the last 35 years on comet 55P, on page 247, is all wrong: Schubart's work was in 1965 — connecting the 1366 and 1866 apparitions led to the 1699 discovery observations, which then led to the 1965 recovery (and Kanda did not "confirm" Hind's theory in the previous paragraph). In his discussion on page 258 of a possible link of C/1385 U1 to C/1490 Y1, Kronk gives no indication of problems with the Williams/Wu orbit for the latter comet, while on page 291 he essentially dismisses the same C/1490 Y1 orbit as unduly contrived. On page 259, Kronk neglects to say how the 1995 recovery of 122P might have affected Hasegawa's suggested 1979 identification with X/1391 J1. For comet C/1733 K1, the context is missing, as Kronk does not say why Oudemans was interested in this comet (Oudemans conjectured that the 1733 comet was connected to a comets observed in 1807 and 1881, but he was wrong on all three counts). This all gives the reader the uncomfortable feeling that little in *Cometography* can be taken without any wondering about what the editor has done by way of processing and presentation.

Another example of Kronk's sometimes-vague wording can be found at the end of the entry for comet C/1737 C1, where he observes that "it has since been proven that it is not possible for the comets of 1532 and 1668 to have been the same comet", without saying who has so proven this and when. And sometimes Kronk is so lost in providing the details for each comet that he fails to stand back and look at the big picture — as with comet D/1770 L1 (Lexell), where he neglects to tell the reader that this was the first really recognized short-period comet (counting 1P/Halley as an intermediate-period comet) — or even why Lexell's name is on the comet, or why the comet has not been seen since 1770.[13]

Inconsistencies

Regarding Kronk's decisions for inclusion and exclusion of material, it is curious that he decided to give the names of the Chinese constellations in which comets were reported but decided *not* to give the Chinese dating. For example, he relates that the comet of 188 AD "was seen within the month of 188 March 16 to April 13", whereas Ho Peng Yoke (Kronk's apparent source) stated also that this was "the second month of the fifth year of the Chung-Phing reign" — information that might be useful to some readers. Kronk also casually notes the east-Asian mention of objects as "guest stars", "sparkling stars", "long-tailed stars", and even a "celestial magnolia tree" (−161) without explaining how or why these might be taken to be comets, and not fireballs or aurorae or something else. With the Chinese constellations mentioned, it would have been helpful to have an appendix correlating these constellations with regions known today (either modern constellations or general borders with right ascension and declination). And, at the beginning of each comet entry, Kronk curiously lists constellations (in unconventional all-capital 3-letter abbreviations most of the time, for some reason — with no explanation of what the abbreviations stand for) and some dates in parentheses without explaining what he's doing (perhaps he means the first date that the comet enters said constellation?); in other words, Kronk has no section explaining specifically how he laid out the information for each comet entry.

Kronk treats years, dates, and time all too briefly in his introduction, and it would be useful for the reader to have some more details regarding how dating occurred in east Asia, the Middle East, and Europe during ancient and medieval

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[12] *e.g.*, Ansari and Rada, cited later in this review essay, and Haldun Menali's translation in *ICQ* **26**, 2 (2004).

[13] It would have been valuable to add that in 1779 this comet made one of the closest known approaches of a comet to Jupiter, which likely threw D/1770 L1 well out of future view from earth. Carusi *et al.* (1985, in *Dynamics of Comets: Their Origin and Evolution*, D. Reidel Publishing Co., pp. 319ff) found that it may been sent away from Jupiter with an orbital period of $\approx$ 280 yr, though its true current orbit is unknown. And though Kronk suggests on page 468 that he mentions 1780 predictions for D/1770 L1 earlier in the book, he actually does not do so.

times. An object seen in China in AD 537, for example, cannot be considered to be dated as reliably as a comet seen by telescopic astronomers in Europe in 1790 — if for no other reason than the issue of extant copied versus original material. Anything at all reported before the age of printing is going to be open to the possibility of corruption in terms of type of object reported, date, location in sky, *etc.* Kronk assumes that comets reported in 676, 677, and 678 were all the same comet actually seen in 676 (and he requested a formal IAU designation X/676 P1 on these grounds), but the evidence is not conclusive, and it is quite possible that there was either a single comet in 677 or two different comets (in 676 and 677). The *Chronica Majora*, dating from 1247 and cited by Kronk as a source for the comet of 905, actually lists a comet in 906 (not 905); Kronk evidently assumes there was a transcription error somewhere — quite possible, though how do we know for sure? — but does not explain this in his write-up for the 905 comet. As for the September date for the comet of 44 BC, Marsden traced this misunderstanding of the dates of the games back to Halley (pages 22-23 in Kronk).

The user of Kronk's *Cometography* is given little help or caution about this pervading comet-dating problem regarding pre-16th-century manuscripts. Kronk states in the middle of his book, at 1582 AD, that the Gregorian calendar now comes into effect for his dates, but this is not explained at all in his introduction, either. It would have been most helpful if Kronk had somehow flagged (say, with an asterisk) those dates in his text that he had personally changed to Gregorian dates from some other system (or had provided the originally given date, with the Gregorian date added in square brackets). Kronk seems surprised when, on page 354, he found that the Englishman John Evelyn was making diary entries for his observations of the 1664 comet in Julian-calendar dates (England didn't change to the Gregorian calendar until 1752); Kronk then proceeds to thoroughly confuse the reader as to which calendar he is referring to in reporting Evelyn's observations (even seeming to confuse the dates himself — something he does again on page 372 for Evelyn's observations of Dec. 12 old-style = Dec. 22 new-style — and possibly for Hevelius' observed coma diameter of the 1683 comet on Sept. 2, the Julian-calendar date provided by Newton in *Principia*). It might also help the reader to be informed that, prior to 1925, astronomical time was reckoned from noon rather than midnight, as it is now. Kronk's uses both BC/AD and −/+ forms of years in his book without explaining (as might be necessary for some readers) that there is no zero year in the BC/AD system but that astronomical years are counted −1 = 2 BC, 0 = 1 BC, 1 = 1 AD, etc.

I mentioned in my shorter *JHA* review some of Kronk's stylistic problems in each comet entry. His use of significant figures with numbers is particularly troublesome, giving as he does closest distances of old comets with poorly known orbits to a precision of 0.0001 AU, and comets' heliocentric and geocentric distances to 0.01 AU, for example. Kronk evidently gives dates frequently to a decimal of a date in Universal Time without saying that it is UT, and without ever defining UT for the non-astronomical reader. And on page 391, Kronk mentions that the comet moved about $4^{\circ}.5$ in only 2 hours, then proceeds to give a position to a precision of 1′ without giving a time! Kronk also gets sloppy sometimes in his wording, as on page 395, where he speaks of Cassini's "latitude and longitude being equal to $\alpha = 20^{h}35^{m}.6$, $\delta = +19^{\circ}24'$ (apparent)", without defining what "apparent" means and missing the important word "celestial" before "latitude and longitude". And why give apparent positions sometimes, but 2000.0 positions at other times (as on page 412)? And why give positions (as Kronk does on page 446) without giving the time of day? One useful concept of Pingré's catalogue was that he frequently gave lists of astrometric positions for comets; Kronk's rather random and inconsistent inclusion of positions from time to time in his text[14] is not likely ever to be useful to the reader — and true value might be added to a revised version of Volume 1 if Kronk would add in available positions used by orbit computers for all of the older comets (especially the pre-Tychonic ones) for which he quotes orbit calculations. For comet C/1793 S2, Kronk says that Charles Messier observed this comet on September 27 and 28, but Kronk provides positions by Messier for only the 28th (though Messier gave additional coordinates, also for the 29th).

This is symptomatic of Kronk's decision-making process, in which much questionable material is included and other useful and important data are omitted (or missed). Kronk lists a second comet in 1402, under a separate entry from that for C/1402 D1, but ends the entry for the second comet by saying "The Author suspects this might be an altered account of" the former — then why have a separate entry? Kronk's ambiguous use of "the author" often in the text (cf. pp. 350-351) can be confusing for the reader, who might wonder if the intended "author" is Kronk or some other writer listed nearby in the text. Also with the 1793 comet, Kronk mentions an orbit by Bochart de Saron, but one must look at the *previous* entry (C/1793 S1) to find the published reference. For comet 2P/Encke in 1795, Kronk states that William Herschel "noted it could be seen with the naked eye" on November 7, when Herschel's exact words were "just visible" (a notable difference). A large amount of observational information on this same comet that was not included by Kronk can be found in Johann Holetschek's 1896 publication on comet brightness and tails. Kronk briefly notes (page 26) that the comet of −4 (or 3 BC) has been sometimes considered as a possibility for the Star of Bethlehem but doesn't note the same for the comet of −11.

Referencing/citation problems

One curious, rather inconsistent, and frustrating feature of Kronk's new book is his manner of referencing earlier works. As a typical example of how Kronk handles sources, for each of the comets 744, 760, 762, and 812, he basically repeats the words "The Byzantine monk Theophanes the Confessor wrote *Chronographia* around 813 and noted . . ." A much more logical manner that would aid the reader would be to simply say "Theopanes (ca. 813) wrote . . ." and have an *extended* bibliography at book's end that lists all works alphabetically by author, with a paragraph or two (as appropriate) explaining the source and evaluating the reliability of the text. (And Turtledove's 1982 translation of Theophanes oddly has a very different text for the comet or comets of 762 from the 1997 translation evidently employed

[14] cf. pages 376-377. And notice the curious precision level for a positions given at the bottom of page 393 and on page 412, which are inconsistent with the precision of the cited times.

by Kronk.) Additional inconsistencies are present in the references, whereby some full references are given by Kronk at the reference section at the bottom of each cometary-apparition discussion, whereas other references are given briefly as author/year with semi-full listing in the existing bibliography at book's end. Some references are listed at the end of a comet's description-text by journal/volume/page notation but *without* author, while others give author also. Often the specific source for information is left out of the text, and the reader is left wondering which of the many sources given in the list below a given comet's write-up is the one relevant for a particular datum. In the case of a citation by Kronk (page 195) of a 1972 publication by S. Kanda, there appears to be no corresponding literature reference at all — ditto with the 1884 textual reference to Celoria on page 279.

The bibliography listing at the end (Appendix 3) is most awkward, with perhaps half the listings given by title and the other half by author; in addition, the main bibliography citations are generally too brief. For example, under the index heading "*Chronica Majora* (1247)", Kronk gives "written by Matthew Paris, *Rerum Britannicarum Medii Aevi Scriptures* [sic], Volume 57, edited by Henry Richards Luard, London: Longman & Co. (1872)." While it is true that *Matthæi Parisiensis, Monachi Sancti Albani, Chronica Majora* was published as part of *Rerum Britannicarum medii ævi scriptores, or Chronicles and Memorials of Great Britain and Ireland during the Middle Ages*, editor Luard infers in his preface that the years in which the original manuscripts were written is uncertain, making Kronk's "1247" almost arbitrary, and indeed there appears to have been more than one author of these particular chronicles attributed to Matthew Paris. Furthermore, the lengthy bibliography list in Appendix 3 is not complete, as many references (including non-journal or non-periodical sources) cited in the text do not appear in Appendix 3, such as *The History of Theophylact Simocatta* (page 97), or Anderson's 1922 *Early Sources of Scottish History*[15] (page 195). This lack of a methodical referencing scheme, when dealing with a historical project of the size of *Cometography*, will inevitably lead to mistakes, omissions, and errors — aside from the inconveniences to the reader.

Given the frequent problem with the year(s) of such writings (and often even the true authors' names), it is perhaps best instead to list a source such as Paris' chronicle under the index header "Luard, H. R. (1872), ed.", thus giving credit also not only because the editor and translator has put in a vast amount of work to produce his understanding of the text and his translation or transcription, but because the newly published text now becomes somewhat dependent upon the editor/translator, who is responsible for errors that result from problems with reading the original manuscript or simple mistakes. Kronk also is quite careless in other respects of his referencing, unfortunately. Evidently without realizing that there are many different French journals starting with the words *Comptes Rendus*, Kronk gives just that, when in fact he means *Comptes rendus hebdomadaires des seances de l'Academie des Sciences* (the *Weekly Reports* of the French Academy of Sciences). Kronk frequently gives very abbreviated titles to works, without any indication that the titles are incomplete (Apian 1531 is one example). Kronk leaves words out of titles that may cause problems for researchers looking in electronic library catalogues (as with *Recueil [des] Historiens des Gaules det de la France*).

Another misleading referencing scheme employed by Kronk arises from his tremendous emphasis on secondary and tertiary (instead of primary) sources: frequently one finds Kronk's paging citations to be in a secondary source, while the reference is given to the original author and year of publication. For example, the comet of 1472 was described in a tract called *De cometis* that has been attributed to either Eberhard Schleusinger or to Johannes Regiomantanus. Kronk refers to "*De Cometis* (1472), pp. 118-19" in his text, and when the reader looks to his bibliography listing at the end, he/she finds "written by Johannes Regiomontanus, translated by Jane L. Jervis, *Cometary Theory in Fifteenth-Century Europe* . . . (1985)". The paging certainly refers to two pages of Jervis' English translation from the original Latin text (and so the textual citation should be to Jervis 1985), whereas the original text (which Kronk has not seen) has the relevant Latin text on page 23a; furthermore, Jervis herself expressed her opinion that this tract was not written by Regiomontanus (as Kronk states) by rather by Schleusinger (who went by the name Thurecensis in the original treatise).

Kronk seems additionally to have missed more detailed observations of this same comet (plus a 1491 Jan. 17 observation of comet C/1490 Y1 by the serious astronomical observer Bernald Walther) in a tract entitled "Ioannis de Monteregio, Georgii Pevrbachii, Bernardi VValtheri, ac aliorum, Eclipsium, Cometarum, Planetarum ac Fixarum obseruationes".[16] Another publication on the 1472 comet, cited by Kronk as "Cato de Supino (1472), pp. 427-8" but referring to paging in Lynn Thorndike's *A History of Magic and Experimental Science*, represents an even worse citation case by Kronk, with no original Latin text in Thorndike and only a summary provided there; the original tract has no printed page numbers, at least in the copy at the John Rylands Library in Manchester. Regarding the 1402 comet, where a facsimile of the original tract by Jacobus Angelus appears in Jervis' book, Kronk gives paging in Jervis and not from Angelus (while citing Angelus and not Jervis). Indeed, Kronk provides little or no distinction between primary, secondary, and tertiary texts, and it would be advisable and most helpful to the reader to split (as many scholars do in writing history-of-astronomy texts) the references into groups of original and secondary material.

Another problem is Kronk's assigning names to comets observed in the decade beginning 1750 — something not done in previous comet catalogues (Marsden's catalogues have names attached to comets beginning in 1760, when Messier and others began systematically searching for comets, evidently for the first time in history — but even this practice is relatively recent). The first object that Kronk does this for, C/1750 C1, is not even certain to have been a comet at all!

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[15] Anderson's work was republished in 1990 and contains comet information not given by Kronk — such as from Icelandic Annals for 1P/1222 R1.

[16] on page 43a of a well-known book titled *Scripta clarissimi mathematici M. Ioannis Regiomontani*, . . . and edited by J. Schöner in 1544 (and which Jervis mentions on page 113). Walther also made observations of comet C/1500 H1, apparently in a manuscript. And, speaking of the 1500 comet, Kronk appears to have missed a 1995 paper by Hasegawa and Nakano that gave additional translation from old oriental texts, together with a suggested link with C/1986 J1.

Typographical errors

Cometography also suffers from typographical errors throughout (including plentiful spelling mistakes, some of which may result from consulting secondary or tertiary, rather than primary, literature), showing that the serious researcher needs to consult primary literature. It might be advisable for Kronk to begin publishing known errata for earlier volumes at the end of the soon-to-be-published remaining volumes of *Cometography* — and hopefully there will be future revised editions of all the volumes eventually in print. A few examples of mistakes in Volume 1:

- top of page viii, *for* 1607 *read* 1609
- top of page xiii, *for* reduced *read* reduce
- page 5, *for* slandering of Ephorus *read* libeling of Ephorus
- page 10, comet -162, *for* Corona Borealis *read* Coronae Borealis
- page 51, last sentence for comet of 236, *for* passed *read* past
- page 78, *for* Ryves (1931 IV) *read* C/1931 P1 (Ryves)
- page 180, *for* James Cooke *read* James Cook
- page 248, *for* C/1368 G1 *read* C/1368 E1
- page 319, *for* Chhien-Niu *read* Chien-Niu
- page 339, in his citing Newton's observation of 1618 Dec. 1, Kronk says that "the comet's head appeared greater than stars of the third magnitude", but Newton's *Principia* actually states first magnitude
- page 354, *for* located between January 1 and 4 *read* December 22 (Julian calendar)
- page 320 (twice), *for* Wohlstedt *read* Woldstedt
- page 343, comet 1625, second paragraph, *for* 1874 *read* 1873
- page 372, Evelyn's comet-Venus distance was given as 23°-'58, not 23°15′.
- page 375, *for* Evelyn wrote for August 28, *read* Evelyn wrote for August 30, [Evelyn gave August 20 on the Julian calendar]
- page 388, *for* Gottfried Kirch *read* Maria Kirch [the first woman known to have discovered a comet]
- page 391, "SC2000.0" does not appear to be defined anywhere
- page 392, the non-astronomer reader might find the undefined SAO star numbers confusing
- page 411, *for* Maraldi, *MAP* (1744), *read* Maraldi, *HAP* (1744),
- page 411, *for* Cassini, *MAP* (1744), *read* Cassini, *HAP* (1744),

Need for revised edition

While Kronk has a 21-page appendix listing "Uncertain Objects" chronologically from "12th or 13th Century BC" to 1798 AD, many such objects noted in this review are absent. It might be suggested that, when a revised version of Volume 1 of *Cometography* appears (and this review should make clear that such a revision is necessary), it should have another appendix added that constitutes "Objects Considered in Some Sources as Comets but Now Thought Not to be Comets" — as many objects recorded over the centuries and millennia fall into this category, and because in many cases much print or handwriting was expended referring to such objects as comets. Two very important cases are the supernovae of 1572 and 1604, in which these "new stars" had profound impacts upon the observers who viewed the genuine comets of that era and upon the perceptions and observational results of those comets. There certainly seems to be way too much arbitrariness sometimes concerning which objects appear in the main catalogue *vs.* which appear in the "Uncertain" appendix — as with the objects reported for 277 and 279 AD. And should the "Caesar comet" of 44 BC, which has been questioned as to its reality, be given in the same list as the very real comet of 1577 AD?

It might have been advisable to have ended Volume 1 of *Cometography* at the end of 1700 rather than 1799 (recognizing that the eighteenth century began in 1701), permitting expansion of text on some of these older comets; comets from the last century or two do not need so much detail because materials on these objects are much easier to access. This reviewer tried to persuade Kronk and his publisher to postpone Volume 1 of *Cometography* until after the 'later' volumes were published, permitting more time to collect material for Volume 1 and permitting 'kinks' to be worked out via the other volumes' being printed and reviewed first, recognizing that Volume 1 is the most important volume in the series because it contains material that is much-less readily available to readers — but, alas, Cambridge University Press did not appreciate this point and pushed for release of Volume 1 first.

As I suggested in my *JHA* review, Volume 1 will need extensive revision, and it has been proposed that a committee be established to help in such a long-term (10-year?) project to assist Kronk in seeking input from astronomers, historians, librarians, etc., from around the world in contributing information not available when Volume 1 was first printed. For example, W. S. Rada and S. M. Razaullah Ansari recently reported[17] additional information on the comets of 905, 907, 912, 941, 943, 1264, 1453, 1P/1456 K1, 1577, 1741[18] from middle-eastern texts evidently not known to Kronk (who relates to "texts written by the Russians and Muslims", on page 262, as if Muslims were/are a nationality rather than

[17] Rada 2000, *Zeitschrift für Geschichte der Arabisch-Islamischen Wissensch.* **13**, 71-91; Razaullah Ansari 2002, *Indian J. Hist. Sci.* **37**, 255

[18] and possibly also C/1299 B1 (with observations preceding those given by Kronk by three months, back to 1298 Oct.) and C/1362 E1 (again with observations potentially going back months or weeks before those given by Kronk)

adherents to a specific religion spread over many peoples over much of the globe) — and Rada includes mention of "tailed stars" or comets in many other years for which Kronk has no comet listed.[19] All of the references in Pingré need to be consulted, for example, and then dismissed or added as is appropriate for each comet. And Kronk or his associates in such a review process need to access important library materials in the northeastern United States, Europe, and Asia to fill in the plentiful significant missing information, to correct misunderstandings and mistakes, and to put some data into better context. One issue that needs to be corrected is "to whom the book is aimed at"; this is not always clear, as sometimes the text gets highly technical in astronomical terms and at other times it is highly elementary — for which an extended introduction and added appendices (as sometimes proposed for specific topics in my review above) would add great value. This is much more than any single person can do, though Kronk is to be greatly commended for his decades of dedicated, careful research to present the world with a much-needed updated descriptive catalogue of comets in history. And he will be long remembered for his *Cometography*.

Daniel W. E. Green

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Tabulation of Comet Observations

Observations contributed on paper are being put off until the July issue, to speed up publication. Some of the descriptive text below by observer GUZ complement tabulated data by that observer published in the July 2003 issue.

Descriptive Information, to complement the Tabulated Data (all times UT):

See the July 2001 issue (page 98) for explanations of the abbreviations used in the descriptive information.

◇ *Comet 2P/Encke* ⟹ 2003 Oct. 24.76: very bright central region w/ dia. 30″ surrounded by very faint coma [HOR02]. Oct. 25.92: central cond. appeared stellar at this magnification, but coma asymmetrical, w/ a broad fan (spanning ≈ 20° of p.a.) ≈ 2′ long and centered at p.a. 340°; more coma hinted at with averted vision [BEG01]. Nov. 4.79: very bright central region w/ dia. 22″, surrounded by large, faint, fan-shaped coma; jet 0′.8 long in p.a. 336°; moonlight [HOR02]. Nov. 6.79: moonlight [HOR02]. Nov. 8.80 and 19.72: dense star field, combined w/ fast motion of comet, made it impossible to measure brightness in larger apertures [HOR02]. Nov. 8.80: very bright central region w/ dia. 20″ surrounded in NW direction by large, fan-shaped coma; strong moonlight [HOR02]. Nov. 19.72: large fan-shaped coma [HOR02]. Nov. 19.76: comet appeared less condensed and slightly fainter than the cluster M71; some cloud interference [GRA04]. Nov. 23.72: comet's alt. ≈ 20°; seen during the last vestiges of twilight; coma appeared much brighter on the sunward-facing side, due to a sunward-pointing wide fan in p.a. ≈ 230° [BEG01]. Dec. 2.65 and 3.65: difficult object in bright moonlight [BAR06]. Dec. 4.70: comet fairly well visible despite an 11-day-old moon and alt. 11° (comet faintly seen with 7×50 B) [GRA04].

◇ *Comet 10P/Tempel* ⟹ 2004 Feb. 15.78, Mar. 15.69, and 26.65: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 11.60: eight ref. stars w/ $B-V$ = +0.45 to +0.85 yield same mag [NAK01]. Apr. 24.61: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01].

◇ *Comet 28P/Neujmin* ⟹ 2003 Dec. 23.97, 25.02, and 2004 Jan. 14.86: stellar appearance [HOR02]. 2004 Feb. 12.51: $B-V$ values of comp. stars were +0.45, +0.59, +0.63, +0.83, and +0.85 [NAK01].

◇ *Comet 29P/Schwassmann-Wachmann* ⟹ 2003 Dec. 7.78 and Dec. 9.79: moonlight [HOR02]. Dec. 9.79: close to star [HOR02].

◇ *Comet 30P/Reinmuth* ⟹ 2003 Feb. 23.82, Mar. 20.81, 21.89, and 22.89: motion confirmed (orbital elements taken from *MPC* 34424) [GUZ]. Feb. 23.82 and Mar. 20.81: limiting stellar mag ≈ 14.2 [GUZ]. Mar. 21.89: limiting stellar mag 14.5 [GUZ]. Mar. 22.89: limiting stellar mag 14.8 [GUZ].

◇ *Comet 40P/Väisälä* ⟹ 2004 Jan. 31.78, Feb. 20.69, Mar. 20.67, and Apr. 17.71: Guide 8.0 software used for comp.-star mags [OHS]. 2004 Jan. 31.78: comp. star has $B-V$ = +0.84 [OHS]. Jan. 31.84 and Feb. 15.83: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 20.69: comp. star has $B-V$ = +0.76 [OHS]. Feb. 21.14: Guide 7.0 software used for comp.-star mags [SAR02]. Mar. 18.04: at 81×, limiting mag ≈ 15.5; second detection made for confirming proper motion at Mar. 18.08 [LEH]. Mar. 18.78: $B-V$ values of comp. stars were +0.32, +0.48, +0.55, +0.66, and +0.80 [NAK01]. Mar. 20.67: $B-V$ values of comp. stars were +0.60, +0.66, and +0.84

[19] *e.g.*, in 922 Sept./Oct. (with a 4° tail in Virgo), in 1002 July from Baghdad, in 1029-1030 from Mosul, in 1053 Sept.-1054 Jan. in Egypt, in 1107-1108 from Mosul and Spain, in 1143-1144 from Baghdad, in 1202-1203 from Cordoba (visible for three months, with a long tail), in 1263 June from Morocco, in 1285 Mar. from Mosul, Rada also provides text on a Damascus source for the comet of 1264, though it appears that the "immense rays" visible toward the northwest that Kronk mentions on page 220 of *Cometography* are likely to refer to aurora borealis — not the comet. Razaullah Ansari mentions a middle-eastern account of the 1742 comet that appears to extend the observational arc to two months before Kronk's first known observation.

[OHS]. Mar. 28.75: $B-V$ values of comp. stars were +0.32, +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Mar. 31.08: at 81×, limiting mag ≈ 16; second detection made for confirming proper motion at Mar. 31.13 [LEH]. Apr. 15.30: "whereas the GSC magnitudes looked good for 123P (see comments below), they looked awful for 40P (I thus used source LA for 40P); GSC gave the comet a magnitude fainter" [MOR]. Apr. 17.71: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS]. Apr. 23.69: $B-V$ values of comp. stars were +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01].

◇ *Comet 43P/Wolf-Harrington* ⟹ 2003 Nov. 8.86 and 2004 Jan. 5.84: strong moonlight [HOR02]. Dec. 7.81 and 9.77: moonlight [HOR02]. Dec. 19.73: between clouds [GUZ]. 2004 Jan. 14.74, 22.76, and Feb. 8.75: `Guide 8.0` software used for comp.-star mags [TOT03]. Jan. 19.72: `Guide 7.0` software used for comp.-star mags [SAN07]. Feb. 10.48, 18.47, and Mar. 14.43: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 10.48: comp. star has $B-V = +0.66$ [OHS]. Feb. 12.46: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85 [NAK01]. Feb. 16.45, 25.44, Mar. 9.42, and 13.41: `Guide 8.0` software used for comp.-star mags [TSU02]. Feb. 16.45: comp. star has $B-V = +0.63$ [TSU02]. Feb. 17.80 and 19.80: comp. stars taken from Henden seq. for SN 2002ap [BOU]. Feb. 18.47: comp. star has $B-V = +0.67$ [OHS]. Feb. 20.48: `Megastar 2.0` software used for comp.-star mags [NAG04]. Feb. 20.73: `Guide 7.0` software used for comp.-star mags [SAR02]. Feb. 22.80 and 23.79: comp. stars taken from TT Ari AAVSO seq. w/ good CCD V mags [BOU]. Feb. 25.44: comp. star has $B-V = +0.38$ [TSU02]. Mar. 9.42: comp. star has $B-V = +0.90$ [TSU02]. Mar. 12.45: `Guide 8.0` software used for comp.-star mags [YOS02]. Mar. 13.41: comp. star has $B-V = +.54$ [TSU02]. Mar. 14.43: $B-V$ values of comp. stars were +0.64, +0.78, and +0.88 [OHS]. Mar. 15.86 and Apr. 14.87: Zodiacal light [GON05]. Apr. 8.44: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet 53P/Van Biesbroeck* ⟹ 2003 June 3.92 and 7.99: limiting stellar mag 14.7; motion confirmed (orbital elements taken from *MPC* 40671) [GUZ].

◇ *Comet 65P/Gunn* ⟹ 2003 May 31.01: despite alt. of only 11°, comet seen relatively easily [GUZ]. June 4.00: alt. only 10° [GUZ].

◇ *Comet 81P/Wild* ⟹ 2004 Feb. 20.81 and Apr. 17.75: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 20.81: comp. star has $B-V = +0.66$ [OHS]. Apr. 17.75: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet 88P/Howell* ⟹ 2004 Mar. 20.80 and Apr. 17.77: `Guide 8.0` software used for comp.-star mags [OHS]. Mar. 20.80: $B-V$ values of comp. stars were +0.67, +0.70, and +0.80 [OHS]. Mar. 25.86: large diffuse object w/ some cond., best seen at low power [PEA]. Apr. 15.76: comet slightly enhanced using Swan Band filter [SEA]. Apr. 17.77: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS]. Apr. 30.36: clouds [AMO01].

◇ *Comet 116P/Wild* ⟹ 2003 May 23.90: alt. ≈ 17°; some light pollution [GUZ]. May 30.88: low alt.; comet seems to be fainter than previously [GUZ]. June 3.91: low alt.; some haze [GUZ].

◇ *Comet 117P/Helin-Roman-Alu* ⟹ 2004 Jan. 31.81 and Apr. 24.59: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 15.77, Mar. 15.65, and 26.62: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 28.74, Mar. 20.69, and Apr. 16.62: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 28.74: $B-V$ values of comp. stars are +0.53, +0.57, and +0.84 [OHS]. Mar. 20.69: $B-V$ values of comp. stars were +0.60, +0.66, and +0.84 [OHS]. Apr. 11.56: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 16.62: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet 118P/Shoemaker-Levy* ⟹ 2004 Jan. 31.78 and Apr. 24.56: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 15.73, Mar. 15.64, and 26.60: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 17.65 and Mar. 13.57: `Guide 8.0` software used for comp.-star mags [TSU02]. Feb. 17.65: comp. star has $B-V = +0.58$ [TSU02]. Feb. 28.70 and Apr. 16.59: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 28.70: $B-V$ values of comp. stars are +0.53, +0.57, and +0.84 [OHS]. Mar. 13.57: comp. star has $B-V = +0.53$ [TSU02]. Mar. 26.00: very faint object obs. near calculated position (orbital elements, from positions reported in *MPECs* during 2002-2004, were calculated for epoch 2004 Apr. 5 using `FIND_ORB` program); a check with DSS2 showed no stars or galaxies near comet's position; comp. stars from Henden seq. for Z UMi [BOU]. Apr. 11.55: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 16.59: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet 123P/West-Hartley* ⟹ 2004 Jan. 25.12, Mar. 17.90, and Apr. 21.89: `Guide 8.0` software used for comp.-star mags [TOT03]. Jan. 31.80 and Apr. 24.59: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 15.79, Mar. 15.70, and 26.66: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 17.68 and Mar. 13.64: `Guide 8.0` software used for comp.-star mags [TSU02]. Feb. 17.68: comp. star has $B-V = +0.66$ [TSU02]. Feb. 18.56, Mar. 20.65, and Apr. 17.63: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 18.56: comp. star has $B-V = +0.67$ [OHS]. Feb. 21.10: `Guide 7.0` software used for comp.-star mags [SAR02]. Feb. 21.18: comet a faint, somewhat condensed object at calculated position; no motion detected due to position near stationary point [BOU]. Feb. 21.18 and Mar. 26.02: comp. stars taken from Skiff's LONEOS file (field of SA-81) [BOU]. Mar. 13.64: comp. star has $B-V = +0.62$ [TSU02]. Mar. 14.96, 17.96, and 31.06: at 81×, limiting mag ≈ 15.5 [LEH]. Mar. 14.96: second detection made for confirming proper motion at Mar. 15.00 [LEH]. Mar. 17.96: second detection made for confirming proper motion at Mar. 18.00 [LEH]. Mar. 20.65: $B-V$ values of comp. stars were +0.60, +0.66, and +0.84 [OHS]. Mar. 31.06: second detection made for confirming proper motion at Mar. 31.10 [LEH]. Apr. 11.61: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 15.22: "I did the reductions using three different comp.-star magnitude sources, and the results were very consistent; I also did two R-mag determinations with V-mag sources (TJ and HT) and then determined the R mag using LA R magnitudes for comp. stars (the R mags are consistently 0.2 mag brighter); my camera (unfiltered) is similar to R; with 123P, the obvious coma size was ∼ 0′.5, but using an aperture

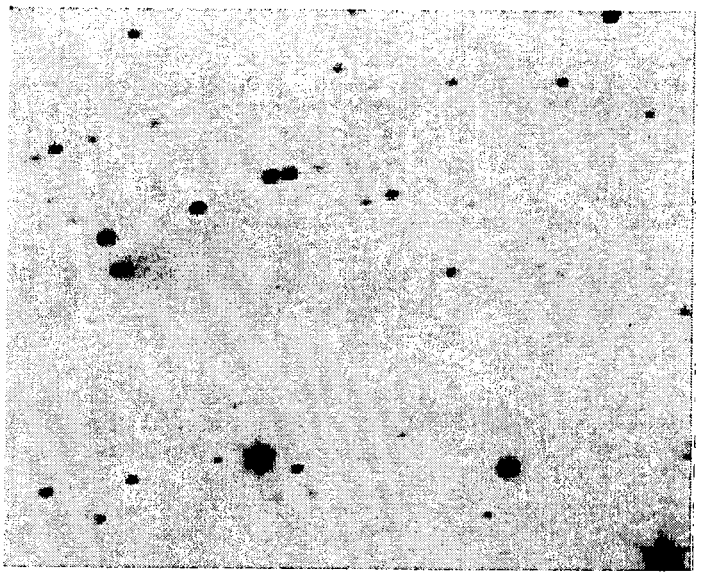

Image of comet 123P taken by Michael Jäger and Gerald Rhemann (near Vienna, Austria) with a 20-cm T (+ SXV-H9 CCD camera), taken on 2004 Mar. 17.0 UT (compilation of three 4-min exposures). The comet is at left, just below a star, with its diffuse fan tail pointing toward the upper right.

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(text continued from page 66)

only slightly bigger than the obvious coma gave a magnitude that was 0.4 mag fainter, so I used the maximum available aperture size; I have also compared different stars in the field (GSC mostly) and they are reasonably consistent (I have done a similar test on one of the Landolt selected-area fields, with good results)" [MOR]. Apr. 17.63: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet 154P/Brewington* ⟹ 2003 Mar. 21.76: alt. only ≈ 16°; zodiacal-light interference [GUZ].

◇ *Comet 155P/Shoemaker* ⟹ 2003 Feb. 23.78: limiting stellar mag 14.3; motion evident (orbital elements taken from *MPC* 46622) [GUZ].

◇ *Comet 157P/2003 T1 (Tritton)* ⟹ 2004 Jan. 31.76: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.84$ [OHS]. Jan. 31.79: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01].

◇ *Comet 158P/2001 RG*$_{100}$ *(Kowal-LINEAR)* ⟹ 2004 Feb. 18.48: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01].

◇ *Comet 159P/2003 UD*$_{16}$ *(LONEOS)* ⟹ 2004 Feb. 12.48: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85 [NAK01].

◇ *Comet C/1995 O1 (Hale-Bopp)* ⟹ 2004 Mar. 21.62: both comp. stars had $B-V = +0.51$ [TSU02]. Mar. 21.62 and 25.59: `Guide 8.0` software used for comp.-star mags [TSU02]. Mar. 25.59: comp. star has $B-V = +0.51$ [TSU02].

◇ *Comet C/1999 U4 (Catalina-Skiff)* ⟹ 2004 Feb. 15.80 and Mar. 15.71: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 11.64: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2000 SV*$_{74}$ *(LINEAR)* ⟹ 2004 Feb. 15.81, Mar. 15.72, 26.69, and Apr. 20.66: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 11.65: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2001 HT*$_{50}$ *(LINEAR-NEAT)* ⟹ 2002 Dec. 3.62: comet at relatively low alt., but definitely seen as a diffuse and somewhat-extended object [PEA]. 2003 Mar. 21.77: comet only 9′ away from Betelgeuse [GUZ]. Mar. 22.88: comet only 10′ away from Betelgeuse [GUZ]. Dec. 7.90 and 2004 Jan. 5.86: strong moonlight [HOR02]. Dec. 9.92: moonlight [HOR02]. 2004 Jan. 14.75, 22.75, and Feb. 8.75: `GUIDE 8.0` software used for comp.-star mags [TOT03]. Feb. 10.44: `Guide 8.0` software used for comp.-star mags; $B-V$ values of comp. stars are +0.57 and +0.76 [NAK01]. Feb. 10.44: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.39$ [TSU02]. Feb. 10.46: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.66$ [OHS].

◇ *Comet C/2001 K5 (LINEAR)* ⟹ 2003 Nov. 4.71, 8.76, and Dec. 9.75: moonlight [HOR02]. Dec. 7.74: comet close to star; moonlight [HOR02]. 2004 Feb. 28.77 and Apr. 17.72: `Guide 8.0` software used for comp.-star mags [OHS]. Feb.

28.77: $B-V$ values of comp. stars are +0.53, +0.57, and +0.84 [OHS]. Apr. 17.72: $B-V$ values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet C/2001 Q4 (NEAT)* ⟹ 2002 Dec. 3.58: difficult obs. in windy conditions, which caused excessive image movement; however, during periods of relative calm, the comet was obs. as a small, moderately condensed object and was confirmed by other observers at the time [PEA]. 2003 Mar. 1.55 and 3.57: bright sky background due to moonlight and low alt.; however, good comparison stars were close by [PEA]. Dec. 13.50 and 2004 Mar. 16.49: moderate light pollution [MAT08]. Dec. 14.87: mag estimate made just before moonrise; comet virtually stellar w/ a faint outer coma just visible with direct vision — more apparent w/ averted vision; alt. low, ≈ 20° [BEG01]. Dec. 28.77: small, compact object [COO02].

2004 Jan. 31.12: low alt. [AMO01]. Feb. 10.98, 11.97, 16.96, 20.98, 27.96, Mar. 16.94, 23.94, 26.92, Apr. 9.92, 14.35, 15.92, 16.92, and 23.90: some clouds interfering [AMO01]. Feb. 11.04: difficult object (light pollution and low alt.) [SOU01]. Feb. 16.48: comet close to star; in 25.4-cm L (71×), non-stellar central cond. of mag ≈ 9.5, w/ pointlike 'nucleus' about 2 mag fainter [SEA]. Feb. 17.46: in 25×100 B, outer coma w/ dia. ≈ 8′; a little fainter when viewed through Swan Band filter [SEA]. Feb. 20.48: w/ 25×100 B, a short 10′ dust tail is visible in p.a. 90°; coma slightly enhanced w/ a Swan-band filter; a CCD image reveals the dust tail plus an ion tail > 24′ long in p.a. 158° and a small starlike nuclear cond. of 12th mag [MAT08]. Feb. 27.41 and 28.44: obs. rather difficult due to moonlight and the glow from the Sydney metropolitan area [SEA]. Feb. 28.58: obs. after moonset; 15° alt. [MAT08].

Mar. 5.12: from Rothera, Antarctica; "moonlight wasn't a problem, as the moon had only just begun to rise and was only a few degrees up; still in astronomical twilight, but the sky is certainly darker than summer skies in the U.K." [SHA02]. Mar. 8.40: sky very light (Moon had just risen) and comet close to 7th-mag star [SEA]. Mar. 9.40: quick obs. through break in drifting cloud [SEA]. Mar. 9.44: moderate light pollution; moderate enhancement w/ a Swan-band filter [MAT08]. Mar. 15.42: "w/ 25.4-cm L (71 ×), coma dia. ≈ 8′ w/ a pronounced central cond.; coma clearly not spherical (appeared to be 'flat' on the NW side, giving a vaguely triangular appearance, a little like a fat pear!); pear shape accentuated by a 'stalk' (a short, narrow, spike-like tail to the SE); little changed when viewed through Swan Band Filter, although central cond. may have been a little less prominent w/ filter" [SEA]. Mar. 15.95, 22.93, Apr. 23.92, 26.90: light pollution interference [SOU01]. Mar. 17.44: "not absolutely certain about naked-eye sighting, but on several occasions a small spot appeared to be visible at the comet's position, using averted vision; estimated total visual mag 6.3 using a mag-6.4 star (very marginally visable in-focus) and a mag-6.1 star (ref: AA; MM = S) that could be quite clearly seen; still, the apparent 'spot' kept appearing w/ averted vision at the location of the comet and the estimated mag was in accord w/ opera-glass estimates, so I think that it was real" [SEA]. Mar. 19.44: CCD image reveals ion tail > 30′ long in p.a. 175° [MAT08]. Mar. 21.72: "first clear, moonless evening this year!"; comet alt. ≈ 12° [BEG01]. Mar. 22.93: w/ 14.3-cm L (80×), coma slightly elongated in p.a. 165°; central cond. off center [AMO01]. Mar. 23.50: comet viewed through 41-cm L; coma had a strong parabolic outline w/ the central cond. at the focus; very vague, broad, and indistinct tail visible, although it was difficult to determine exact extent due to this vagueness, which appeared more of a slight brightening of the sky background; comet glimpsed w/ the naked eye at this dark-sky location, although it could not be held in direct vision [PEA]. Mar. 23.85: comet obs. in the morning sky; observations were again made w/ the naked eye — more definite due to the darker morning sky (comet not held in direct vision, but clearly evident in many glimpses made over a 20-min period); tail length ≈ 0°.5 in p.a. 140° (however, the measurement was difficult due to the vagueness of the tail) [PEA]. Mar. 23.98: on board the ship RRS Ernest Shackleton, crossing the Drake Passage [SHA02]. Mar. 24.49 and 25.50: `Guide 8.0` software used for comp.-star mags [TSU02]. Mar. 25.49: broad, diffuse tail w/ brighter, more-well-defined edges at p.a. 178° and 102° (difficult to measure tail length; however, it appeared to be at least 0°.5); relatively easy to keep in direct vision; rough estimate made using In-Out method [PEA]. Mar. 25.50: comp. star has $B-V = +0.51$ [TSU02]. Mar. 25.72: "comet well-enhanced through Swan Band Filter in both 10×50 and 25×100 B — this was especially noticeable w/ 25×100 B in the lighter evening skies; central cond. appeared significantly sharper through filter (I am puzzled by the results using the Swan Band Filter: once again, the comet is significantly enhanced through the filter, in contrast to the situation of recent weeks; the enhancement is more apparent when the comet appears relatively faint against a light background, but this cannot be the whole story and it appears that the dust content of the comet has increased and then decreased again since the end of last year)"; in 25×100 B, coma dia. 8′ w/ vague tail extending to ≈ 0°.5 and spanning p.a. ≈ 140°-160° [SEA]. Mar. 27.11: observed from the European Southern Obs., La Silla, Chile; comet at low alt. [HOE]. Mar. 27.45: w/ 25×100 B, > 1° of tail visible [MAT08]. Mar. 28.01: alt. ~ 20° [HOE]. Mar. 29.96, 30.93, Apr. 1.92, 13.35, 26.93, 27.91, 28.91, and 29.91: moonlight [AMO01]. Mar. 30.93: w/ 20×80 B, 0°.1 tail in p.a. 140° faintly visible [AMO01]. Mar. 31.75: almost certainly glimpsed via naked eye, but thin high cloud began to drift in before this could be confirmed [SEA].

Apr. 1.82: tail appeared slightly brighter this morning, particularly in the first 10-15 min [PEA]. Apr. 6.70: comet alt. ≈ 13°; through 20×60 B, the coma was extended in p.a. 170°, and a broad diffuse tail was traced w/ averted vision for 25′ in this same direction [BEG01]. Apr. 7.71: through 20-cm L (76×), the comet had a distinctive stellar central cond., w/ a short curved dust tail traced for 20′ in p.a. 165° [BEG01]. Apr. 8.91 and 9.92: w/ 20×80 B, thin 10′ fan tail in p.a. 160° [AMO01]. Apr. 9.71: "comet now immediately obvious even at low alt.; definitely brighter than two nights ago" [BEG01]. Apr. 9.97: ref. stars η^2 Hyi and SAO 248381 [MAN04]. Apr. 12.91: w/ 20×80 B, fan tail 15′ long in p.a. 160° [AMO01]. Apr. 14.44: in 25×100 B, 40′ tail in p.a. 165°; in 25.4-cm L (71×), up to 1° of tail visible; very sharp central cond. w/ a small 'point nucleus' at the center of this [SEA]. Apr. 14.72: faint tail visible, 25′ long in p.a. 155°; cloud interference [PRI04]. Apr. 15.40: "in 25×100 B, coma dia. 8′, w/ 1°.5 tail in p.a. 150° near the coma, but the tail curved toward p.a. 165°; comet was a fine sight in binoculars and easily visible to naked eye; brighter section of tail visible to naked eye, giving comet an elongated appearance" [SEA]. Apr. 15.47: broad and diffuse tail observed 1°.45 long in p.a. 162°; first 30′ of tail quite bright [PEA]. Apr. 15.70: tail 35′ long spanning p.a. 160°-152°, broad and faint [PRI04].

Apr. 16.70: w/ 20-cm L (89×), prominent central point, not quite stellar, surrounded by considerable spurious outer coma [COO02]. Apr. 17.42: from The Entrance, N.S.W., comet could be seen faintly via naked eye through the light pollution of metropolitan Sydney [SEA]. Apr. 17.70: w/ 20-cm L (89×), broad fan-shaped tail, spanning p.a. 113°-164°, but most prominent in p.a. 145°, extending 23′; central point still prominent, but more obscured by coma than previously [COO02]. Apr. 18.42: appeared easier to naked eye than previously; tail visible in 10×50 B despite considerable light pollution in region of comet [SEA]. Apr. 18.50: intermittent clouds; coma dia. approx.; obs. from Riverside, Tasmania [BEN06]. Apr. 18.70: comet seems to be fainter than last night [COO02]. Apr. 18.88 and 20.88: hurried obs. between clouds, although mag estimate is accurate [PEA]. Apr. 20.71: "tail more narrow and less fan-shaped — as though streaming away from the nucleus more strongly; tail spans p.a. 139°-156°; in 20-cm L (89×), central cond. still very prominent, $m_2 \approx 10$, but less sharp than previously, as though seen through a thicker layer of coma" [COO02]. Apr. 22.85: broad and faint tail observed 1°.9 in p.a. 145°, although the obs. was hampered somewhat due to close proximity of a 3rd-mag star along tail path [PEA]. Apr. 22.90: w/ 11×80 B, broad, faint tail spans p.a. 145°-150° [SOU01]. Apr. 23.90: visible to naked eye; central cond. of mag ≈ 5.8 [AMO01]. Apr. 23.92 and 26.90: clouds [SOU01]. Apr. 24.36: alt. 5° [AMO01]. Apr. 24.40: easily seen w/ naked eye; in 25×100 B, comet was a fine sight w/ 1°.7 of tail in p.a. 150°, and coma dia. 12′ w/ pronounced central cond. [SEA]. Apr. 24.96: ref. stars SAOC 233463 (4.44) and 248969 (3.34) [MAN04]. Apr. 25.39: "tail marginally glimpsed w/ naked eye using averted vision; comet was a fine sight in 25×100 B and 10×50 B; tail visible to 4° in 25×100 B, quite broad from p.a. 130° to at least 140°; S edge of tail more clearly defined" [SEA]. Apr. 25.89: comet at low alt., which probably affected tail measurement (however, comp. stars were also at same alt.) [PEA]. Apr. 25.97: ref. stars SAOC 233822 (4.71), 233463 (4.44), and 248969 (3.34); w/ 15-cm L (13×), 2° tail in p.a. 140°; oval-shaped coma of size 11′ × 12′ [MAN04]. Apr. 27.54: bright moonlit sky now hampering obs. of the full extent of the coma and tail [PEA]. Apr. 27.90: moonlight interference; w/ 13.5-cm L and comet filter, tail appears more obvious [SOU01]. Apr. 27.95: small, bright central cond.; fan tail [DES01]. Apr. 28.89: central cond. brighter than on previous night; fan tail spans 50° of p.a.; w/ 27-cm f/5 L (55×, 90×), $m_1 = 4.0$ (MM = S, ref = YG), coma dia. 15′-16′, DC = 5/ to 7, 1°.45 tail in p.a. 145° [DES01]. Apr. 29.88: better conditions than previous evening; via naked eye, total mag 3.8; w/ 20-cm T (100×, 200×), coma has bluish-white color and strong starlike cond. [SOU01]. Apr. 29.89: better conditions than on previous evening; comet a very easy object; coma still shows a very strong central starlike cond. w/ a blue-white color; w/ 27-cm f/5 L (55×), $m_1 = 4.0$ (MM = S, ref = YG), coma dia. 20′, DC = 5/, 1°.44 tail in p.a. 145°; at 108×, $m_1 = 4.0$, dia. 12′, DC = 5 [DES01]. Apr. 29.99: visible w/ naked eye (limiting visual mag 4.7); moonlit sky [BAL07]. Apr. 30.89: moonlight; w/ 11×80 B, coma dia. 25′, tail 0°.3 long in p.a. 130° [SOU01]. May 1.49: easily seen as a diffuse object w/ the naked eye, despite the moonlit sky; even a small portion of the tail can be seen [PEA].

◇ *Comet C/2001 RX$_{14}$ (LINEAR)* ⟹ 2003 May 30.86 and June 3.87: limiting stellar mag ≈ 14 [GUZ]. May 30.86: ≈ 20° above horizon [GUZ]. June 3.87: only ≈ 17° above horizon [GUZ].

◇ *Comet P/2001 YX$_{127}$ (LINEAR)* ⟹ 2004 Mar. 28.70: B–V values of comp. stars were +0.32, +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Apr. 11.67: hint of tail to W; eight ref. stars w/ B–V = +0.45 to +0.85 yield same mag [NAK01].

◇ *Comet C/2002 J5 (LINEAR)* ⟹ 2004 Mar. 18.79: B–V values of comp. stars were +0.32, +0.48, +0.55, +0.66, and +0.80 [NAK01]. Mar. 20.70: `Guide 8.0` software used for comp.-star mags; B–V values of comp. stars are +0.60, +0.66, and +0.84 [OHS]. Mar. 28.74: B–V values of comp. stars were +0.32, +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Apr. 20.72: B–V values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01].

◇ *Comet C/2002 O7 (LINEAR)* ⟹ 2003 Mar. 21.88: limiting stellar mag ≈ 14.5; motion obvious [GUZ]. Mar. 22.92: limiting stellar mag 14.7; motion obvious [GUZ].

◇ *Comet C/2002 T5 (LINEAR)* ⟹ 2004 Feb. 16.62 and 14.56: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 16.62: comp. star has B–V = +0.66 [OHS]. Feb. 18.54: B–V values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Mar. 12.50: B–V values of comp. stars were +0.43, +0.55, and +0.85 [NAK01]. Mar. 14.56: B–V values of comp. stars were +0.64, +0.78, and +0.88 [OHS]. Mar. 26.52: B–V values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 11.49: eight ref. stars w/ B–V = +0.45 to +0.85 yield same mag [NAK01].

◇ *Comet P/2002 T6 (NEAT-LINEAR)* ⟹ 2004 Jan. 26.48 and Feb. 10.56: `Guide 8.0` software used for comp.-star mags [TSU02]. 2004 Jan. 26.48: comp. star has B–V = +0.61 [TSU02]. Feb. 10.56: comp. star has B–V = +0.54 [TSU02]. Feb. 18.53: B–V values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Mar. 12.50: comp. star has B–V = +0.63 [NAK01]. Mar. 14.55: `Guide 8.0` software used for comp.-star mags; B–V values of comp. stars are +0.64, +0.78, and +0.88 [OHS]. Apr. 11.48: eight ref. stars w/ B–V = +0.45 to +0.85 yield same mag [NAK01].

◇ *Comet C/2002 T7 (LINEAR)* ⟹ 2003 Oct. 25.95: "coma so condensed that it was stellar at this power; easy to see because of the high cond. — in fact, much easier than comet 2P, which I rated as brighter earlier; object identity confirmed from motion over 1-hr period" [BEG01]. Oct. 31.95: central cond. easily seen and almost stellar at this power, w/ a very faint surrounding haze of coma ≈ 20″ across; at 88×, the central cond. was more disk-like in appearance and estimated as ≈ 5″ across [BEG01]. Nov. 4.87, 9.10, Dec. 7.84, 9.72, and 2004 Jan. 5.88: moonlight [HOR02]. Nov. 6.86, Dec. 9.69, 2004 Jan. 1.77, and 3.87: moonlight [HOR02]. Nov. 9.05: during total lunar eclipse [HOR02]. Nov. 19.85: elliptical coma [HOR02]. Nov. 20.13: indication of a tail towards ESE [GRA04]. Nov. 20.88; "at 87×, coma was bright, compact, and elliptical (vertex distance 20″; semi-latus rectums values 45″ and 45″, symmetrical in shape); very little diffuse outer coma visible, except in the direction of the coma extension noted (this was very diffuse and faint)" [BEG01]. Nov. 20.92: obs. between strong auroral storms [HOR02]. Nov. 23.95: coma still elliptical and very condensed; hint of a

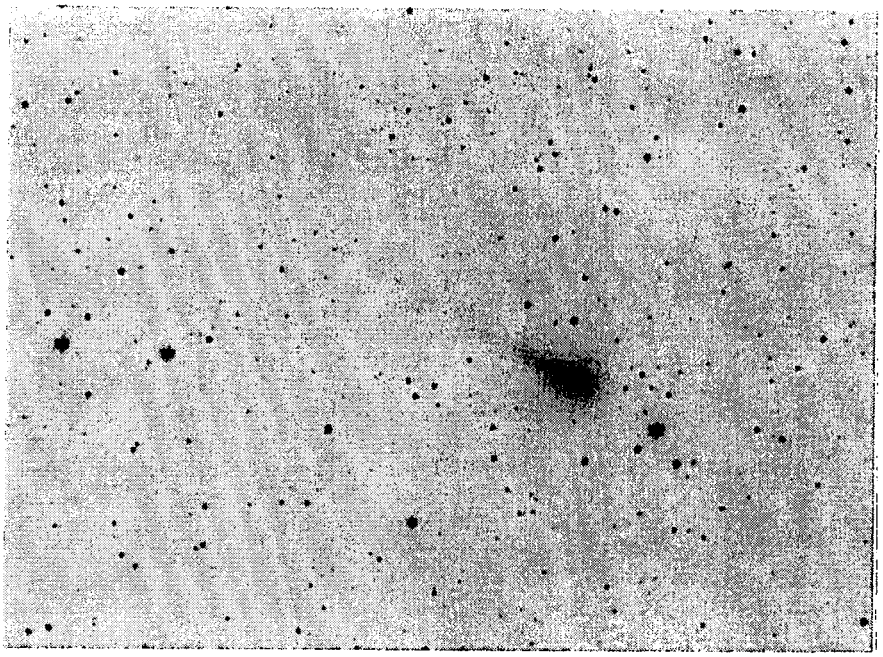

Image of comet C/2002 T7 taken by Michael Jäger and Gerald Rhemann (near Vienna, Austria) with a 25-cm T (+ SXV-H9 CCD camera) on 2004 Feb. 1.72 UT.

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stellar central cond. w/ averted vision; "tail feature" now much more obvious [BEG01]. Dec. 4.73: faintly visible due to moonlight and some dew problems [GRA04]. Dec. 10.69: strong moonlight, high clouds [GUZ]. Dec. 12.08: moonlight [GRA04]. Dec. 12.85: moonlight [BAR06]. Dec. 14.86: distinct stellar central cond. [BEG01]. Dec. 16.77: definite starlike point at center; comet stellar in 5-inch rich-field R [COO02]. Dec. 19.74: diffuse coma, faint tail; comet not visible in 7×50B, although 9th-mag stars were clearly seen [GRA04]. Dec. 21.45 and 21.47: correction of data published in *ICQ* 129 [EZA]. Dec. 24.69: central 2′ of coma elongated ⊥ to the axis of the tail [GUZ]. Dec. 27.71: some moonlight [GUZ]. Dec. 28.69: some cloud interference [GRA04].

2004 Jan. 8.75, 14.71, 16.70, 19.71, 21.72, 22.75, 23.77, Feb. 8.74, 15.74, 17.74, and 20.74: `Guide 7.0` software used for comp.-star mags [SAN07]. Jan. 14.46 and Feb. 8.41: `StellaNavigator ver. 6.1` software used for comp.-star mags [MOM]. Jan. 14.42, 22.40, Feb. 15.41, 27.41, 29.41, Apr. 17.81, and 24.78: `The Sky ver. 5` software used for comp.-star mags [MIT]. Jan. 14.73, 22.77, and Feb. 8.74: `Guide 8.0` software used for comp.-star mags [TOT03]. Jan. 18.77: faint outer halo [MEY]. Jan. 18.86: w/ 30.5-cm T, coma more diffuse than during Dec., w/ central cond. less dominating; tail well visible; at 242×, starlike false nucleus of mag 11.5; at 75×, DC = s5 and 0°.2 tail in p.a. 60° [KAM01]. Jan. 23.46, Feb. 11.42, 15.43, 20.44, and Apr. 20.80: `Guide 8.0` software used for comp.-star mags [NAG04]. Jan. 23.80: "w/ 30.5-cm *f*/10 T, central cond. w/ false nucleus; tail well visible (showing two streamers?)"; at 75×, DC = s5, 0°.2 tail in p.a. 70° [KAM01]. Jan. 24.80: easy to see, but a large object; tail diffuse [BUS01]. Jan. 25.76: difficult under hazy conditions [COO02]. Jan. 28.43: comp. star has $B-V = +0.56$ [TSU02]. Jan. 28.43, Feb. 8.44, 10.40, 16.39, Mar. 4.41, Apr. 24.80, and 25.80: `Guide 8.0` software used for comp.-star mags [TSU02]. Jan. 28.46, Feb. 15.44, 23.44, 27.44, and Apr. 15.82: `Guide 8.0` software used for comp.-star mags [YOS02]. Jan. 28.82, 30.86, 31.85, Feb. 4.83, 5.81, 24.82, and Mar. 1.82: moonlight [GON05]. Jan. 31.44, Feb. 10.41, 16.41, 18.41, 25.42, and 27.41: `Guide 6.0` software used for comp.-star mags [NAG08]. Feb. 2.76: tail visible, but no length-determination due to incoming clouds [BUS01]. Feb. 4.72: diffuse coma; well visible despite an almost-full moon [GRA04]. Feb. 7.75: moon at 2° alt., behind clouds over E horizon [BOU]. Feb. 8.41, 10.43, 17.41, 25.41, and Apr. 24.79: `Guide 7.0` software used for comp.-star mags [MIY01]. Feb. 8.84, 11.82, 12.82, 13.82, 20.83: Zodiacal light [GON05]. Feb. 9.76: `Guide 7.0` software used for comp.-star mags [BAL04]. Feb. 10.40: comp. star has $B-V = +0.50$ [TSU02]. Feb. 10.73: drop-shaped coma with starlike central cond. of mag 8.4; faint tail [BAR06]. Feb. 11.77: `Guide 8.0` software used for comp.-star mags [CSO]. Feb. 12.72: haze; comp. stars SAOC 91779, SAOC 91850, and SAOC 91740; `Guide 8.0` software were used for comp.-star mags [SVE01]. Feb. 12.99: obs. from dark site near Mt. Washington and Crawford Notch in northern New Hampshire; glare from bright Venus!; comet only 10′-20′ from bright γ Peg, which probably affected size and brightness est. somewhat [GRE]. Feb. 14.81: in 7.0-cm R (15×), hint of tail towards NE [GRA04]. Feb. 15.03: obs. from Laurel Brook Farm between Logan and Bremen, OH; comet's tail was visible w/o much difficulty [CRE01]. Feb. 15.77: in 7×50 B, comet clearly visible (and somewhat fainter, but larger than M92 — seen at about the same alt., 20°) [GRA04]. Feb. 15.78: central cond. of mag ≈ 9.5; in good seeing, tail sometimes visible to longer than 1° in 15×80 B [RIE]. Feb. 16.39: comp. star has $B-V = +0.49$ [TSU02]. Feb. 16.79: comet rather inconspicuous in binoculars; w/ 30.5-cm T, tail > 0°.2 long in p.a. 55° (impossible to estimate the extent because of brightened background); coma showed a brighter inner region, but false nucleus (mag

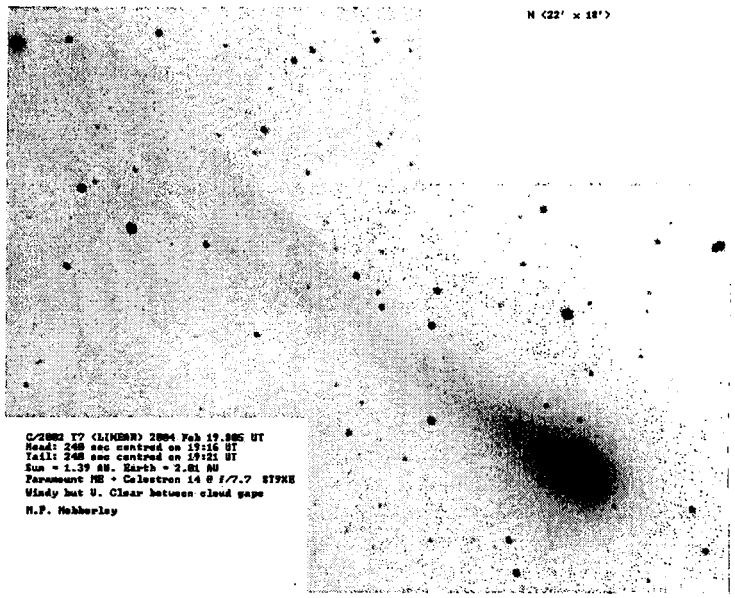

Image of comet C/2002 T7 taken by Martin Mobberley with a Celestron 14 f/7.7 (+ ST-9XE CCD camera) on 2004 Feb. 19.805 UT (mosaic of two 240-sec exposures beginning with the head).

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11.5) was inconspicuous [KAM01]. Feb. 17.94: low alt. [SOU01]. Feb. 19.80: only faintly seen due to a rather bright sky background (overlooking Oslo) [GRA04]. Feb. 20.72: Guide 7.0 software used for comp.-star mags [SAR02]. Feb. 20.74: nuclear cond. w/ mag 9.0 [CSU]. Feb. 20.77: not an easy object in binoculars due to bright background; w/ 20-cm T, brighter inner coma and inconspicuous false nucleus of mag 11.0 [KAM01]. Feb. 21.79: plasma tail short and straight; coma growing more condensed [KAR02]. Feb. 23.78: "slight interference by moonlight; weak tail visible?" [SCH04]. Feb. 26.81: vaguely seen due to moonlight interference; w/ 20-cm T, a starlike false nucleus of mag 10.5 was rather well visible [KAM01]. Feb. 28.80: in 20.3-cm T (62×), tail ≈ 0°.2 long (of moderate width) was visible without much trouble; moonlight [GRA04]. Feb. 29.78: comet only faintly seen due to clouds, moonlight, and low alt. (≈ 10°) [GRA04]. Feb. 29.79: comet observed in strong moonlight at alt. 12° [BOU].

Mar. 3.79: seen as a rather faint diffuse glow in moonlight [GRA04]. Mar. 4.41: comp. star has $B-V = +0.46$ [TSU02]. Mar. 4.79: only barely visible, but seen at correct location; moonlight and some haze; alt. 8° [GRA04]. Mar. 7.72: weak haze near the horizon [BAR06]. Mar. 7.77: comet fairly well seen despite twilight (sun 13° below true horizon) and 8° alt.; first detected at solar alt. −10° [GRA04]. Mar. 10.78: comet quite a challenging object and only seen for ≈ 10 min before setting below the local horizon; formal obs. obtained at true alt. 5°.0 (when the sun was 13° below the horizon; mag somewhat uncertain, as the primary ref. star (34 Psc) was only obs. 7 min later (true alt. 4°.6) [GRA04]. Apr. 9.36: nautical twilight; central cond. of mag ≈ 6.5 [AMO01]. Apr. 9.88: bright, well-condensed object w/ prominent central cond.; comp. stars were at the same alt. as the comet (therefore, the estimate is quite accurate); sky background a little too bright to discern any possible tail that may have been present [PEA]. Apr. 11.88: very condensed object this morning and very prominent central cond.; still no traces of a tail; however, the comet is getting higher in the sky; comp. stars at the same alt. as the comet (therefore, the estimate is quite accurate) [PEA]. Apr. 13.35: astron. twilight; central cond. of mag ≈ 5.5; w/ 20×80 B, 10′ tail in p.a. 250° [AMO01]. Apr. 14.36, 16.35, 24.36: clouds [AMO01]. Apr. 14.36: nautical twilight [AMO01]. Apr. 15.20, 25.17, and 27.18: mountain location, clear sky [GON05]. Apr. 15.20: naut. twilight [GON05]. Apr. 15.80: in 25×100 B, tail clearly visible in twilight for at least 1°; comet enhanced via Swan Band filter; visible to naked eye, together w/ C/2001 Q4 well to the S [SEA]. Apr. 15.89: both C/2002 T7 and C/2001 Q4 visible to the naked eye in the morning sky [PEA]. Apr. 17.79: StellaNavigator ver. 6.1 software used for comp.-star mags [KON03]. Apr. 17.80, 20.80, 23.79, and 24.79: StellaNavigator ver. 6 software used for comp.-star mags [NAG08]. Apr. 19.14: w/ 20-cm L, DC = 6, definite greenish color; tail possibly 1° long in p.a. 250°; just a hint of tail visible in 10×50 B; comet visible to naked eye [VAN15]. Apr. 19.15: bright, very sharp coma, w/ definite bluish tint; short, narrow tail [COO02]. Apr. 21.87: very impressive object and certainly the most impressive since C/2000 WM_1; straight, and relatively thin tail 4°.9 long in p.a. 260° w/ an antitail (easily obs.) ≈ 10′ long in p.a. 32°; in moments of good seeing, individual streamers were observed within the first 1° of the tail in a 20-cm L (45×) [PEA]. Apr. 22.88: straight, relatively thin tail observed 6°.5 long in p.a. 252° w/ an antitail easily observed ≈ 15′ long in p.a. 30°; tail also faintly visible to the naked eye (however, the obs. was hampered somewhat due to the bright Zodiacal light); the coma had a distinct bluish hue as obs. through 20-cm L [PEA]. Apr. 23.88: tail 5°.2 long in p.a. 256° w/ an antitail ≈ 10′ long in p.a. 9° (although the anti-tail appears to be getting fainter) [PEA]. Apr. 24.78: tail faintly visible to naked eye w/ averted vision; in 25×100 B, coma dia. 3′, 2°.3 tail in p.a. ≈ 263°; faint type-III tail extending 8′ to N [SEA].

Apr. 25.17 and 27.18: mag est. corrected for atmospheric extinction w/ *ICQ* 'winter' table; very low alt.; beg. of naut. twilight [GON05]. Apr. 25.34: total mag 4.2 to naked eye [AMO01]. Apr. 25.78: comet was a beautiful sight in 25×100 B and 10×50 B w/ relatively intense type-I tail visible to at least 3°.5 in p.a. 254° (about half this length seen w/ naked eye using averted vision); fainter type-III tail visible to 8′ in p.a. ≈ 30°; coma very condensed and blue/green in color [SEA]. Apr. 25.88: tail 5°.5 long in p.a. 262° (where it exits the coma) w/ an antitail observed ≈ 10′ long in p.a. 2°, which is gradually getting fainter; distinct kink or bend in the tail ≈ 2°.5 from the coma; tail clearly seen w/ the naked eye despite the bright Zodiacal-light background [PEA]. Apr. 26.37: ref. stars ι Psc (4.14) and ω Psc (4.03); w/ 15-cm L (13×), 2° tail in p.a. 250° [MAN04]. Apr. 28.88: coma was a distinct bluish hue in both 20×80 B and 20-cm L; antitail now effectively gone — only a vague, broad extension to the coma on the N side seen through the 20-cm L; tail also faintly visible to the naked eye (however, the obs. was hampered somewhat due to the bright Zodiacal light) [PEA]. Apr. 29.87: coma was a distinct bluish hue in both 20×80 B and 20-cm L; anti-tail now gone; comet suffering somewhat from being located right in the middle of the bright Zodiacal Light (however, it's still an impressive sight) [PEA]. May 1.88: "this has developed into quite a spectacular comet! — best view is through 20×80 B, which shows a lot detail within tail structure; first 3° of tail is of a very high surface brightness; 6° of tail easily seen w/ the naked eye, despite the Zodiacal light background" [PEA].

◇ *Comet C/2002 V1 (NEAT)* ⟹ 2002 Dec. 3.55: diffuse coma w/ the outer boundary difficult to discern from the sky background [PEA]. Dec. 28.87: coma appears spherical, w/ a definite central brightening and large faint outer coma [BEG01]. 2003 Jan. 5.74: extremely good conditions, w/ excellent "seeing"; coma no longer appears perfectly spherical, but instead is slightly elongated in p.a. 68° [BEG01]. Jan. 6.82: faint stellar central cond. visible — first w/ averted vision and then directly [BEG01]. Jan. 14.76: clearly visible despite 86-percent-lit moon (no challenge at all), w/ a stellar core and the inner coma still apparent [BEG01]. Jan. 15.75: strong moonlight interference, but comet still visible [BEG01]. Jan. 18.74: comet in moonlight and seen for ≈ 5 min between clouds [BEG01]. Feb. 12.69: comet noticed when sun was only 7° below horizon (comet then at alt. 9°); comet lost at alt. < 3° (only 16° from sun); tail was golden and very bright; coma was elongated with brilliant golden central cond. ≈ 0′.5 in dia. — a beautiful sight [GUZ]. Feb. 12.70: faintly visible with naked at alt. only 5°.5 [GUZ]. Feb. 26.97: ref. stars SAO 191524 at alt. 4° (mag 1.17) [which gives mag ≃ 4.6 from *ICQ* avg. extinction table – Ed.] and SAO 214444 at alt. 9° (mag 4.41) [which gives mag ≃ 6.3 from *ICQ* avg. extinction table – Ed.], while comet was at alt. 5°; BUS02 gave m_1 = 4.1 w/ respect to uncorrected star mags (tab. mag obtained by *ICQ* Editor assuming that the comet was a few tenths of a mag brighter than SAO 214444) [BUS02]. Mar. 16.77: bright moon; no tail visible [COO02].

◇ *Comet P/2002 X2 (NEAT)* ⟹ 2003 Dec. 1.79: *B–V* values of comp. stars were +0.43, +0.55, +0.59, +0.63, +0.83, and +0.85 [NAK01]. 2004 Jan. 31.76: *B–V* values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 18.63: *B–V* values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01].

◇ *Comet C/2002 X5 (Kudo-Fujikawa)* ⟹ 2002 Dec. 18.08: strong moonlight; limiting stellar $m_v \sim$ 9.2-9.3 [SVE01]. 2003 Feb. 8.51: viewed over a sea horizon, but suffered from cloud close to the horizon; easily seen, condensed object; a bright, broad tail was briefly seen, 2°.0 long in p.a. 172° (however, this could only be obs. during a brief cloud break, and only once); comp. stars were at a similar alt. as the comet [PEA]. Feb. 11.52: comet observed in a brighter sky due to moonlight; broad tail seen, 0°.5 long in p.a. 182°; a fairly rapid fade in brightness is evident in the last 3 days [PEA]. Mar. 16.77: no sign of cond.; featureless in 40-cm L [COO02]. Mar. 21.75: alt. ≈ 15° [GUZ]. Mar. 24.76: fainter than previously [GUZ]. Mar. 24.76, 26.77, and 31.78: low alt. [GUZ]. Mar. 31.78: comet more than 1 mag fainter than five days ago (fading faster than it should) [GUZ].

◇ *Comet C/2002 Y1 (Juels-Holvorcem)* ⟹ 2003 Feb. 12.98: bright moonlight [GUZ]. Feb. 21.90: some light pollution [GUZ]. Feb. 22.75 and 23.75: low alt. [GUZ]. Mar. 20.78: comet only 13° above horizon [GUZ]. Mar. 21.76: comet only 15° above horizon [GUZ]. Mar. 22.80: only 9° above horizon [GUZ]. Mar. 24.77: only 11° above horizon [GUZ]

◇ *Comet C/2003 A2 (Gleason)* ⟹ 2004 Jan. 31.73: *B–V* values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 18.57: *B–V* values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Mar. 15.60: *B–V* values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 11.51: eight ref. stars w/ *B–V* = +0.45 to +0.85 yield same mag [NAK01].

◇ *Comet C/2003 E1 (NEAT)* ⟹ 2004 Mar. 18.83: *B–V* values of comp. stars were +0.32, +0.48, +0.55, +0.66, and +0.80 [NAK01].

◇ *Comet C/2003 G1 (LINEAR)* ⟹ 2004 Feb. 28.76: `Guide 8.0` software used for comp.-star mags; *B–V* values of comp. stars are +0.53, +0.57, and +0.84 [OHS]. Mar. 28.78: *B–V* values of comp. stars were +0.32, +0.66, +0.68, and +0.72, +0.73, +0.76, +0.84 [NAK01].

◇ *Comet C/2003 H1 (LINEAR)* ⟹ 2004 Jan. 31.80: comp. star has *B–V* = +0.84 [OHS]. Jan. 31.80, Feb. 20.72, Mar. 20.59, and Apr. 17.50: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 15.75 and Mar. 15.61: *B–V* values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 17.54: comet close to star; fainter through Swan Band filter [SEA]. Feb. 18.80 and Mar. 14.58: `Guide 6.0` software used for comp.-star mags [NAG08]. Feb. 20.69: CCD image shows faint curving dust fan > 10′ long that spans p.a. 10°-49° [MAT08]. Feb. 20.72: comp. star has *B–V* = +0.66 [OHS]. Feb. 21.08: `Guide 7.0` software used for comp.-star mags [SAR02]. Mar. 12.55: `Guide 8.0` software used for comp.-star mags [YOS02]. Mar. 13.59: `Guide 8.0` software used for comp.-star mags; comp. star has *B–V* = +0.51 [TSU02]. Mar. 13.60: `Megastar 2.0` software used for comp.-star mags [NAG04]. Mar. 17.79: `Guide 8.0` software used for comp.-star mags [TOT03]. Mar. 20.59: `Guide 8.0` software used for comp.-star mags; *B–V* values of

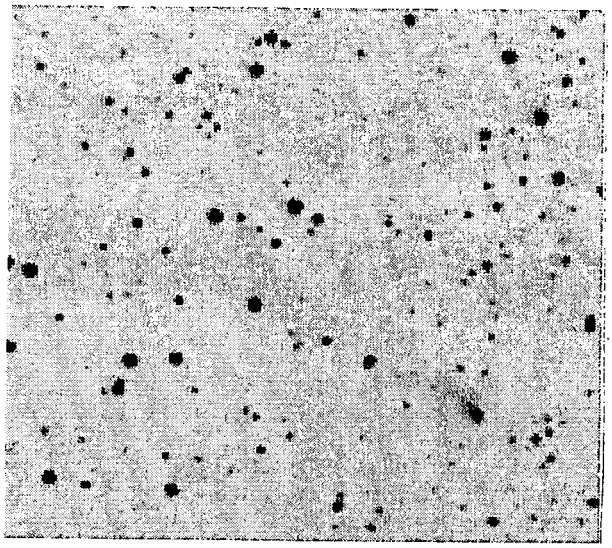

Image of comet C/2003 H1 taken by Jäger and Rhemann 20-cm T (+ SXV-H9 CCD camera) on 2004 Mar. 17.91 UT (three 2-min exposures). The comet is near lower right with a diffuse tail extending toward the upper left.

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comp. stars are +0.57, +0.63, and +0.87 [NAK01]. Mar. 20.59: *B–V* values of comp. stars were +0.61, +0.63, and +0.87 [OHS]. Mar. 23.51: small, somewhat-condensed object [PEA]. Mar. 28.54: `Guide 7.0` software used for comp.-star mags [MIY01]. Apr. 8.48: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 8.81: `Guide 8.0` software used for comp.-star mags [NAG09]. Apr. 15.48: this comet has surprisingly gotten fainter and quite difficult to see; it appeared as an ill-defined, diffuse object against even a dark background sky and at high alt. [PEA]. Apr. 17.50: *B–V* values of comp. stars were +0.64 and +0.87 [OHS].

◇ *Comet C/2003 H3 (NEAT)* ⟹ 2004 Feb. 28.82: `Guide 8.0` software used for comp.-star mags; *B–V* values of comp. stars are +0.53, +0.57, and +0.84 [OHS].

◇ *Comet P/2003 K2 (Christensen)* ⟹ 2003 May 29.85: low alt. [HOR02].

◇ *Comet C/2003 K4 (LINEAR)* ⟹ 2003 Oct. 24.82: dense star field [HOR02]. Dec. 7.72 and 9.73: moonlight [HOR02]. 2004 Feb. 21.15: `Guide 7.0` software used for comp.-star mags [SAR02]. Feb. 21.21: comp. stars taken from Henden seq. for AW Sge [BOU]. Feb. 28.78 and Mar. 20.74: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 28.78: *B–V* values of comp. stars are +0.54, +0.63, and +0.69 [OHS]. Mar. 18.82, 28.75, and Apr. 16.80: `Guide 8.0` software used for comp.-star mags [NAG04]. Mar. 20.15: comp. stars used from nearby Henden seq. for FG Sge [BOU]. Mar. 20.74: *B–V* values of comp. stars were +0.54, +0.70, and +0.80 [OHS]. Mar. 23.86: small object that appeared quite condensed w/ a prominent central cond. at high power (200×) [PEA]. Mar. 25.53: coma appeared elongated in ENE-WSW direction [PEA]. Mar. 27.14: comet close to star of mag 12; comp. stars taken from Henden seq. for PU Vul [BOU]. Mar. 28.82: *B–V* values of comp. stars were +0.32, +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Mar. 30.14: comp. stars taken from Henden seq. for PU Vul [BOU]. Apr. 15.78: fainter using Swan Band filter [SEA]. Apr. 15.78: `Guide 8.0` software used for comp.-star mags [YOS02]. Apr. 16.00 and 22.04: `Guide 8.0` software used for comp.-star mags [NAG09]. Apr. 16.79 and 23.77: `StellaNavigator ver. 6` software used for comp.-star mags [NAG08]. Apr. 17.02: in 36-cm L, bright coma surface; fanlike tail probable [BAR06]. Apr. 17.71: `StellaNavigator ver. 6.1` software used for comp.-star mags [KON03]. Apr. 23.80: *B–V* values of comp. stars were +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Apr. 23.86: prominent starlike central cond. clearly seen, which has increased the overall condensed nature of this comet over the last 24 hr [PEA].

◇ *Comet C/2003 L2 (LINEAR)* ⟹ 2004 Feb. 12.45: *B–V* values of comp. stars were +0.62, +0.67, and +0.85 [NAK01].

◇ *Comet C/2003 O1 (LINEAR)* ⟹ 2004 Mar. 28.77: *B–V* values of comp. stars were +0.32, +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01]. Mar. 31.76: *B–V* values of comp. stars were +0.51, +0.63, +0.68, +0.72, +0.73, and +0.85 [NAK01].

◇ *Comet P/2003 S1 (NEAT)* ⟹ 2004 Feb. 10.45: *B–V* values of comp. stars were +0.62, +0.67, and +0.85 [NAK01].

◇ *Comet P/2003 S2 (NEAT)* ⟹ 2004 Feb. 10.47: *B–V* values of comp. stars were +0.62, +0.67, and +0.85 [NAK01]. Feb. 18.46: *B–V* values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01].

Comet C/2003 T2 (LINEAR) $\Longrightarrow$ 2003 Nov. 4.85 and Dec. 9.69: moonlight [HOR02]. Nov. 29.90: dense star field [HOR02]. Dec. 7.76: strong moonlight [HOR02]. 2004 Feb. 13.45: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.53$ [NAK01]. Feb. 18.45: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01].

◇ *Comet C/2003 T3 (Tabur)* $\Longrightarrow$ 2004 Apr. 25.16: obs. through the tail of nearby C/2004 F4! [GON05].

◇ *Comet C/2003 T4 (LINEAR)* $\Longrightarrow$ 2003 Nov. 9.06: during total lunar eclipse [HOR02]. Nov. 29.92: comet close to star [HOR02]. 2004 Jan. 28.49, Feb. 10.54, and Mar. 9.46: `Guide 8.0` software used for comp.-star mags [TSU02]. Jan. 28.49 and Feb. 10.54: comp. star has $B-V = +0.49$ [TSU02]. Feb. 13.52: `Guide 8.0` software used for comp.-star mags; $B-V$ values of comp. stars are +0.75 and +0.80 [NAK01]. Feb. 18.52 and Mar. 14.62: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 18.52: comp. star has $B-V = +0.67$ [OHS]. Mar. 9.46: comp. star has $B-V = +0.31$ [TSU02]. Mar. 14.62: $B-V$ values of comp. stars were +0.64, +0.78, and +0.88 [OHS]. Apr. 8.46: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2003 V1 (LINEAR)* $\Longrightarrow$ 2003 Nov. 9.04: during total lunar eclipse [HOR02]. Nov. 29.99: comet close to bright star [HOR02]. Dec. 7.95: moonlight [HOR02]. 2004 Jan. 28.51: comp. star has $B-V = +0.60$ [TSU02]. Jan. 28.51, Feb. 10.60, 17.62, and Mar. 13.55: `Guide 8.0` software used for comp.-star mags [TSU02]. Jan. 31.74 and Apr. 24.53: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 10.60: comp. star has $B-V = +0.30$ [TSU02]. Feb. 16.66: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.66$ [OHS]. Feb. 17.62: comp. star has $B-V = +0.47$ [TSU02]. Feb. 18.62: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Mar. 13.55: comp. star has $B-V = +0.54$ [TSU02]. Mar. 15.58 and 26.55: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 8.56: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2003 W1 (LINEAR)* $\Longrightarrow$ 2004 Feb. 10.49: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85 [NAK01]. Feb. 13.48: `Guide 8.0` software used for comp.-star mags; $B-V$ values of comp. stars are +0.56 and +0.59 [NAK01].

◇ *Comet P/2003 WC$_7$ (LINEAR-Catalina)* $\Longrightarrow$ 2004 Feb. 12.47: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85; faint tail extends eastward [NAK01]. Feb. 18.50: comp. star has $B-V = +0.67$ [OHS]. Feb. 18.50 and Mar. 14.48: `Guide 8.0` software used for comp.-star mags [OHS]. Mar. 14.48: $B-V$ values of comp. stars were +0.64, +0.78, and +0.88 [OHS]. Apr. 8.45 and 11.46: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2003 WT$_{42}$ (LINEAR)* $\Longrightarrow$ 2004 Feb. 10.51: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85 [NAK01]. Mar. 13.43: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.58$ [TSU02].

◇ *Comet P/2004 A1* $\Longrightarrow$ 2004 Jan. 28.56: `Guide 8.0` software used for comp.-star mags; comp. star has $B-V = +0.40$ [TSU02]. Jan. 31.70: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Feb. 10.49, 16.64, and 28.69: `Guide 8.0` software used for comp.-star mags [OHS]. Feb. 10.49: comp. star has $B-V = +0.95$ [OHS]. Feb. 12.54: $B-V$ values of comp. stars were +0.45, +0.59, +0.63, +0.83, and +0.85 [NAK01]. Feb. 16.64: comp. star has $B-V = +0.66$ [OHS]. Feb. 18.55: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Feb. 28.69: $B-V$ values of comp. stars are +0.53, +0.57, and +0.84 [OHS]. Mar. 12.52: $B-V$ values of comp. stars were +0.43, +0.55, and +0.85 [NAK01]. Mar. 26.53: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 8.49: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 24.54: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01].

◇ *Comet C/2004 B1 (LINEAR)* $\Longrightarrow$ 2004 Feb. 10.52 and 12.50: $B-V$ values of comp. stars were +0.62, +0.67, and +0.85 [NAK01]. Feb. 18.49: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01].

◇ *Comet C/2004 C1 (Larsen)* $\Longrightarrow$ 2004 Feb. 15.71, Mar. 15.57, and 26.57: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Feb. 18.60: $B-V$ values of comp. stars were +0.55, +0.60, +0.75, and +0.85 [NAK01]. Mar. 20.54: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Apr. 8.51 and 11.53: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet P/2004 CB (LINEAR)* $\Longrightarrow$ 2004 Apr. 23.81: $B-V$ values of comp. stars were +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01].

◇ *Comet P/2004 DO$_{29}$ (Spacewatch-LINEAR)* $\Longrightarrow$ 2004 Mar. 18.67: $B-V$ values of comp. stars were +0.32, +0.48, +0.55, +0.66, and +0.80 [NAK01]. Mar. 20.56: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Apr. 20.56: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01].

◇ *Comet C/2004 DZ$_{61}$ (Catalina-LINEAR)* $\Longrightarrow$ 2004 Mar. 15.69 and Apr. 20.60: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01].

◇ *Comet P/2004 EW$_{38}$ (Catalina-LINEAR)* $\Longrightarrow$ 2004 Apr. 20.62: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01].

◇ *Comet P/2004 F1 (NEAT)* $\Longrightarrow$ 2004 Mar. 20.60: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01]. Mar. 26.64 and Apr. 20.58: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 8.53 and 11.58: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2004 F2 (LINEAR)* $\Longrightarrow$ 2004 Mar. 31.80: $B-V$ values of comp. stars were +0.51, +0.63, +0.68, +0.72, +0.73, and +0.85 [NAK01]. Apr. 23.75: $B-V$ values of comp. stars were +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84

[NAK01].

◇ *Comet P/2004 F3 (NEAT)* ⟹ 2004 Mar. 31.71: $B-V$ values of comp. stars were +0.51, +0.63, +0.68, +0.72, +0.73, and +0.85 [NAK01]. Apr. 8.55 and 11.62: eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01]. Apr. 20.65: $B-V$ values of comp. stars were +0.48, +0.51, +0.55, +0.63, +0.80, and +0.85 [NAK01]. Apr. 24.63: $B-V$ values of comp. stars were +0.48, +0.55, and +0.80 [NAK01].

◇ *Comet C/2004 F4 (Bradfield)* ⟹ 2004 Apr. 23.21, 25.12, and 27.16: mountain location, clear sky [GON05]. Apr. 23.21 and 25.12: mag estimate corrected for atmospheric extinction with *ICQ* 'winter' table [GON05]. Apr. 23.21: comet's alt. only 5°; short fanned dust tail visible in nautical twilight [GON05]. Apr. 23.79 and 24.79: `The Sky ver. 5` software used for comp.-star mags [MIT]. Apr. 23.799: 35-mm $f/2.8$ lens + CCD shows a tail ≈ 12° long, extending to around the position of α And (C/2002 T7 in Psc also visible on image; reported via S. Nakano, from *Hoshi-no-Hiroba Circular* HAL No. 73) [Tetuo Kudo, Kumamoto, Japan]. Apr. 23.80 and 24.80: `StellaNavigator ver. 6` software used for comp.-star mags [NAG08]. Apr. 24.07: comet showed a small, bright coma, but no tail was seen visually; quite challenging obs. due to low alt. (4°.5) and nautical twilight (sun 11° below horizon); the field was subsequently imaged using a Minolta DiMAGE Z1 digital camera with a 58-mm-focal-length $f/3.5$ lens, w/ an image from Apr. 24.078 (exp. 2 sec, ISO 200) showing a coma of size ≈ 1′, and there was a hint of an 8′-long tail in p.a. 300° [GRA04]. Apr. 24.08: comet easily visible in binoculars; almost-stellar coma w/ short tail; comp. stars η (38) And and ϕ (85) Psc were both at similar alt. as the comet, and no extinction correction was applied; clear sky [DAH]. Apr. 24.39: twilight; remarkably uniform-looking tail, almost resembling a lighthouse beam, with high surface brightness; coma very condensed [CRE01]. Apr. 24.79: `Guide 7.0` software used for comp.-star mags [MIY01]. Apr. 24.81 and 25.81: `Guide 8.0` software used for comp.-star mags [YOS02]. Apr. 25.12: very low alt.; beg. of astron. twilight; tail 8°.5 long visible to naked eye [GON05]. Apr. 25.80: `Guide 8.0` software used for comp.-star mags [NAG04]. Apr. 25.80: `Guide 8.0` software used for comp.-star mags [TSU02]. Apr. 27.08, 29.07, and 30.07: `Guide 8.0` software used for comp.-star mags [NAG09]. Apr. 27.09: appearance of comet very reminiscent of C/1980 Y1 (Bradfield) in early Jan. 1981; in 25.4-cm J, the head of the comet looked like a very compact unresolved globular cluster w/ dia. ≈ 1′.5 [BOU]. Apr. 27.16: astron. twilight; comet visible to naked eye; comp. stars at the same low alt. as the comet [GON05]. Apr. 27.37: obs. from Salt Fork State Park, near Cambridge, OH; stunning binocular object; first 3° of tail quite prominent — fans out noticeably by 4° from coma, w/ a brighter, narrow core in the first 1° of the tail; w/ naked eye, ≃ 2° of tail visible; "in the nearly 20 years I've observed comets, I've never seen a 5th-mag comet < 10° above the horizon with such a prominent tail" [CRE01]. Apr. 28.01: strong central starlike cond.; parabolic tail slightly curved clockwise [BAR06]. Apr. 29.08: `Guide 7.0` software used for comp.-star mags [SAR02]. May 1.07: moon and low cirrus; comp. stars at the same alt. as the comet; despite the bad conditions, the tail was clearly seen [MEY].

[text continued on page 78]

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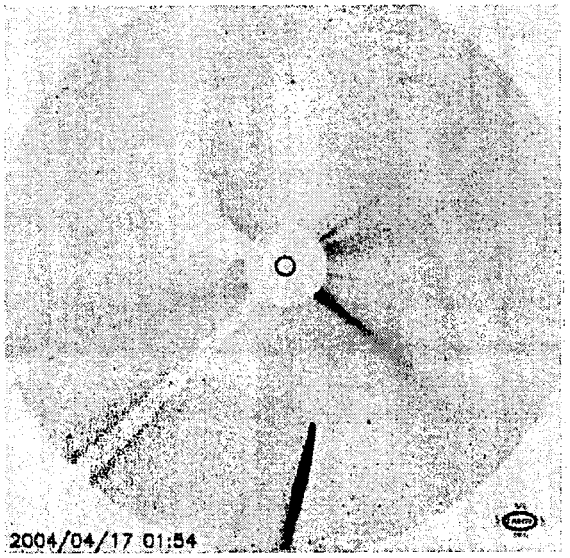
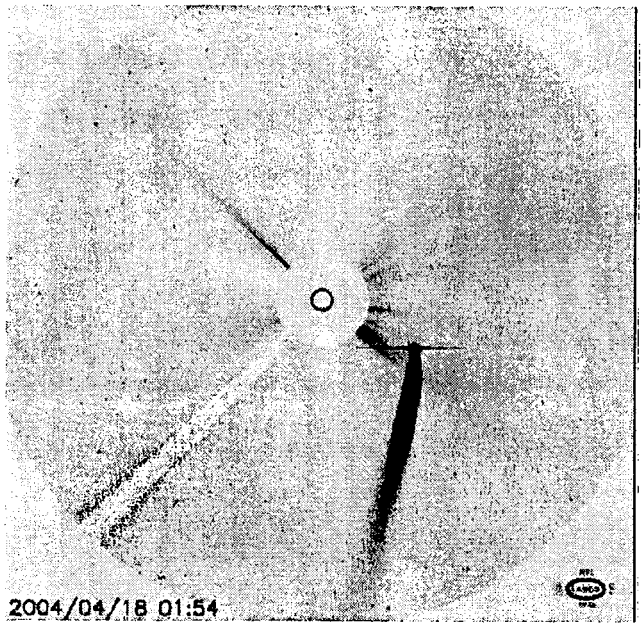
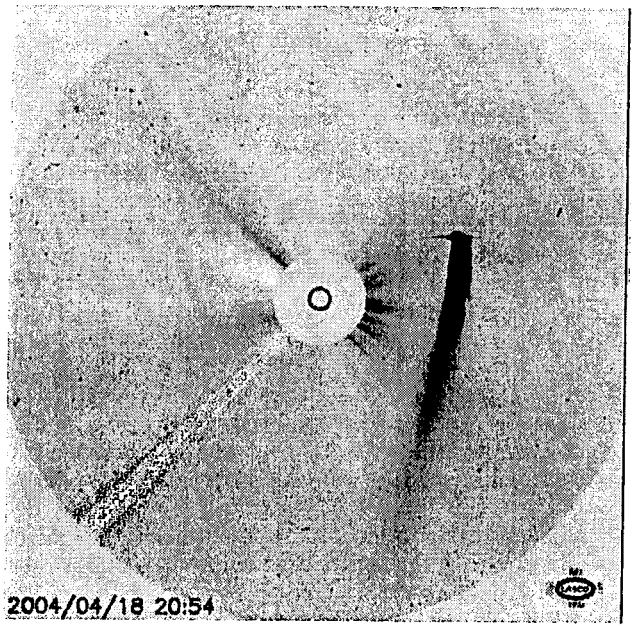
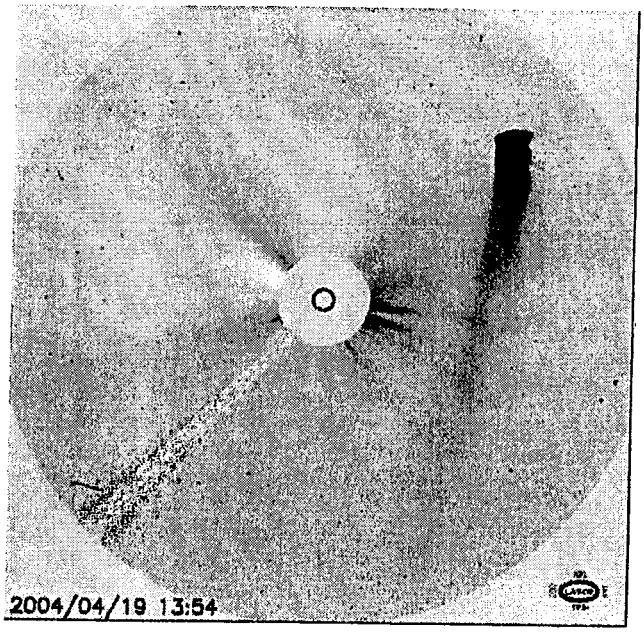
Below: two images from the SOHO LASCO/C3 coronagraph showing comet C/2004 F4 on 2004 Apr. 17.079 and 18.079 UT as it rounded the sun. The horizontal line through the comet's head in the right-hand image is due to saturation of the CCD pixels from the comet's brightness.









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Three additional SOHO S3 images showing comet C/2004 F4 on Apr. 18.871 (upper left), 19.579 (upper right), and 19.954 UT (lower left). Just over three days later, as the comet moved back into view of ground-based observers, Michael Jäger and Gerald Rhemann imaged the comet on Apr. 23.08 with a red filter and a 280-mm f/4 APO telephoto lens (lower right).

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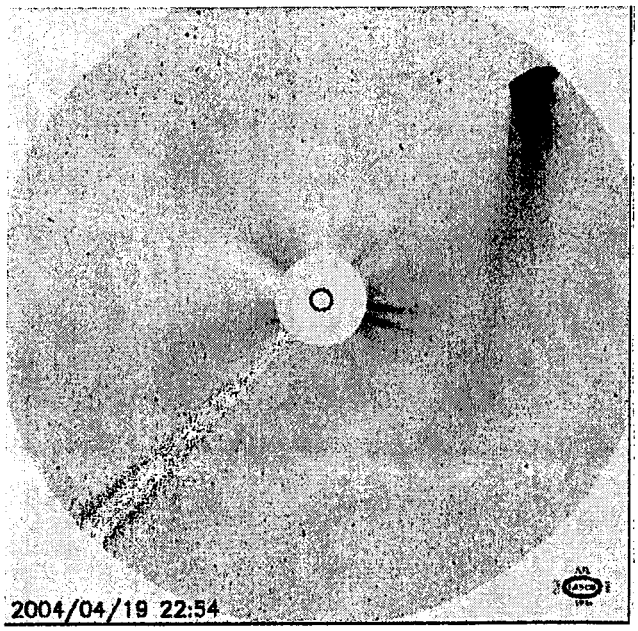

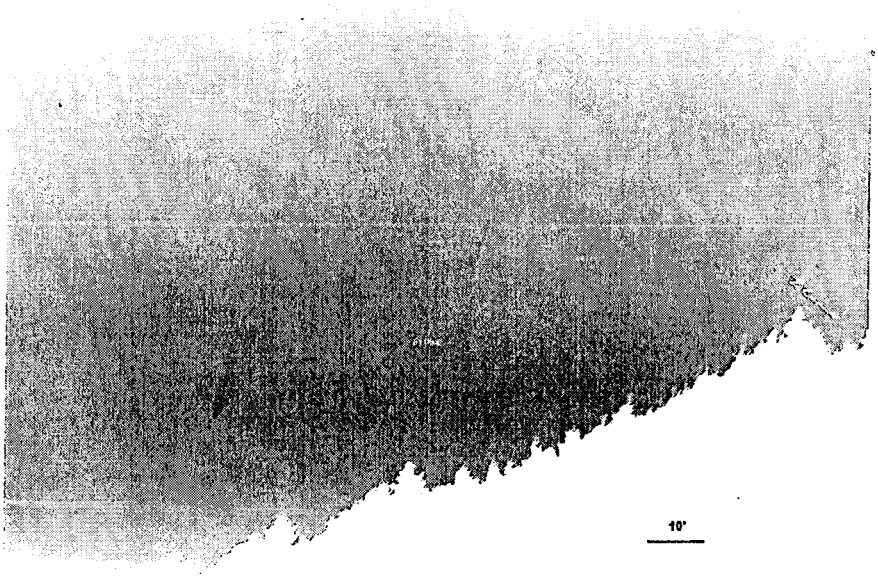

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Above: Image of C/2004 F4 taken by Jäger and Rhemann (near Vienna, Austria) on 2004 Apr. 22.118 UT, about 70 min before sunrise, with an APO 180-mm f/3.3 telephoto lens (+ red filter; six 4-min exposures). The original image shows a tail ≈ 1°.5 long. Three stars are labelled in the image — 81 Psc to the right of the comet, 79 Psc above comet near top edge, and 84 Psc to upper left of comet near left edge. The bar at lower right indicates 10′, and the arrow at center right indicates that north is to the upper left.

Below: Photograph of C/2004 F4 taken by J. J. Gonzalez from the Cantabrian Mountains, at Alto del Castro (elevation 1717 m) near Leon, Spain, on 2004 Apr. 27.14. Gonzalez used a Nikkor 50-mm f/1.8 lens and Fuji Superia 800 color positive film (25-sec exposure). The brightest star in the field (to upper left of comet) is β And.

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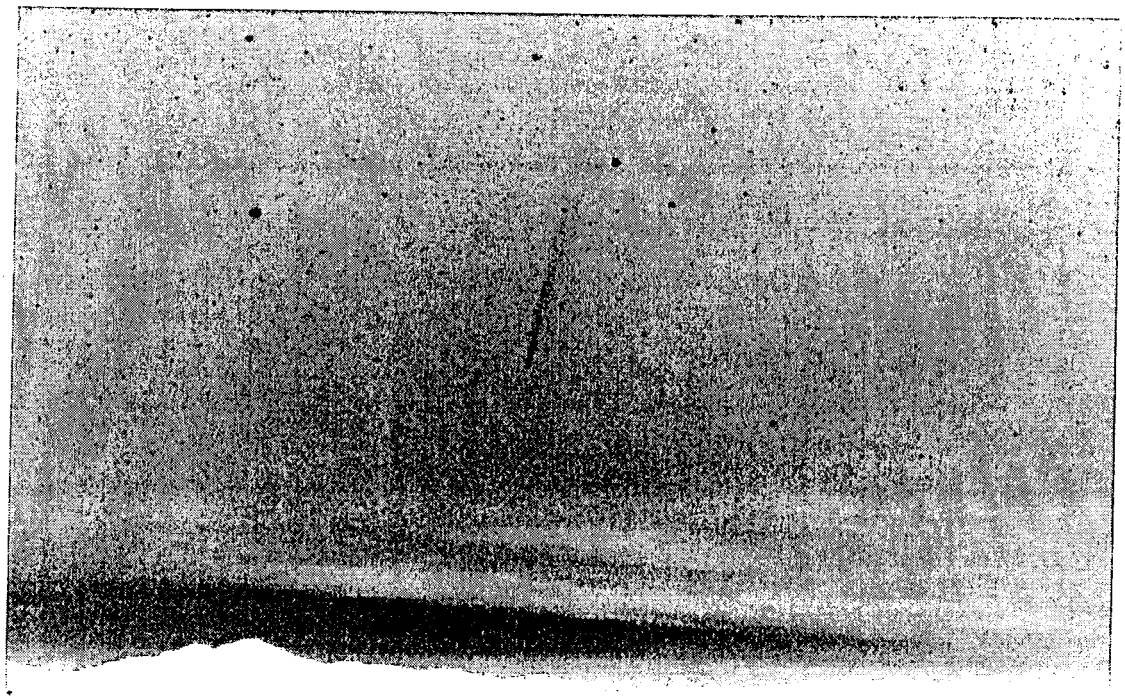
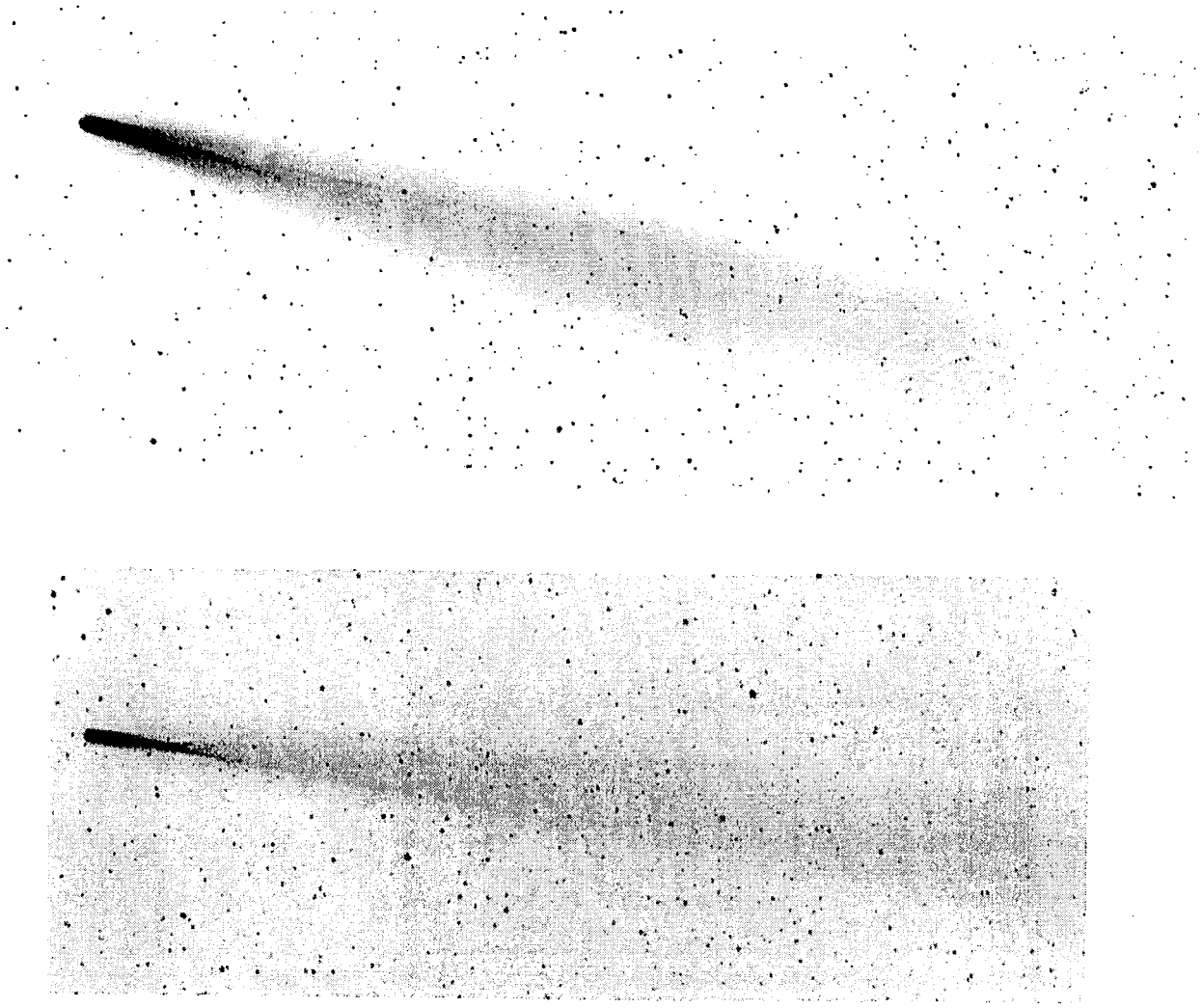


C/2004 F4 (Bradfield) – 27.14 UT Abril 2004 – J. J. González



Two images of C/2004 F4 from Jäger and Rhemann with a 20-cm Celestron Schmidt camera. Top image: 3° × 1° field showing a mosaic taken from LRGB CCD exposures totalling 10 minutes, centered on 2004 Apr. 28.122 UT. Bottom image: taken on Apr. 30.115.

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[text continued from page 75]

◇ *Comet C/2004 G1 (LINEAR)* ⟹ 2004 Apr. 11.70: tail expands in W-SW; eight ref. stars w/ $B-V = +0.45$ to +0.85 yield same mag [NAK01].

◇ *Comet C/2004 H1 (LINEAR)* ⟹ 2004 Apr. 20.52 and 24.51: Guide 8.0 software used for comp.-star mags [NAK01]. Apr. 20.52: $B-V$ values of comp. stars are +0.43, +0.50, and +0.96 [NAK01]. Apr. 24.51: $B-V$ values of comp. stars are +0.29 and +0.37 [NAK01].

◇ *Comet P/2004 H2 (Larsen)* ⟹ 2004 Apr. 23.72: $B-V$ values of comp. stars were +0.66, +0.68, +0.72, +0.73, +0.76, and +0.84 [NAK01].

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Key to observers with observations published in this issue, *with 2-digit numbers between Observer Code and Observer's Name indicating source [07 = Comet Section, British Astronomical Association; 11 = Dutch Comet Section (Werkgroep Kometen); 16 = Japanese observers (via Akimasa Nakamura, Kuma, Japan); 35 = South American observers (c/o Jose G. de Souza Aguiar, Brazil); 42 = Belarus observers (c/o V. S. Nevski and S. E. Shurpakov, Vitebsk); 48 = Ukrainian observers (c/o Denis A. Svechkarev); etc.]:*

ADA02 18 Jacek Adamik, Poland
AMO01 35 Alexandre Amorim, Brazil
BAL04 32 J. Balogh, Hosszúhetény, Hungary
BAL07 35 Gustavo E. Ballan, Argentina

BAR06	37	A. Baransky, Okhnovka, Ukraine
BEG01	15	Mike Begbie, Harare, Zimbabwe
*BEN06		David Benn, Tasmania, Australia
BOH02	18	Jerzy Bohusz, Gdynia, Poland
BOU		Reinder J. Bouma, Netherlands
BUS01	11	E. P. Bus, The Netherlands
BUS02	35	V. A. Buso, Rosario, Argentina
CER01	23	Jakub Černý, Praha, Czech Rep.
CHE03	33	Kazimieras T. Cernis, Lithuania
CHR	18	Antoni Chrapek, Pikulice, Poland
COM	11	Georg Comello, The Netherlands
COO02		Tim P. Cooper, South Africa
CRE01		Phillip J. Creed, OH, U.S.A.
CSO	32	Tibor Csörgei, Slovak Republic
CSU	32	Mátyás Csukás, Salonta, Romania
DAH	24	Haakon Dahle, Norway
DES01		Jose G. de Souza Aguiar, Brazil
DIE02		Alfons Diepvens, Belgium
DIJ		Edwin van Dijk, The Netherlands
DOR02	18	Dariusz Dorosz, Poland
EZA	16	Y. Ezaki, Toyonaka, Osaka, Japan
FIL04	18	Marcin Filipek, Poland
GEY	14	M. J. Geyser, South Africa
GIA01		A. Giambersio, Potenza, Italy
GON05		Juan Jose Gonzalez, Spain
GRA04	24	Bjoern Haakon Granslo, Norway
GRA09	18	K. Graczewski, Izabelin, Poland
GRE		Daniel W. E. Green, U.S.A.
GUZ	18	Piotr Guzik, Krosno, Poland
HAS02		Werner Hasubick, Germany
HOE		Sebastian F. Hoenig, Germany
HOR02	23	Kamil Hornoch, Czech Rep.
*HOR03	23	Petr Horalek, Czech Republic
*JAR02	18	Maciej Jarmoc, Bialystok, Poland
KAM01		A. Kammerer, Ettlingen, Germany
KAR02	21	Timo Karhula, Virsbo, Sweden
KID01	18	Krzysztof Kida, Elblag, Poland
KON03	16	Eitoshi Konno, Iwate, Japan
KOS		A. Kósa-Kiss, Salonta, Romania
*KUG		Francois Kugel, France
KWI	18	Maciej Kwinta, Krakow, Poland
LAB02		C. Labordena, Castellon, Spain
LEH		Martin Lehky, Czech Republic
LIG		R. Ligustri, Latisana, Italy
MAK02	18	Pawel Maksym, Lodz, Poland
MAN02	23	Roman Maňák, Lipov, Czech Rep.
MAN04		Luis A. Mansilla, Argentina
MAR02	13	Jose Carvajal Martinez, Spain
MAT08		Michael Mattiazzo, S. Australia
MEY	28	Maik Meyer, Germany
MIT	16	Shigeo Mitsuma, Saitama, Japan
MIY01	16	Osamu Miyazaki, Ibaraki, Japan
MOM	16	Masahiko Momose, Nagano, Japan
MOR		Charles S. Morris, U.S.A.
NAG04	16	Kazuro Nagashima, Nara, Japan
NAG08	16	Yoshimi Nagai, Nagano, Japan
NAG09	32	Miklós Nagy, Csenger, Hungary
NAK01	16	Akimasa Nakamura, Ehime, Japan
NAV02		Jose P. Navarro Pina, Spain
NED	23	Martin Nedved, Praha, Czech Rep.
NEK		A. N. Nekrasov, Baran, Belarus
NEV	42	V. S. Nevski, Vitebsk, Belarus
OHS	16	Yuuji Ohshima, Nagano, Japan
PEA	14	Andrew R. Pearce, Australia
PLE01	18	Janusz Pleszka, Poland
POW01	18	Jacek Powichrowski, Poland
PRI04	15	David Pringlewood, Zimbabwe
RAE		Stuart T. Rae, New Zealand
RES	18	M. Reszelski, Szamotuly, Poland
RIE	11	Hermanus Rietveld, Netherlands
*ROB06		Walter R. Robledo, Argentina
ROM	42	Aleksandr M. Romancev, Belarus
SAJ	32	András Sajtz, Satu-Nou, Romania
SAN04	38	Juan Manuel San Juan, Spain
SAN07	32	G. Sánta, Kisujszállás, Hungary
SAR02	32	K. Sárneczky, Budapest, Hungary
SCA02		Toni Scarmato, Calabria, Italy
SCH04	11	Alex H. Scholten, Netherlands
SCI		Tomasz Sciezor, Poland
SEA	14	David A. J. Seargent, Australia
SEM02	42	Andrey S. Semenyuta, Kazakstan
SER	42	Ivan M. Sergey, Belarus
SHA02	07	Jonathan D. Shanklin, England
SHU	42	Sergey E. Shurpakov, Belarus
SOU01	35	Willian Carlos de Souza, Brazil
*SUZ03	16	Junji Suzuki, Tokyo, Japan
SVE01	48	Denis A. Svechkarev, Ukraine
SWI	18	Mariusz Swietnicki, Poland
TOT03	32	Zoltán Tóth, Hungary
TSU02	16	Mitsunori Tsumura, Japan
TUR01	18	Pawel Turek, Krakow, Poland
*VAN15	15	Koos van Zyl, South Africa
*VAN16		David Vansteelant, Belgium
YOS02	16	Katsumi Yoshimoto, Japan
YOS04	16	Seiichi Yoshida, Ibaraki, Japan
*YOU03		Karen Young, CA, U.S.A.
YUM	35	Raquel Yumi Shida, Brazil

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TABULATED VISUAL DATA (also format for old-style CCD data)

NOTE: As begun in the October 2001 issue, the CCD and visual tabulated data are separated. The tabulated CCD data are also now generally further separated into two "CCD" sections: the first in the old format for those observations submitted only in the old format, and the second in the new format (whose columns are described on page 208 of the July 2002 *ICQ*).

The headings for the tabulated data are as follows: "DATE (UT)" = Date and time to hundredths of a day in Universal Time; "N" = notes [* = correction to observation published in earlier issue of the *ICQ*; an exclamation mark (!) in this same location indicates that the observer has corrected his estimate in some manner for atmospheric extinction (prior to September 1992, this was the standard symbol for noting extinction correction, but following publication of the extinction paper — July 1992 *ICQ* — this symbol is only to be used to denote corrections made using procedures different from that outlined by Green 1992, *ICQ* **14**, 55-59, and in Appendix E of the *ICQ Guide to Observing Comets* — and then only for situations where the observed comet is at altitude > 10°); '&' = comet observed at altitude 20° or less with no atmospheric extinction correction applied; '$' = comet observed at altitude 10° or lower, observations corrected by the observer using procedure of Green (*ibid.*); for a correction applied by the observer using Tables Ia, Ib, or Ic of Green (*ibid.*), the letters 'a', 'b', or 's', respectively, should be used; x indicates that a secondary source (often amateur computer software) was used to get supposedly correct comparison-star magnitudes from an accepted catalogue].

"MM" = the method employed for estimating the total (visual) magnitude; see article on page 186 of the Oct. 1996 issue [B = VBM method, M = Morris method, S = VSS or In-Out method, I = in-focus, C = unfiltered CCD, c = same as 'C', but for 'nuclear' magnitudes, V = electronic observations — usually CCD — with Johnson *V* filter, *etc.*]. "MAG." = total (visual) magnitude estimate; a colon indicates that the observation is only approximate, due to bad weather conditions, *etc.*; a left bracket ([) indicates that the comet was not seen, with an estimated limiting magnitude given (if the comet IS seen, and it is simply estimated to be fainter than a certain magnitude, a "greater-than" sign (>) must be used, not a bracket). "RF" = reference for total magnitude estimates (see pages 98-100 of the October 1992 issue, and Appendix C of the *ICQ Guide to Observing Comets*, for all of the 1- and 2-letter codes; an updated list is also maintained at the *ICQ* World Wide Website). "AP." = aperture in centimeters of the instrument used for the observations, usually given to tenths. "T" = type of instrument used for the observation (R = refractor, L = Newtonian reflector, B = binoculars, C = Cassegrain reflector, A = camera, T = Schmidt-Cassegrain reflector, S = Schmidt-Newtonian reflector, E = naked eye, *etc.*). "F/" and "PWR" are the focal ratio and power or magnification, respectively, of the instrument used for the observation — given to nearest whole integer (round even); note that for CCD observations, in place of magnification is given the exposure time in seconds [see page 11 of the January 1997 issue; a lower-case "a" indicates an exposure time under 1000 seconds, an upper-case "A" indicates an exposure time of 1000-1999 seconds (with the thousands digit replaced by the "A"), an upper-case "B" indicates an exposure time of 2000-2999 seconds (with the thousands digit replaced by the "B"), etc.].

"COMA" = estimated coma diameter in minutes of arc; an ampersand (&) indicates an approximate estimate; an exclamation mark (!) precedes a coma diameter when the comet was not seen (*i.e.*, was too faint) and where a limiting magnitude estimate is provided based on an "assumed" coma diameter (a default size of 1′ or 30″ is recommended; cf. *ICQ* **9**, 100); a plus mark (+) precedes a coma diameter when a diaphragm was used electronically, thereby specifying the diaphragm size (i.e., the coma is almost always larger than such a specified diaphragm size). "DC" = degree of condensation on a scale where 9 = stellar and 0 = diffuse (preceded by lower- and upper-case letters S and D to indicate the presence of stellar and disklike central condensations; cf. July 1995 issue, p. 90); a slash (/) indicates a value midway between the given number and the next-higher integer. "TAIL" = estimated tail length in degrees, to 0.01 degree if appropriate; again, an ampersand indicates a rough estimate. Lower-case letters between the tail length and the p.a. indicate that the tail was measured in arcmin ("m") or arcsec ("s"), *in which cases the decimal point is shifted one column to the right.* "PA" = estimated measured position angle of the tail to nearest whole integer in degrees (north = 0°, east = 90°). "OBS" = the observer who made the observation (given as a 3-letter, 2-digit code).

A complete list of the Keys to abbrevations used in the *ICQ* is available from the Editor for $4.00 postpaid (available free of charge via e-mail); these Keys (with the exception of the Observer Codes) are also available in the *Guide to Observing Comets* and via the *ICQ*'s World Wide Web site. *Please note that data in archival form, and thus the data to be sent in machine-readable form, use a format that is different from that of the Tabulated data in the printed pages of the ICQ;* see pages 59-61 of the July 1992 issue, p. 10 of the January 1995 issue, and p. 100 of the April 1996 issue for further information [note correction on page 140 of the October 1993 issue]. Further guidelines concerning reporting of data may be found on pages 59-60 of the April 1993 issue, and in the *ICQ Guide to Observing Comets.*

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NOTE: *The new-style CCD tabulated data begin on page 100 of this issue.*

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Visual Data

Comet 2P/Encke

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 10 18.86	x	S	12.0:	TT	30	L	6	60	& 4	1			FIL04
2003 10 18.88	x	S	12.6	HS	20	L	5	110	0.8	3			POW01
2003 10 19.92	x	S	12.7	HS	20	L	5	110	0.8	3			POW01
2003 10 23.86	x	S	12.4	HS	20	L	5	50	1.2	2/			POW01
2003 10 24.88	x	S	11.7	HS	25	L	6	54	2	1			SWI

Comet 2P/Encke [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 10 24.91	x	S	12.6	HS	20	L	5	50	1	2			POW01
2003 10 24.91	x	S	13.0:	TJ	31.7	L	5	78	& 1	1			ADA02
2003 10 25.92		M	10.2	AC	15.0	L	7	42	1.5	6			BEG01
2003 10 25.92	x	S	11.5:	TJ	20	L	5	58	3	1			SWI
2003 10 27.80	x	S	12.0	TJ	35	L	6	105	& 1	2			CHR
2003 10 28.74	x	S	11.3	TK	25	L	5	93	2.3	1			BOH02
2003 10 28.75	x	S	11.6	TJ	25	L	6	108	2	1			SWI
2003 10 28.80		S	12.3	HS	35	L	5	158	2.5	1/			HOR02
2003 10 28.92	x	S	12.0	TT	20	L	5	80	1.6	1			POW01
2003 11 02.98		S	9.5	TI	7.6	L	9	18	8	2			CER01
2003 11 04.08	x	S	10.3	TJ	18.5	L	5	53	3	1/			KWI
2003 11 05.08		S	8.7	TI	11.4	L	8	23	7	2			CER01
2003 11 06.79		S	10.5	TK	35	L	5	68	4	1			HOR02
2003 11 11.69	x	S	9.5	TJ	20	L	5	58	4	1			SWI
2003 11 11.70		S	8.4	TT	8.0	B		10	12	1			HOR02
2003 11 12.68	x	S	9.5	TJ	31.7	L	5	78	& 5	2			ADA02
2003 11 12.69	x	S	9.1	TJ	20	L	5	58	5	1			SWI
2003 11 12.71		S	8.2	TT	8.0	B		10	15	1/			HOR02
2003 11 12.71		S	8.3	TK	6.0	B		20	8	3			BAR06
2003 11 13.68	x	S	11.0	TJ	35	L	6	105	& 3	d1			CHR
2003 11 13.69	x	S	9.5	TJ	31.7	L	5	78	& 5	2			ADA02
2003 11 16.74	x	S	9.3	TT	30	L	6	105	& 4	1/			FIL04
2003 11 19.71		S	7.3	TK	5.0	B		7	14	3			GRA04
2003 11 19.72		S	7.2	TT	8.0	B		10	19	1/			HOR02
2003 11 19.76		S	7.1	TK	7.0	R	7	15	17	2/			GRA04
2003 11 20.72	x	S	10.5	TJ	35	L	6	105	& 3	d1			CHR
2003 11 21.70	x	S	8.4	TJ	7.0	B		15	7	2			SWI
2003 11 21.70	x	S	9.6	TJ	35	L	6	105	& 5	d2			CHR
2003 11 21.83		S	7.2	TK	6.0	B		20	17	1			BAR06
2003 11 22.69	x	S	8.2	TJ	7.0	B		15	7	2			SWI
2003 11 22.82		S	7.1	TK	6.0	B		20	15	1			BAR06
2003 11 23.65	x	B	7.5	TK	5.0	B		20	15	2			DOR02
2003 11 23.68		S	6.9	TK	5.0	B		10	18	2			BAR06
2003 11 23.72		M	7.0	AA	5.0	B		10	8	5			BEG01
2003 11 24.65	x	B	8.0	TK	5.0	B		20	15	2			DOR02
2003 11 26.69	x	S	7.9	TJ	25	L	5	66	& 5	1			KID01
2003 11 27.66	x	B	7.6	TK	5.0	B		20	7	3			DOR02
2003 11 27.66	x	S	7.9	TJ	5.0	B		10	12	1/			PLE01
2003 11 27.67	x	S	8.2:	TT	6.7	B		20	& 7	2			SCI
2003 11 27.69	x	S	7.4	TJ	6.0	B		20	& 7	2			ADA02
2003 11 27.73	x	S	7.7	TT	6.6	B		20	& 6	d3			FIL04
2003 11 27.74	x	S	8.1	TJ	18.5	L	5	53	5	1			KWI
2003 12 01.70	x&	S	7.5	TT	6.6	B		20	& 7	3/			FIL04
2003 12 01.73	x	B	8.3	HS	50	L	5	100	& 6	2			TUR01
2003 12 02.65		S	6.7:	TK	5	R		24	14	2			BAR06
2003 12 02.66	x	S	7.5:	TK	10	M	10	50	8	3			DOR02
2003 12 03.65		S	6.8:	TK	5	R		24	10	2			BAR06
2003 12 04.70		M	6.7	TK	7.0	R	7	15	8	3/			GRA04
2003 12 04.70		S	6.7	TK	5.0	B		7	8				GRA04
2003 12 06.69		S	6.0	TT	8.0	B		10	17	1/			HOR02
2003 12 07.68		S	6.0:	TT	8.0	B		10	14	2			HOR02
2003 12 24.70		E	6.1	HD	6	L	7	33	6	4			ROM

Comet 29P/Schwassmann-Wachmann

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 08 31.97	x	S	13.3	HS	20	L	5	50	1.5	4			POW01
2003 09 02.90	x	S	12.6	TT	30	L	6	105	& 1.5	2			FIL04

Comet 40P/Väisälä

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 21.14	x	S	[14.0	HS	25.0	L	5	91	! 0.5				SAR02
2004 03 18.04		B	14.4	HS	42	L	5	81	0.6	4			LEH
2004 03 25.83		S	[14.0	VN	41	L	4	200	! 0.5				PEA

Comet 40P/Väisälä [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 03 31.08		B	14.5	HS	42	L	5	81	0.5	4			LEH
2004 04 15.71		S	[14.0	VN	41	L	4	200	! 0.5				PEA

Comet 43P/Wolf-Harrington

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 12 19.73		S	12.5:	HS	20.3	L	6	63	1.0	3			GUZ
2003 12 19.81	x	S	12.5	HS	20	L	5	110	1.0	4			POW01
2003 12 23.74	x	S	12.8	TT	30	L	6	105	& 1.5	2			FIL04
2003 12 23.87		M	13.0	HS	35	L	5	158	1.2	3			HOR02
2003 12 24.68		S	12.6	HS	20.3	L	6	63	1.0	4			GUZ
2003 12 25.78		S	12.6	HS	20.3	L	6	63	1.0	4			GUZ
2004 01 11.71		S	12.3	TK	20.3	L	6	63	1.0	4			GUZ
2004 01 14.74		S	13.1	HS	27.0	L	6	83	0.8	4			TOT03
2004 01 19.72		S	[12.0	HS	11.4	L	6	50	! 0.7				SAN07
2004 01 22.76		S	12.9	HS	27.0	L	6	120	0.8	3			TOT03
2004 02 08.75		S	12.7	HS	27.0	L	6	120	1.3	3			TOT03
2004 02 08.80		S	13.0:	HS	30	R	20	300	1.1	3			SHA02
2004 02 11.76		M	12.0	TK	20.3	L	6	63	1.2	4			GUZ
2004 02 11.76		S	12.7	TK	30	L	5	60	0.8	3			NEV
2004 02 15.48		S	12.0	TJ	40.0	L	4	144	1.1	2			YOS04
2004 02 17.80		S	11.7	HN	25.4	J	6	88	1.8	3			DIJ
2004 02 17.80		S	11.9	HN	25.4	J	6	88	1.5	3/			BOU
2004 02 19.75		S	12.5	TK	30	L	5	60	1	3			NEV
2004 02 19.80		S	11.8	HN	25.4	J	6	88	1.5	2/			DIJ
2004 02 19.80		S	12.1	HN	25.4	J	6	88	1.4	3			BOU
2004 02 20.48	x	B	12.7	HS	30.4	L	5	142	0.6	3			NAG04
2004 02 20.73	x	S	12.5	HS	25.0	L	5	91	1.7	s4			SAR02
2004 02 20.78		S	12.0	TK	25.4	J	6	88	1.3	3			BOU
2004 02 20.79		S	11.9	TK	25.4	J	6	88	0.9	2/			DIJ
2004 02 22.79		S	11.9	AC	25.4	J	6	72	1.5	3			DIJ
2004 02 22.80		S	12.0	AC	25.4	J	6	72	1.6	3			BOU
2004 02 23.79		S	12.1	AC	25.4	J	6	88	1.4	3/			BOU
2004 02 23.80		S	11.9	AC	25.4	J	6	88	1.1	3			DIJ
2004 03 09.81		S	12.5	HS	44.0	L	5	226	0.7	4			HAS02
2004 03 12.45		S	12.7	AU	25.4	L	4	113	1.2	3/			YOS02
2004 03 12.73		S	12.2:	TK	20	L	5	70	1.3	3/			BAR06
2004 03 13.76	w	M	12.2	PA	41	L	4	89	0.7	3			SHU
2004 03 13.82		S	11.9	TK	25.4	J	6	88	1.2	3/			BOU
2004 03 13.83		S	11.7	TK	25.4	J	6	88	1.7	4			DIJ
2004 03 14.77		M	12.2	HS	42	L	5	81	1.6	3			LEH
2004 03 15.86		S	11.8	TK	20.3	T	10	77	2	3			GON05
2004 03 17.77		M	12.5	HS	42	L	5	81	1.5	3			LEH
2004 03 21.82		S	11.8	TK	25.4	J	6	72	1.5	3/			BOU
2004 03 22.81		S	12.0	TK	20	L	5	70	1.5	3			BAR06
2004 03 22.82		S	11.7	TK	25.4	J	6	88	1.2	2/			DIJ
2004 03 22.82		S	11.8	TK	25.4	J	6	88	1.5	3			BOU
2004 03 23.82		S	11.7	TK	25.4	J	6	72	1.6	3/			BOU
2004 04 08.84		S	13.0	HS	44.0	L	5	156	0.7	4			HAS02
2004 04 11.84		S	12.0	TK	31.0	J	6	89	1.2	2/			BOU
2004 04 13.79		S	11.7:	HS	20	L	5	70	1.5	3			BAR06
2004 04 14.77		S	11.6	HS	20	L	5	70	1.7	3			BAR06
2004 04 14.87		S	12.0	TK	20.3	T	10	77	1.5	3			GON05
2004 04 15.46		S	12.5	HS	41	L	4	90	1.4	3			PEA
2004 04 15.76		S	11.5	HS	20	L	5	70	1.7	2			BAR06
2004 04 16.78		S	11.8:	HS	20	L	5	70	1.5	2			BAR06
2004 04 17.79		S	12.1	HS	36	L	6	80	1.8	2			BAR06

Comet 81P/Wild

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 03 25.82		S	[14.0	VN	41	L	4	200	! 0.5				PEA

Comet 88P/Howell

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 03 25.71		S	11.1	VN	41	L	4	90	3.0	3			PEA
2004 04 15.76		S	10.3	GA	10.0	B		25	2				SEA
2004 04 15.87	x	S	10.4:	TT	8.0	B		20	4.5	2			PEA
2004 04 15.87	x	S	10.7	TT	41	L	4	90	2.7	3			PEA
2004 04 21.86	x	S	10.4	TT	20	L	4	45	5	3			PEA
2004 04 22.86	x	S	10.4	TT	20	L	4	45	4	3/			PEA
2004 04 22.87	x	S	10.1	TT	8.0	B		20	6	2/			PEA
2004 04 23.85	x	S	10.3	TT	20	L	4	45	4	3			PEA
2004 04 23.86	x	S	9.9	TT	8.0	B		20	6.5	2			PEA
2004 04 25.86	x	S	10.2	TT	20	L	4	45	4.5	3/			PEA
2004 04 25.87	x	S	9.9	TT	8.0	B		20	6	2			PEA
2004 04 26.35		S	10.0	TK	14.3	L		35	2.5	1			AMO01
2004 04 27.33		S	10.5	TK	14.3	L		35	2	5			AMO01
2004 04 28.86	x	S	10.0	TT	20	L	4	45	4.5	3/			PEA
2004 04 28.87	x	S	9.9	TT	8.0	B		20	5.5	3			PEA
2004 04 29.35		S	10.0	TK	14.3	L		35	1.3	5			AMO01
2004 04 29.86	x	S	9.8	TT	8.0	B		20	5.5	3			PEA
2004 04 29.86	x	S	10.0	TT	20	L	4	45	4.5	3/			PEA
2004 04 30.36		S	10.0:	TK	14.3	L		35	1	4			AMO01
2004 05 01.86	x	S	9.9	TT	8.0	B		20	6	2			PEA
2004 05 01.86	x	S	10.2	TT	20	L	4	45	3.5	3/			PEA

Comet 118P/Shoemaker-Levy

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 03 25.72		S[	14.0	VN	41	L	4	200	! 0.5				PEA
2004 03 26.00	a	S	14.3	HN	31.0	J	6	143	0.6	2/			BOU
2004 03 26.00	a	S	14.5	HN	31.0	J	6	143	0.6	1/			DIJ

Comet 123P/West-Hartley

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 01 25.12		S	12.6	HS	27.0	L	6	120	1.3	2			TOT03
2004 02 15.74		S[	13.4	HS	40.0	L	4	144	! 1.0				YOS04
2004 02 21.10	x	S[	14.3	HS	25.0	L	5	91	! 0.5				SAR02
2004 02 21.18		S	13.8	SK	31.0	J	6	143	0.8	3			BOU
2004 02 21.20		S	13.6	SK	31.0	J	6	143	0.7	2			DIJ
2004 02 23.75		S	13.7	HS	40.0	L	4	144	1.0	4			YOS04
2004 03 13.63		S[	13.4	AU	32.0	L	5	87	! 1.0				NAG08
2004 03 13.63	x	S[	13.2	HS	32.0	L	5	87	! 1.0				NAG08
2004 03 14.96		B	13.6	HS	42	L	5	81	1.3	4			LEH
2004 03 17.90		S	12.0	HS	27.0	L	6	120	1.5	2			TOT03
2004 03 17.96		B	13.8	HS	42	L	5	81	1.3	4			LEH
2004 03 23.73		S	13.8	VN	41	L	4	200	0.8	2			PEA
2004 03 25.71		S	13.6	VN	41	L	4	200	1.0	3			PEA
2004 03 26.02		S	13.6	SK	31.0	J	6	143	1.2	2/			DIJ
2004 03 26.02		S	13.7	SK	31.0	J	6	143	1.0	3/			BOU
2004 03 31.06		B	13.8	HS	42	L	5	81	1.2	4			LEH
2004 04 08.85		S	12.7	HS	44.0	L	5	156	1.5	4			HAS02
2004 04 15.69		S	14.0	VN	41	L	4	200	0.7	2			PEA
2004 04 21.89		S[	13.2	HS	27.0	L	6	120	! 1.0				TOT03

Comet 157P/Tritton

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 10 28.11		S	12.2:	HS	11.4	L	9	76	1	4			CER01

Comet C/1983 O1 (Černis)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 07 18.92		B	11.5:	AC	48.0	L	5	65	1.2	3			CHE03
1983 07 19.99		S	10.8:	AC	11.0	B		20		1			CHE03
1983 07 20.02		S	11.5:	AC	48.0	L	5	65					CHE03
1983 07 20.96		B	11.3:	AC	48.0	L	5	65	1.5	3			CHE03
1983 07 21.97		S	11.2:	AC	11.0	B		20					CHE03

Comet C/1983 O1 (Černis) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 07 22.97		S	10.8:	AC	11.0	B		20		1			CHE03
1983 07 25.99		S	10.8:	AC	11.0	B		20		1			CHE03
1983 07 27.99		B	11.0	AC	48.0	L	5	65					CHE03
1983 07 29.92		B	11.0	AC	48.0	L	5	65					CHE03
1983 07 30.93		B	11.2	AC	48.0	L	5	65					CHE03
1983 08 09.95		S	10.3	AC	11.0	B		20	2.5	3			CHE03
1983 08 10.95		S	10.3:	AC	11.0	B		20	2	3			CHE03
1983 08 11.96		S	10.0	AC	11.0	B		20	2	3			CHE03
1983 08 12.95		S	10.5:	AC	11.0	B		20		3			CHE03
1983 08 30.96		B	9.6:	AC	20.0	R	15	120	2	3			CHE03
1983 08 31.92		B	9.5:	AC	20.0	R	15	120	2	3			CHE03
1983 09 01.82		B	9.7	AC	48.0	L	5	65	3				CHE03
1983 09 01.90		B	9.2	AC	11.0	B		20		2			CHE03
1983 09 02.90		B	9.4	AC	11.0	B		20	2.5				CHE03
1983 09 03.85		B	9.5	AC	11.0	B		20	3	2			CHE03
1983 09 05.91		B	9.3	AC	11.0	B		20	3	1			CHE03
1983 09 06.86		B	9.2:	S	11.0	B		20					CHE03
1983 09 09.85		B	9.5	S	11.0	B		20					CHE03
1983 09 15.91		B	9.3:	S	11.0	B		20					CHE03
1983 09 16.79		B	9.2	S	11.0	B		20	2.5	3			CHE03
1983 09 19.92		B	9.3	S	11.0	B		20	2				CHE03
1983 09 26.85		B	9.8	AC	48.0	L	5	65	2	1			CHE03
1983 09 27.73		B	9.8	AC	48.0	L	5	65	2	1			CHE03

Comet C/1985 K1 (Machholz)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 07 18.95		[	9.0:	AC	11.0	B		20					CHE03
1985 07 21.95		[	10.5	AC	48.0	L	5	65					CHE03

Comet C/1985 R1 (Hartley-Good)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 10 28.75		B	7.1	S	11.0	B		20	6	3			CHE03

Comet C/1986 V1 (Sorrells)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 12 09.01		S	9.7	AC	11.0	B		20	3	3			CHE03
1987 01 20.72		S	10.1:	AC	11.0	B		20	2	3			CHE03
1987 01 28.81		S	10.2:	AC	11.0	B		20	2	3			CHE03

Comet C/1987 B1 (Nishikawa-Takamizawa-Tago)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 01 28.85		B	8.4	S	11.0	B		20	5	3			CHE03
1987 01 29.81		B	8.5	S	11.0	B		20	5	3			CHE03

Comet C/1987 P1 (Bradfield)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 12.73		B	7.8	S	11.0	B		20	4	5			CHE03
1987 09 16.64		B	8.1	S	11.0	B		20		4	0.1		CHE03
1987 09 17.64		B	8.0	S	11.0	B		20	4	4	0.1		CHE03
1987 09 17.65		B	8.3	S	25.0	C	5	48		4	0.2		CHE03
1987 09 21.63		B	7.6	S	11.0	B		20	4	5	0.1		CHE03
1987 09 22.63		B	7.3	S	11.0	B		20		5			CHE03
1987 09 22.64		B	6.8:	S	5.0	B		7	5	4			CHE03
1987 09 24.63		B	7.3	S	11.0	B		20		5			CHE03
1987 09 25.63		B	7.2	S	11.0	B		20	5	5			CHE03
1987 10 13.62		B	7.0	S	11.0	B		20		5	0.2	93	CHE03
1988 01 15.68		B	7.0:	S	8.0	B		10	6	3			CHE03

Comet C/1987 Q1 (Rudenko)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 11.73		B	9.0	S	11.0	B		20	1.5	3			CHE03
1987 09 12.72		B	8.8	S	11.0	B		20		3			CHE03
1987 09 13.73		B	9.0	S	11.0	B		20		3			CHE03
1987 09 16.64		B	8.6	S	11.0	B		20	2	3			CHE03
1987 09 17.65		B	8.5	S	11.0	B		20		3			CHE03
1987 09 17.66		B	8.5	S	25.0	C	5	48		3			CHE03
1987 09 18.64		B	8.5	S	11.0	B		20		3			CHE03
1987 09 18.65		B	8.3:	S	25.0	C	5	48		4			CHE03
1987 09 21.63		B	8.3	S	11.0	B		20		3			CHE03
1987 09 22.64		B	8.0:	S	11.0	B		20	1.5	3			CHE03

Comet C/1988 A1 (Liller)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 07 02.70		B	9.3	S	11.0	B		20	3.5	2			CHE03
1988 07 04.73		S	9.1	S	11.0	B		20	5	2			CHE03
1988 07 05.73		S	9.8:	AC	25.0	C	5	48	7	1			CHE03
1988 07 06.72		S	9.8:	AC	25.0	C	5	36	7	1			CHE03
1988 07 07.73		S	10.2	AC	11.0	B		20	6	1			CHE03
1988 07 08.82		[	10.0	AC	11.0	B		20					CHE03
1988 07 08.83		B	10.5	AC	25.0	C		36		1			CHE03
1988 07 09.81		B	10.3	AC	11.0	B		20		1			CHE03
1988 07 12.80		B	10.2	AC	11.0	B		20	6	1			CHE03
1988 07 13.82		B	10.3	AC	25.0	C	5	36	5	1			CHE03
1988 07 15.81		B	10.5:	AC	11.0	B		20		1			CHE03
1988 07 16.83		B	10.5	AC	11.0	B		20		1			CHE03
1988 07 17.81		B	10.5:	AC	25.0	C	5	36	5	3			CHE03
1988 07 18.82		B	10.9	AC	25.0	C	5	36	5	1			CHE03

Comet C/1989 T1 (Helin-Roman-Alu)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 10 24.80		B	11.0:	AC	48.0	L	5	65	4.5	1			CHE03
1989 10 25.67		B	10.5	AC	48.0	L	5	65	4	1			CHE03
1989 10 25.68		S	10.7:	AC	11.0	B		20	3	1			CHE03
1989 10 27.69		B	10.2	AC	48.0	L	5	65	5	1			CHE03
1989 10 28.72		B	10.4	AC	48.0	L	5	65	6	1			CHE03
1989 10 28.73		S	10.3:	AC	11.0	B		20	6	1			CHE03

Comet C/1989 Y1 (Skorichenko-George)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 03 31.88		B	9.8	AC	14.0	R	9	37	2	3			CHE03
1990 04 11.80		[	9.5	AC	12.0	R	5	35					CHE03
1990 04 13.80		[	10.5	AC	35.0	L	4	55					CHE03

Comet C/1996 B1 (Szczepanski)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1996 01 31.91		S	9.0:	S	7.5	B		40	5	1			CHE03
1996 02 01.18		S	8.5:	S	6.0	B		20	8	3			CHE03
1996 02 28.12		[	8.5	S	11.0	B		20					CHE03
1996 02 29.12		S	9.2	S	25.0	C	5	54	5	3			CHE03
1996 03 17.01		S	9.0:	S	11.0	B		20	10	1			CHE03
1996 03 18.00		S	9.0:	S	11.0	B		20	8	1			CHE03
1996 03 19.01		S	9.5:	S	12.0	R	5	27					CHE03

Comet C/2001 HT_50 (LINEAR-NEAT)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2002 12 03.62	x	S	13.3	HS	28	T	6	196	1	3			PEA
2002 12 06.82		S	12.8	VN	20	L	4	100	1.0	2			PEA
2002 12 07.81		S	12.8	VN	41	L	4	200	1.0	1/			PEA
2003 01 05.81		S	12.6	VN	20	L	4	100	1.0	2			PEA
2003 01 06.78		S	12.6	VN	20	L	4	100	1.0	3			PEA

Comet C/2001 HT_50 (LINEAR-NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 01 07.76		S	12.7	VN	20	L	4	100	1.2	3/			PEA
2003 01 08.76		S	12.7	VN	20	L	4	100	1.8	3			PEA
2003 01 12.76		S	13.0	VN	20	L	4	100	1.0	3			PEA
2003 01 25.57		S	12.0	VN	20	L	4	100	2.0	2			PEA
2003 01 26.56		S	12.0	VN	20	L	4	100	2.0	1/			PEA
2003 09 01.02	x	S	12.5	TT	20	L	5	50	1	2/			POW01
2003 09 22.10	x	S	12.1	TT	30	L	6	105	& 1	2/			FIL04
2003 09 26.10	x	S	11.7	TT	20	L	5	50	1.5	3			POW01
2003 09 27.09	x	S	11.9	TT	20	L	5	50	1.5	3			POW01
2003 10 04.13		M	12.1	TI	25	L	5	50	1.6	5			HOR03
2003 10 18.84	x	S	11.4	TT	20	L	5	50	1.5	3			POW01
2003 10 18.94	x	S	12.1	HS	50	L	5	100	& 1.6	2/			PLE01
2003 10 18.96	x	S	12.0	HS	50	L	5	212	& 1.5	2			TUR01
2003 10 23.89	x	S	11.3	TT	20	L	5	50	1.5	3			POW01
2003 10 24.92	x	B	11.7:	TJ	31.7	L	5	78	0.5	7			ADA02
2003 10 24.94	x	S	11.5	TT	20	L	5	50	1.5	3			POW01
2003 10 24.95	x	B	12.2	HS	50	L	5	100	& 1.5	2/			PLE01
2003 10 24.95		M	11.6	TK	35	L	5	68	1.4	5			HOR02
2003 10 24.96	x	B	12.1	HS	50	L	5	50	1.2	3			TUR01
2003 10 27.82	x	S	11.2	TJ	35	L	6	105	& 0.5	d2			CHR
2003 10 27.89	x	S	11.4	TJ	25	L	5	130	1.4	2/			BOH02
2003 10 28.94	x	S	11.5	TT	20	L	5	50	1.2	3			POW01
2003 10 28.95	x	S	11.7	TT	15	L	6	60	1	3			JAR02
2003 10 29.15	x	S	12.4	TT	30	L	6	105	& 1	3/			FIL04
2003 10 29.80	x	S	11.3	TJ	35	L	6	105	& 0.5	d2			CHR
2003 10 30.07	x	S	11.6	TT	20	L	5	50	1.2	3			POW01
2003 11 03.00		M	10.7	TI	7.6	L	9	35	2.5	4			CER01
2003 11 03.01	x	S	11.1	TJ	18.5	L	5	53	1	3			KWI
2003 11 04.09	x	S	11.0	TJ	18.5	L	5	53	1	3			KWI
2003 11 05.13		M	11.3	TI	11.4	L	8	76	1.9	4			CER01
2003 11 13.70	x	S	11.8	TJ	35	L	6	105	& 0.5	d1			CHR
2003 11 16.72	x	S	10.8:	TT	30	L	6	105	& 1	4			FIL04
2003 11 21.72	x	S	12.5	TJ	35	L	6	105		0/			CHR
2003 11 27.76	x	S	11.6	TJ	18.5	L	5	53	1.5	3			KWI
2003 12 19.83	x	S	11.6	TT	20	L	5	50	1.0	4			POW01
2003 12 19.85	x	S	11.2:	TT	32	L	8	100	& 1	3			MAK02
2003 12 23.73	x	S	11.9	TT	30	L	6	105	& 2	2			FIL04
2003 12 23.91		M	12.5	HS	35	L	5	158	1.1	5			HOR02
2003 12 24.67		S	12.0	TJ	20.3	L	6	63	1.5	4			GUZ
2003 12 25.75	x	B	13.3	HS	50	L	5	212	& 1	1/			TUR01
2003 12 25.79		S	12.1	TJ	20.3	L	6	63	1.5	3			GUZ
2004 01 11.72		S	12.5:	HS	20.3	L	6	63	1.2	3			GUZ
2004 01 14.75		S	12.7	TI	27.0	L	6	83	1.0	4			TOT03
2004 01 21.74	x	S	12.7:	TT	30	L	4	132	1.4	2/			GRA09
2004 01 22.75		S	12.7	TI	27.0	L	6	120	1.0	4			TOT03
2004 02 08.75		S	13.0	TI	27.0	L	6	120	0.6	2/			TOT03
2004 02 15.42		S	[12.0	HS	40.0	L	4	144	! 0.8				YOS04

Comet C/2001 Q4 (NEAT)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2002 12 03.58	x	S	14.5:	HS	28	T	6	196	0.5	4			PEA
2003 08 30.82		S	12.3	VN	41	L	4	200	1.4	3			PEA
2003 12 13.50		S	10.5:	TK	28	T	10	133	1	5			MAT08
2003 12 14.87		B	10.2	AC	15.0	L	7	42	0.5	6			BEG01
2003 12 27.52		S	10.1	TK	28	T	10	133	2	5			MAT08
2003 12 28.77		S	9.2	S	40.0	L	4	146		5/			C0002
2004 01 23.50		S	9.0	TK	10	B		25	3	6			MAT08
2004 01 25.77		S	9.1	S	40.0	L	4	102	0.8	5			C0002
2004 01 26.06		B	9.0	TK	20.3	T	10	57	> 3.5	D7	> 5.0m	130	ROB06
2004 01 31.12		S	8.8	TK	14.3	L	6	35	2	3			AMO01
2004 02 02.96		S	8.8	TJ	8.0	B		11	2	4			SOU01
2004 02 02.97		S	8.2	TK	8.0	B		20	2	5			AMO01
2004 02 03.97		S	8.5	TJ	8.0	B		20	2	4/			SOU01
2004 02 06.97		S	8.2	TK	8.0	B		20	2	5			AMO01

Comet C/2001 Q4 (NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 08.96		S	8.2	TK	8.0	B		20	2	6			AMO01
2004 02 09.02		S	8.8	TK	20.3	T	10	57	> 3.5	D7	> 5.0m	135	ROB06
2004 02 09.97		S	8.0	TK	5.0	B		7		7			AMO01
2004 02 09.97		S	8.0	TK	8.0	B		20	4	5			AMO01
2004 02 10.98		S	8.1	TK	8.0	B		20	2	5			AMO01
2004 02 11.04		S	8.0	TJ	8.0	B		11	2				SOU01
2004 02 11.97		S	8.0	TK	8.0	B		20	4	5			AMO01
2004 02 12.97		S	8.0	TK	8.0	B		20	5	5			AMO01
2004 02 16.00		S	8.0	TK	8.0	B		20	4	3			AMO01
2004 02 16.48		M	7.8	AA	10.0	B		25					SEA
2004 02 16.96		S	7.9	TK	8.0	B		20	4	6			AMO01
2004 02 17.01		S	8.0	TJ	8.0	B		11	2	5			SOU01
2004 02 17.04		S	8.0	TJ	20	T	10	62	5	4			SOU01
2004 02 17.46		S	7.7	AA	3.5	B		6					SEA
2004 02 17.96		S	8.0	TJ	8.0	B		11	5	6/			SOU01
2004 02 18.46		S	7.6	AA	3.5	B		6					SEA
2004 02 19.04		S	7.2	TK	5.0	B		10	9	4			SHA02
2004 02 19.45		S	7.6	AA	3.5	B		6					SEA
2004 02 19.46		S	7.6	AA	2.5	B		2					SEA
2004 02 20.43		S	7.6	AA	5.0	B		10					SEA
2004 02 20.48		S	7.8	TK	5.0	B		7	5	5			MAT08
2004 02 20.98		S	7.8	TK	8.0	B		20	4	6			AMO01
2004 02 26.14		S	7.3	TK	5.0	B		10	7	4			SHA02
2004 02 26.95		S	7.9	TJ	8.0	B		11	5	6			SOU01
2004 02 27.41		S	7.3	AA	5.0	B		10					SEA
2004 02 27.96		S	7.8	TK	8.0	B		20	4	5			AMO01
2004 02 28.44		M	7.5	AA	10.0	B		25					SEA
2004 02 28.44		S	7.4	AA	5.0	B		10					SEA
2004 02 28.58		S	7.5	TK	5.0	B		7	5	5			MAT08
2004 02 29.95		S	7.8	TJ	8.0	B		11	5	6			SOU01
2004 03 01.55	x	S	7.8	TT	8.0	B		20	5	3			PEA
2004 03 01.77		S	7.2	AA	3.5	B		6					SEA
2004 03 02.01		S	8.0	TK	20.3	T	10	57	5.5	D6	15.0m	165	ROB06
2004 03 02.51	x	S	7.7	TT	8.0	B		20	5	3/			PEA
2004 03 02.72		S	7.0	AA	2.5	B		2					SEA
2004 03 02.72		S	7.1	AA	3.5	B		6					SEA
2004 03 02.95		S	7.8	TJ	8.0	B		11	5	5			SOU01
2004 03 03.57	x	S	7.7	TT	8.0	B		20	4.5	3/			PEA
2004 03 04.12		S	7.3	TK	5.0	B		10	7	4			SHA02
2004 03 04.50	x	S	7.7	TT	8.0	B		20	4.5	4			PEA
2004 03 05.12		S	7.2	TK	5.0	B		10	9	4			SHA02
2004 03 07.51	x	S	7.7	TT	8.0	B		20	5	4			PEA
2004 03 07.94		S	7.4	TK	8.0	B		20	5	5			AMO01
2004 03 07.94		S	7.5	TK	5.0	B		7		6			AMO01
2004 03 08.40		S	7.1	AA	5.0	B		10					SEA
2004 03 08.52	x	S	7.5	TT	8.0	B		20	5	4/			PEA
2004 03 09.40		S	6.9	AA	5.0	B		10					SEA
2004 03 09.44		S	7.4:	TK	10	B		25	5	5			MAT08
2004 03 09.57	x	S	7.5	TT	8.0	B		20	5	4			PEA
2004 03 10.52	x	S	7.4	TT	8.0	B		20	6	5			PEA
2004 03 11.52	x	S	7.4	TT	8.0	B		20	6.5	5			PEA
2004 03 12.44		S	7.2	TK	10	B		25	6	5			MAT08
2004 03 13.50	x	S	7.3	TT	8.0	B		20	6	5			PEA
2004 03 13.99		M	7.7	TK	20.3	T	10	57	6.5	D6	18.0m	170	ROB06
2004 03 15.42		S	6.3	AA	3.5	B		6					SEA
2004 03 15.52	x	S	7.1	TT	8.0	B		20	6.5	5			PEA
2004 03 15.94		S	6.7	TK	5.0	B		7	10	5			AMO01
2004 03 15.95		S	7.2	TJ	8.0	B		11	5	5			SOU01
2004 03 16.28		S	6.9	TK	5.0	B		7	10	5			SHA02
2004 03 16.44		S	6.3	AA	2.5	B		2					SEA
2004 03 16.49		S	6.9:	TK	10	B		25	6	5			MAT08
2004 03 16.51	x	S	7.1	TT	8.0	B		20	6.5	5/			PEA
2004 03 16.94		S	6.8	TK	5.0	B		7	7	6			AMO01
2004 03 17.10		S	7.0	TK	5.0	B		10	8	6	0.2	130	SHA02
2004 03 17.17		S	6.9	TK	2.5	B		10	7	6			SHA02

Comet C/2001 Q4 (NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 03 17.40		S	6.3	AA	2.5	B		2					SEA
2004 03 17.51	x	S	6.9	TT	4.0	B		8	8	4			PEA
2004 03 17.51	x	S	7.0	TT	8.0	B		20	6.5	6			PEA
2004 03 18.39		S	6.3	AA	5.0	B		10					SEA
2004 03 18.51	x	S	6.7	TT	8.0	B		20	7	6			PEA
2004 03 19.44		S	6.7	TK	10	B		25	7	5			MAT08
2004 03 19.52	x	S	6.7	TT	8.0	B		20	7.5	6			PEA
2004 03 20.35		M	6.4	TJ	2.1	B		8	14	6			RAE
2004 03 20.40		S	6.1	AA	5.0	B		10					SEA
2004 03 20.45		S	6.6	TK	5.0	B		7	7	5			MAT08
2004 03 21.01		S	6.7	TK	5.0	B		10	9	5	10	m 190	SHA02
2004 03 21.33		S	6.4	TK	5.0	B		7	8	6			AM001
2004 03 21.37		M	6.3	TJ	2.1	B		8	12	5/			RAE
2004 03 21.52	x	S	6.5	TT	8.0	B		20	8	6			PEA
2004 03 21.72		B	6.7	AA	5.0	B		10	6	5			BEG01
2004 03 21.93		S	6.5	TK	5.0	B		7	7	6			AM001
2004 03 21.99		B	7.1	TK	20.3	T	10	57	7.5	D7	15.0m	170	ROB06
2004 03 22.33		S	6.3	TK	5.0	B		7	10	5			AM001
2004 03 22.55	x	S	6.5	TT	8.0	B		20	8	6			PEA
2004 03 22.93		S	6.3	TK	5.0	B		7	8	5			AM001
2004 03 22.93		S	6.4	TJ	8.0	B		11	5	5			SOU01
2004 03 23.39		M	6.3	AA	5.0	B		10					SEA
2004 03 23.49	x	B	6.4	TT	4.0	B		8	10	6			PEA
2004 03 23.50	x	B	6.5	TT	8.0	B		20	9	6			PEA
2004 03 23.85	x	B	6.4	TT	4.0	B		8	10	6			PEA
2004 03 23.85	x	B	6.5	TT	8.0	B		20	9	6	0.5	140	PEA
2004 03 23.92		S	6.3	TJ	8.0	B		11	5	5			SOU01
2004 03 23.94		S	6.5	TK	8.0	B		20	6	4			AM001
2004 03 23.98		S	6.7	TK	5.0	B		7	8	6	0.5	175	SHA02
2004 03 24.35		M	6.0	TJ	2.1	B		8	10	5			RAE
2004 03 24.40		S	6.2	AA	5.0	B		10					SEA
2004 03 24.41		S	6.1	AA	2.5	B		2					SEA
2004 03 24.49	x	M	6.5	TT	5.0	B		7					TSU02
2004 03 25.00		B	6.8	TK	20.3	T	10	57	8	D7	15.0m	170	ROB06
2004 03 25.00		S	6.0	TK	0.7	E		1	15	3			SHA02
2004 03 25.00		S	6.6	TK	5.0	B		10	9	6	40	m 165	SHA02
2004 03 25.35		M	6.1	TJ	2.1	B		8	12	5			RAE
2004 03 25.41		S	6.1	AA	5.0	B		10					SEA
2004 03 25.49	x	B	6.3	TT	4.0	B		8	10	6			PEA
2004 03 25.49	x	B	6.4	TT	8.0	B		20	8	6	0.5		PEA
2004 03 25.72		S	6.0	AA	2.5	B		2					SEA
2004 03 25.85	x	B	6.3	TT	4.0	B		8	10	7			PEA
2004 03 25.85	x	B	6.3	TT	8.0	B		20	9	6/	0.5		PEA
2004 03 25.85	x	I	6.5:	TT	0.0	E		1					PEA
2004 03 25.93		S	6.2	TK	5.0	B		7	8	6			AM001
2004 03 26.11		S	6.4	TK	5.0	B		10	9	6	0.5	175	SHA02
2004 03 26.39		M	5.9	TJ	2.1	B		8	11	4			RAE
2004 03 26.92		S	6.3	TK	5.0	B		7	7	6			AM001
2004 03 26.98		S	6.4	TK	5.0	B		10	9	6	25	m 170	SHA02
2004 03 27.11	$	S	5.8	TK	3.0	B		8	11	5/			HOE
2004 03 27.45		S	6.1	TK	5.0	B		7	7	5			MAT08
2004 03 28.01		I	5.6	TK	1.0	E		1					HOE
2004 03 28.01	$	S	5.6	TK	3.0	B		8	11	6/	0.35	170	HOE
2004 03 28.85	x	B	6.3	TT	8.0	B		20	6	6/			PEA
2004 03 29.73		B	6.1	AA	5.0	B		10					SEA
2004 03 29.73		S	5.9	AA	2.5	B		2					SEA
2004 03 29.83	x	B	6.1	TT	8.0	B		20	8	6			PEA
2004 03 29.96		S	6.0	TK	5.0	B		7	7	6			AM001
2004 03 30.87	x	B	6.0	TT	8.0	B		20	8.5	6/			PEA
2004 03 30.93		S	6.0	TK	5.0	B		7	8	6			AM001
2004 03 31.34		S	6.0	TK	5.0	B		7	10	5			AM001
2004 03 31.75		S	5.8	AA	5.0	B		10					SEA
2004 03 31.84	x	B	6.0	TT	4.0	B		8	10	7			PEA
2004 03 31.84	x	B	6.0	TT	8.0	B		20	9	6/	0.5		PEA
2004 04 01.76		S	5.6	AA	0.0	E		1					SEA

Comet C/2001 Q4 (NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 01.82	x	B	5.9	TT	4.0	B		8	10	7			PEA
2004 04 01.82	x	B	6.0	TT	8.0	B		20	9	6/	0.5		PEA
2004 04 01.92		S	6.0	YG	5.0	B		7	6	5			AM001
2004 04 06.70		B	5.5	AA	5.0	B		10	9	6			BEG01
2004 04 07.71		B	5.3	AA	5.0	B		10	9	6			BEG01
2004 04 07.92		S	5.6	YG	8.0	B		11	6	4			SOU01
2004 04 07.93		S	5.3	YG	5.0	B		7	14	6			AM001
2004 04 07.97		B	5.4	TI	5.2	B		7	9	6	0.1	170	MAN04
2004 04 08.91		M	5.1	YG	5.0	B		7	11	5			AM001
2004 04 09.39		S	5.0	AA	2.5	B		2					SEA
2004 04 09.45	x	B	5.6	TT	4.0	B		8	12	7			PEA
2004 04 09.71		B	5.1	AA	5.0	B		7	10	6			BEG01
2004 04 09.73		S	5.2	AA	3.5	B		7	6	6			PRI04
2004 04 09.84	x	B	5.6	TT	8.0	B		20	10	7	1.0	163	PEA
2004 04 09.92		S	5.2	YG	5.0	B		7	10	5			AM001
2004 04 10.40		S	5.2	AA	5.0	B		10					SEA
2004 04 10.71		M	5.1	AA	5.0	B		7	10	6			BEG01
2004 04 10.71		M	5.2	AA	5.0	B		10	8	6			PRI04
2004 04 10.72		S	5.8	S	12.5	R	8	40	6.5	6			C0002
2004 04 10.87	x	B	5.5	TT	4.0	B		8	13	7			PEA
2004 04 10.87	x	B	5.6	TT	8.0	B		20	10	7	0.45	165	PEA
2004 04 11.46	x	B	5.4	TT	4.0	B		8	11	7			PEA
2004 04 11.87	x	B	5.4	TT	4.0	B		8	14	7			PEA
2004 04 11.88	x	B	5.5	TT	8.0	B		20	11.5	7			PEA
2004 04 11.98		M	4.9	TK	5	R	7	13	10	D7	>20 m	165	ROB06
2004 04 12.50	x	B	5.3	TT	4.0	B		8	9	7			PEA
2004 04 12.50	x	B	5.3	TT	8.0	B		20	7.5	7	0.9	160	PEA
2004 04 12.70		S	5.6	AA	5.0	B		10	6	5			C0002
2004 04 12.91		S	4.9	YG	5.0	B		7	15	5			AM001
2004 04 13.35		M	4.9	YG	5.0	B		7	15	5			AM001
2004 04 13.70		B	5.0	AA	5.0	B		7	9	7	35 m	155	BEG01
2004 04 13.71		M	5.1	AA	5.0	B		10	9	6	0.3	160	PRI04
2004 04 13.91		M	4.9	YG	5.0	B		7	15	6	0.2	160	AM001
2004 04 14.35		S	5.0	YG	5.0	B		7	10	4			AM001
2004 04 14.44		S	4.6	AA	0.0	E		1					SEA
2004 04 14.49	x	B	5.0	TT	8.0	B		20	8.5	7	0.8	149	PEA
2004 04 14.49	x	B	5.1	TT	4.0	B		8	10.5	7			PEA
2004 04 14.72		M	4.9	AA	5.0	B		10	9	6	25 m	155	PRI04
2004 04 14.86	x	B	5.0	TT	4.0	B		8	11	7			PEA
2004 04 14.86	x	B	5.1	TT	8.0	B		20	9	7	1.1		PEA
2004 04 15.40		S	4.7	AA	0.0	E		1					SEA
2004 04 15.47	x	B	4.8	TT	4.0	B		8	11	7	1.45	162	PEA
2004 04 15.47	x	B	4.8	TT	8.0	B		20	10	7	1.45	162	PEA
2004 04 15.47	x	I	5.0	TT	0.0	E		1		9			PEA
2004 04 15.48		S	4.8	TK	5.0	B		7	11	6	1.8	165	MAT08
2004 04 15.48		S	4.9	TK	0.7	E		1		5			MAT08
2004 04 15.70		M	4.9	AA	5.0	B		10	9	7	35 m	156	PRI04
2004 04 15.71		B	4.9	AA	5.0	B		7	12	7	1.0	160	BEG01
2004 04 15.87	x	B	4.9	TT	4.0	B		8	11	7	1.55	162	PEA
2004 04 15.87	x	B	5.0	TT	8.0	B		20	10	7	1.55	162	PEA
2004 04 15.87	x	I	5.0	TT	0.0	E		1		9			PEA
2004 04 15.92		S	4.7	YG	5.0	B		7	10	5			AM001
2004 04 16.48		S	4.7	TK	5.0	B		7	11	6	2.0	162	MAT08
2004 04 16.70		S	5.0	AA	5.0	B		10	6	5			C0002
2004 04 16.92		S	4.7	YG	0.0	E		1		2			AM001
2004 04 16.92		S	4.8	YG	5.0	B		7	10	4/	0.16	160	AM001
2004 04 16.96		B	4.3	TI	5.2	B		7	15	6/	1.5	160	MAN04
2004 04 17.34		S	4.7	YG	5.0	B		7	15	4/	0.16	160	AM001
2004 04 17.42		S	4.7	AA	0.0	E		1					SEA
2004 04 17.50		S	4.6	TK	5.0	B		7	12	6	3.0	160	MAT08
2004 04 17.70		S	4.8	S	5.0	B		10	6	6	0.3	145	C0002
2004 04 17.98		B	4.2	TI	5.2	B		7	12	6	1.5	160	MAN04
2004 04 17.98		B	4.4	TK	5	R	7	10	10	D7	>0.42	160	ROB06
2004 04 18.42		S	4.6	AA	0.0	E		1					SEA
2004 04 18.50		B	4.8:	TJ	5.0	B		7	10	5	>1	160	BEN06

Comet C/2001 Q4 (NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 18.70		S	5.1	AA	5.0	B		10		5			C0002
2004 04 18.88	x	B	4.8	TT	4.0	B		8		7			PEA
2004 04 19.15		S	5.0:	S	5.0	B		10		3			VAN15
2004 04 19.53	x	B	4.8	TT	4.0	B		8	14.5	7	1.7	148	PEA
2004 04 20.41		S	4.4	AA	0.0	E		1					SEA
2004 04 20.71		S	4.6	S	5.0	B		10	8	6/	45 m	146	C0002
2004 04 20.88	x	B	4.7	TT	4.0	B		8		7			PEA
2004 04 21.85	x	B	4.5	TT	4.0	B		8	14	7	2.2	150	PEA
2004 04 21.85	x	B	4.5	TT	8.0	B		20	12	7	2.2	150	PEA
2004 04 21.88	x	I	4.7	TT	0.0	E		1					PEA
2004 04 22.44		S	4.1	AA	2.8	B		4					SEA
2004 04 22.85	x	B	4.4	TT	4.0	B		8	13	7	1.9	145	PEA
2004 04 22.85	x	B	4.4	TT	8.0	B		20	10	6	1.9	145	PEA
2004 04 22.85	x	B	4.5	TT	0.0	E		1					PEA
2004 04 22.89		S	4.5	YG	3.0	B		8	10	6			SOU01
2004 04 22.90		S	4.5	YG	8.0	B		11	10	7	0.15	150	SOU01
2004 04 23.85	x	I	4.5	TT	0.0	E		1					PEA
2004 04 23.88	x	B	4.4	TT	4.0	B		8	14	7/	2.0	149	PEA
2004 04 23.88	x	B	4.4	TT	8.0	B		20	12	6/	2.0	149	PEA
2004 04 23.90		M	4.3	YG	5.0	B		7	15	5/	0.3	140	AM001
2004 04 23.92		S	4.5	YG	8.0	B		11	10	5			SOU01
2004 04 24.36		S	4.5:	YG	8.0	B		20	10	3			AM001
2004 04 24.40		S	4.0	AA	0.0	E		1					SEA
2004 04 24.96		M	4.1	TI	5.2	B		7	10	7	1.0	140	MAN04
2004 04 24.97		B	4.1	TK	5	R	7	10	14	6	>1.16	145	ROB06
2004 04 25.39		S	3.9	AA	0.0	E		1					SEA
2004 04 25.89	x	B	4.2	TT	4.0	B		8	15	7	1.1	131	PEA
2004 04 25.89	x	B	4.2	TT	8.0	B		20	12.5	7	1.1	131	PEA
2004 04 25.90		I	4.2	YG	0.0	E		1		6			AM001
2004 04 25.90		M	4.3	YG	5.0	B		7	10	5	0.3	145	AM001
2004 04 25.97		M	4.1	TI	5.2	B		7	11	7			MAN04
2004 04 26.54	x	B	4.4	TT	4.0	B		8	15	7	2.0	145	PEA
2004 04 26.54	x	I	4.5	TT	0.0	E		1					PEA
2004 04 26.90		S	4.2	YG	8.0	B		11	10	5			SOU01
2004 04 26.92		I	4.0	YG	0.0	E		1		7			AM001
2004 04 26.93		M	4.0	YG	5.0	B		7	15	6	0.6	140	AM001
2004 04 27.54	x	B	4.2	TT	4.0	B		8	11	7	2.7	136	PEA
2004 04 27.89		S	4.1	YG	3.0	B		11	10	3			SOU01
2004 04 27.90		I	3.9	YG	0.0	E		1		6			AM001
2004 04 27.90		S	4.0	YG	8.0	B		11	15	4/			SOU01
2004 04 27.91		M	4.0	YG	5.0	B		7	15	5	0.5	140	AM001
2004 04 27.91		S	4.0	YG	13.5	L	5	26	12	5	0.3	135	SOU01
2004 04 27.95		S	4.0	YG	8.0	B		11	15	5	>0.90	145	DES01
2004 04 28.88		S	3.9	YG	3.0	B		11	10	4			SOU01
2004 04 28.89		S	3.9	YG	8.0	B		11	15	5	0.5	135	SOU01
2004 04 28.89		S	3.9	YG	8.0	B		11	18	6	1.92	145	DES01
2004 04 28.90		S	3.9	YG	13.5	L	5	26	15	6	0.9	135	SOU01
2004 04 28.91		M	3.9	YG	5.0	B		7	13	5	0.33	130	AM001
2004 04 28.93		B	4.0	TK	5.0	B		12	11	7			YUM
2004 04 29.53	x	B	4.1	TT	4.0	B		8	16	7	1.8	135	PEA
2004 04 29.88		S	3.9	YG	3.0	B		11	15	4			SOU01
2004 04 29.89		S	3.9	YG	8.0	B		11	25	6	1.92	145	DES01
2004 04 29.89		S	3.9	YG	8.0	B		11	20	6	1.2	135	SOU01
2004 04 29.90		S	3.6	YG	0.0	E		1	10	6/			AM001
2004 04 29.90		S	3.9	YG	20	T	10	62	20	7	1.0	135	SOU01
2004 04 29.91		M	3.8	YG	5.0	B		7	15	5	0.8	130	AM001
2004 04 29.92		S	3.9	YG	13.5	L	5	26	20	6	0.9	135	SOU01
2004 04 29.99		M	3.9	HV	5.0	B		7	15	7	1.2	125	BAL07
2004 04 30.56	x	I	4.0	TT	0.0	E		1					PEA
2004 04 30.89		S	3.8	YG	3.0	B		8	20	6			SOU01
2004 04 30.89		S	3.8	YG	8.0	B		11	25	5/			DES01
2004 05 01.49	x	B	3.8	TT	0.0	E		1					PEA
2004 05 01.49	x	B	3.8	TT	4.0	B		8	13	7/	2.7	131	PEA

Comet C/2002 E2 (Snyder-Murakami)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 02 02.76		S	14.3	HS	44.5	L	4	166	1	0			SANO7

Comet C/2002 J4 (NEAT)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 15.86		S	[13.8	VN	41	L	4	200	! 0.5				PEA

Comet C/2002 T7 (LINEAR)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 10 18.84		S	11.1:	TI	15.5	R	16	46	0.8				MANO2
2003 10 18.88		M	10.9	TI	25	L	5	50	2.2	7			HORO3
2003 10 24.93		S	11.1:	TI	15.5	R	16	46	1.0				MANO2
2003 10 24.97		M	11.0	TK	35	L	5	68	0.9	7/			HORO2
2003 10 25.95		B	10.8	AC	15.0	L	7	42		9			BEGO1
2003 10 31.95		B	10.7	AC	15.0	L	7	42	0.5	6			BEGO1
2003 11 02.99		M	10.5	TI	7.6	L	9	35	1.5	7			CERO1
2003 11 05.10		M	10.3	TI	11.4	L	8	76	1.3	7			CERO1
2003 11 05.11		S	10.5	TI	11.4	L	8	76	1.3	2			NED
2003 11 06.86		M	10.5	TK	35	L	5	68	1.0	6/			HORO2
2003 11 06.88		S	10.3	TT	15.5	R	16	46	1.1	6			MANO2
2003 11 09.05		M	10.4	TK	35	L	5	68	1.2	7/			HORO2
2003 11 19.85		M	9.8	TT	35	L	5	68	2.1	6/			HORO2
2003 11 20.13		M	9.9	TK	25.4	L	6	48	2.0	6			GRAO4
2003 11 20.88		B	9.7	AC	15.0	L	7	42	1.5	7			BEGO1
2003 11 20.92		M	9.9	TT	8.0	B		10	4	5			HORO2
2003 11 23.95		B	9.6	AC	15.0	L	7	42	1.2	7	4 m	120	BEGO1
2003 11 24.88		M	9.6	TT	8.0	B		10	5	5/			HORO2
2003 11 29.86		M	9.2	TT	8.0	B		10	6	5			HORO2
2003 12 03.03		S	9.0	TK	6.0	B		20	6	5			BARO6
2003 12 04.06		S	9.0	TK	6.0	B		20	5	4/			BARO6
2003 12 04.73		M	9.4	TK	7.0	R	7	24	2.5	5/			GRAO4
2003 12 08.74		M	9.8	TI	25	L	5	50	2.5	6	0.06	11	HORO3
2003 12 09.69		M	8.7	TT	8.0	B		10	7	4			HORO2
2003 12 10.68		M	8.5	TT	8.0	B		10	7	4			HORO2
2003 12 10.69		B	9.7	TT	6	R	10	30	3.9	3			MANO2
2003 12 12.08		M	9.3	TK	15.2	L	5	44	2	5			GRAO4
2003 12 12.85		S	8.9:	TK	6.0	B		20	5	4			BARO6
2003 12 14.69		M	8.5	TT	8.0	B		10	6	3/			HORO2
2003 12 14.70		B	9.5	TT	6	R	10	30	5.3	3			MANO2
2003 12 14.86		B	9.8	AC	15.0	L	7	42	2	6	6 m	75	BEGO1
2003 12 15.78		B	9.3	TT	6	R	10	30	4.3	4			MANO2
2003 12 16.71		M	8.4	TT	8.0	B		10	6	4			HORO2
2003 12 16.77		S	9.0	AC	20.0	L	8	83	2	3			COOO2
2003 12 16.88		B	9.1	TT	6	R	10	30	4.3	4			MANO2
2003 12 17.75		S	9.0:	HD	6	R	10	30	1.7	3			SEMO2
2003 12 18.75		S	9.0:	HD	6	R	10	30	1.5	3			SEMO2
2003 12 19.71		M	8.9	TK	20.3	L	6	63	4	D5	5 m	80	GUZ
2003 12 19.72		S	9.1	HD	6	R	10	30	2.6	2			SEMO2
2003 12 19.74		M	9.0	TK	15.2	L	5	38	2.5	5/	0.12	75	GRAO4
2003 12 21.86		S	8.8	TK	6.0	B		20	5	4			BARO6
2003 12 22.70		M	8.7	TK	5.0	B		10	& 5	5	5 m	75	GUZ
2003 12 22.82		S	8.5	TT	6	R	10	30	3.4	5			MANO2
2003 12 22.90		S	8.8	TK	10.0	B		20	4.5	d5			MEY
2003 12 23.70		S	8.9	HD	6	R	10	30	1.7	3			SEMO2
2003 12 23.75		B	9.3	TT	11	L	7	32	3.8	5	0.09	80	MANO2
2003 12 23.75		B	9.6	TT	15.5	R	16	46	2.9	6	0.07	80	MANO2
2003 12 23.75		S	8.9	TT	11	L	7	32					MANO2
2003 12 23.76		B	8.9	TT	10	B		25	4.8	5	0.07	80	MANO2
2003 12 23.79		M	8.2	TT	8.0	B		10	8	3/			HORO2
2003 12 23.86		B	9.1	TT	6	R	10	30	4.8	5			MANO2
2003 12 23.86		S	8.6	TT	6	R	10	30					MANO2
2003 12 23.90		E	8.3	NP	6	L	7	33	5	4			ROM
2003 12 24.69		M	8.5	TK	5.0	B		10	7	6	0.15	75	GUZ
2003 12 24.69		M	8.7	TK	20.3	L	6	63	5	s6	0.25	78	GUZ

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 12 24.86		S	8.2	TK	5.0	B		10	7	3/			BAR06
2003 12 24.89		E	8.4	NP	6	L	7	33	5	4			ROM
2003 12 24.97		M	8.3	TT	8.0	B		10	10	3/			HOR02
2003 12 25.68		S	8.8	HD	6	R	10	30	1.7	3			SEM02
2003 12 25.80		M	8.6	TK	20.3	L	6	63	5	s6	0.3	75	GUZ
2003 12 25.81		M	8.5	TK	5.0	B		10	7	6	0.15	75	GUZ
2003 12 25.93		M	8.3	TT	8.0	B		10	10	3/			HOR02
2003 12 25.96		S	8.1	TK	5.0	B		10	7	3/			BAR06
2003 12 26.70		S	8.9	TT	6	R	10	30	4.6	6			MAN02
2003 12 26.83		M	8.2	TT	8.0	B		10	9	3			HOR02
2003 12 26.90		E	8.3	NP	6	L	7	33	5	5			ROM
2003 12 26.90		M	8.3	TK	5.0	B		10	6	5	0.1	75	GUZ
2003 12 27.68		S	8.9	HD	6	R	10	30	2.2	2			SEM02
2003 12 27.71		M	8.3	TK	5.0	B		10	6	5	0.15	70	GUZ
2003 12 27.94		S	8.2	TK	5.0	B		10	7	3			BAR06
2003 12 28.69		M	8.7	TK	7.0	R	7	24	3.5	5			GRA04
2003 12 28.76		S	8.8	S	20.0	L	8	83	3	4/			COO02
2003 12 29.65		S	8.6	HD	6	R	10	30	2.2	3			SEM02
2004 01 01.77		M	8.0	TT	8.0	B		10	11	3			HOR02
2004 01 03.87		M	8.0	TT	8.0	B		10	8	4			HOR02
2004 01 05.76		M	7.7	TT	10	B	4	25	5	6			LEH
2004 01 06.70		S	7.8	AA	6.0	B		20	5	2/			CSU
2004 01 08.74		M	8.2	TK	5.0	B		10	5	6			GUZ
2004 01 08.75		S	8.3:	TI	11.4	L	5	50	5	1			SAN07
2004 01 09.71		M	8.0:	TK	5.0	B		10	8	5	0.1	70	GUZ
2004 01 10.66		S	8.4	HD	6	R	10	66	2.3	3			SEM02
2004 01 11.69		M	8.0	TK	20.3	L	6	63	8	5	0.4	70	GUZ
2004 01 11.70		M	7.6	TK	5.0	B		10	12	5	0.2	70	GUZ
2004 01 11.75		S	8.0	TT	8.0	B		15	&12	5			SCH04
2004 01 12.85		S	7.8	TT	5.0	B		10	12	5			RIE
2004 01 14.42	x	M	8.6	TJ	15.0	B		25	6	5			MIT
2004 01 14.46	x	S	8.3	TK	12.0	R	5	28		5			MOM
2004 01 14.71		M	7.6	TI	5.0	B		10	8	3/	0.25	65	SAN07
2004 01 14.71		M	7.6	TT	8.0	B		10	14	4/	0.3	50	HOR02
2004 01 14.73		S	8.2	TI	27.0	L	6	60	8	6	0.2	60	TOT03
2004 01 14.74		M	7.6	AA	6.0	B		20	6	5/	1.0	51	CSU
2004 01 14.76		S	7.5	AA	5.0	B		10	5.0	4			SAJ
2004 01 14.82		M	7.7	TK	20.3	L	6	63	9	5	0.5	70	GUZ
2004 01 14.83		M	7.5	TK	5.0	B		10	12	5	0.3	70	GUZ
2004 01 15.73		S	7.6	AC	6.0	B		7	& 9	3			RES
2004 01 16.70		M	7.7:	TI	5.0	B		10	6	D5	0.1	70	SAN07
2004 01 16.80		E	8.0	NP	6.0	B	5	20	8	8			ROM
2004 01 16.83		S	7.9	TK	5.0	B		10	7	s4			BAR06
2004 01 18.73		S	7.4	AC	6.0	B		7	11	3			RES
2004 01 18.77		B	7.8	TK	10.0	B		20	7	4/	0.2	65	MEY
2004 01 18.78		S	7.6	TK	5.0	B		10		3/			MEY
2004 01 18.84		S	8.0	TK	6.3	B		9	6	4			KAM01
2004 01 19.71		M	7.3	TI	5.0	B		10	10	s5	0.2	60	SAN07
2004 01 21.72		M	7.5	TI	11.4	L	6	20	6	D4/	0.1	60	SAN07
2004 01 21.74		S	7.6	AA	6.0	B		20	5	5			CSU
2004 01 21.81		M	7.6	TK	7.0	R	7	24	7	5			GRA04
2004 01 21.86		S	7.6	TK	10.0	B		20	8	4			MEY
2004 01 22.40	x	M	8.4	HV	15.0	B		25	6	5			MIT
2004 01 22.70		[	7.5	TJ	7.5	B		40					CHE03
2004 01 22.72		S	7.2	TI	5.0	B		7	16	s6	1.0	45	SCA02
2004 01 22.72		S	7.8	AA	5.0	B		10	5.0	s6			SAJ
2004 01 22.75		M	7.2	TI	5.0	B		10	10	4	0.25	60	SAN07
2004 01 22.76		M	7.5	TT	8.0	B		10	14	4/	0.4	60	HOR02
2004 01 22.77		S	7.6	AA	6.0	B		20	6	5	1.0	65	CSU
2004 01 22.77		S	8.1	TI	27.0	L	6	60	8	5	0.2	60	TOT03
2004 01 23.46	x	B	8.2	TJ	10.0	B		26	3.3	6	21 m	65	NAG04
2004 01 23.73		S	7.6	AA	6.0	B		20	7	5	1.0	70	CSU
2004 01 23.75		S	7.5	TT	8.0	B		15	&11	6			SCH04
2004 01 23.76		S	7.7	HV	6.3	B		9	8	4			KAM01
2004 01 23.77		B	8.0	TK	5.0	B		10	11.4	5			HAS02

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 01 23.77		M	7.2	TI	5.0	B		10	10	4	0.25	60	SAN07
2004 01 23.77		M	7.4	TT	8.0	B		10	16	4	0.4	50	HOR02
2004 01 23.77		S	7.2	TI	5.0	B		7	13	s7	1.2	45	SCA02
2004 01 23.81		M	7.7	TK	10.0	B		20	7	5	0.3	60	MEY
2004 01 23.82		S	7.6	TK	5.0	B		10		3			MEY
2004 01 24.75		M	7.5	TT	10	B	4	25	7	6			LEH
2004 01 24.77		S	7.2	TJ	15.0	R	8	30	7	5			DIE02
2004 01 24.79		M	7.5	TT	8.0	B		10	14	4	0.5	50	HOR02
2004 01 24.79		S	7.0	TI	5.0	B		7	14	s7	1.5	45	SCA02
2004 01 24.80		S	7.3	TT	5.6	B		10	&14	4	&1	60	BUS01
2004 01 25.71		S	7.9	TJ	7.5	B		40	3	3			CHE03
2004 01 25.74		S	7.8	AC	13.0	L	6	45	7	4			RES
2004 01 25.76		S	8.9:	S	20.0	L	8	83		3			C0002
2004 01 28.46	x	M	8.1	TK	10.0	B		20	5	5			YOS02
2004 01 28.79		S	8.7	TK	20.3	T	10	62	5	6			NAV02
2004 01 28.80		S	7.5	TK	8.0	B		11	6	5			GON05
2004 01 28.80		S	7.6	TK	5.0	B		7	6	5			GON05
2004 01 28.81		S	7.6	TK	10.0	B		25	4	6	0.2	65	GON05
2004 01 28.82		S	7.9	TK	10.2	M	13	65	4	6	0.1	65	GON05
2004 01 29.17		M	7.4	TJ	8.0	B		20	6	6			MOR
2004 01 30.70		B	8.3	HD	11	L	8	32	4	3			SER
2004 01 30.74		S	7.0	TI	5.0	B		7	12	s6	0.5	40	SCA02
2004 01 30.77		S	8.8	TK	20	T	10	62	5	3			NAV02
2004 01 30.82		S	7.4	TK	8.0	B		11	6	5			GON05
2004 01 30.82		S	7.6	TK	10.0	B		25	5	6			GON05
2004 01 30.86		S	7.9	TK	10.2	M	13	65	4	6			GON05
2004 01 31.44	x	M	7.4	TJ	14.1	B		25	5	4	10 m	60	NAG08
2004 01 31.47		S	7.4	TJ	25.4	T	6	32	5	4			YOS04
2004 01 31.72		S	7.0	TK	5.0	B		10	10	3			BAR06
2004 01 31.73		S	7.5:	AA	5.0	B		10	8.0	3			SAJ
2004 01 31.75		S	7.6	AA	6.0	B		20	4	4			CSU
2004 01 31.75		S	7.7	TJ	7.0	B		16	15	5			GIA01
2004 01 31.76		S	7.1	TI	5.0	B		7	9	s5	20 m	40	SCA02
2004 01 31.83		S	7.5	TK	8.0	B		11	7	5	0.1	65	GON05
2004 01 31.84		S	7.5	TK	5.0	B		7	7	5			GON05
2004 01 31.85		S	7.7	TK	10.0	B		25	6	6	0.1	65	GON05
2004 02 04.72		M	7.1	TK	15.2	L	5	38	6	5			GRA04
2004 02 04.83		S	7.5	TK	8.0	B		11	5	5			GON05
2004 02 05.81		S	7.7	TK	8.0	B		11	4	6			GON05
2004 02 07.42		S	6.8	TJ	25.4	T	6	32	4	3			YOS04
2004 02 07.75		M	7.5	TK	8.0	B		15	6	5/			BOU
2004 02 07.75		S	6.6	TI	5.0	B		7	6	s7/	1.0	50	SCA02
2004 02 07.76		S	7.4	TK	5.0	B		7	5.5	3/			DIJ
2004 02 07.79		S	7.1	TK	8.0	B		20	8	4	8 m	55	SHA02
2004 02 08.41	x	S	7.4	TK	12.0	R	5	28	5	5	10 m	50	MOM
2004 02 08.41	x	S	7.6	TJ	8.0	B		11	5.5	5			MIY01
2004 02 08.44	x	M	7.3	TT	10.0	B		26					TSU02
2004 02 08.73		M	7.0	TK	5.0	B		10	8	6	0.5	55	GUZ
2004 02 08.74		M	7.2	TI	11.4	L	6	20	6	s3/	0.2	90	SAN07
2004 02 08.74		S	7.2	TI	27.0	L	6	60	7	6	0.2	70	TOT03
2004 02 08.75		S	6.7	TI	5.0	B		7	6	s7	1.0	50	SCA02
2004 02 08.76		S	6.9	TT	5.6	B		10	&10	5			BUS01
2004 02 08.78		S	7.0	TK	8.0	B		20	8	6	20 m	55	SHA02
2004 02 08.82		S	7.3	TK	5.0	B		7	11	6	0.2	60	GON05
2004 02 08.83		S	7.3	TK	8.0	B		11	11	6	0.2	60	GON05
2004 02 08.83		S	7.4	TK	10.0	B		25	9	6	0.2	60	GON05
2004 02 08.84		S	7.6	TK	10.2	M	13	65	7	6	0.1	60	GON05
2004 02 09.76		B	7.8	S	5.0	B		7	& 5	5			KUG
2004 02 09.76		S	7.0	TI	6.0	B		20	8	7	0.25	60	BAL04
2004 02 09.79		S	7.1	TK	10	B		25	8	5			SHA02
2004 02 10.12		M	7.2	TJ	5.0	B		10		6	&1.5		MOR
2004 02 10.12		M	7.2	TJ	8.0	B		20	7	6/	&2.0		MOR
2004 02 10.13					25	L	4	129	3	5	5 m	355	YOU03
2004 02 10.13		S	7.7	S	5.0	B		15					YOU03
2004 02 10.41	x	M	7.2	TJ	8.0	B		11	9	5			NAG08

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 10.41	x	M	7.3	TJ	10.0	B		20	5	6	25 m	55	NAG08
2004 02 10.43	x	S	7.3	TJ	8.0	B		11	5.5	5/			MIY01
2004 02 10.68		M	7.4	HD	7	R	6	26	6	5			SHU
2004 02 10.73		M	7.1	TK	5.0	B		10	14	s5	0.1	48	BAR06
2004 02 10.73		S	6.9	AC	6.0	B		7	&10	3			RES
2004 02 10.73		S	7.6	AA	5.0	B		10	8.0	5	0.75	52	SAJ
2004 02 10.75		S	6.5	TI	5.0	B		7	9	s7	2.5	50	SCA02
2004 02 10.77		B	7.8	TI	8.0	B		11	6	5			LAB02
2004 02 10.80		M	7.1	S	3.0	B		6	15	5			MAR02
2004 02 11.11		M	7.1	TJ	5.0	B		10		6			MOR
2004 02 11.11		M	7.2	TJ	8.0	B		20	7	6/	&2.0		MOR
2004 02 11.42	x	B	7.7	TJ	10.0	B		26	4.0	5	>10 m	75	NAG04
2004 02 11.70		E	7.7	NP	6.0	B	5	20	8	7	0.1		ROM
2004 02 11.70		S	7.7	TJ	8.0	B		18	4	3			CHE03
2004 02 11.71		M	7.5	HD	11	B		20	7	5			NEV
2004 02 11.74		M	6.9	TK	5.0	B		10	9	6	0.4	55	GUZ
2004 02 11.75		M	6.9	TK	5.0	B		10	12	s5	0.15	46	BAR06
2004 02 11.75		M	7.0	TK	20.3	L	6	63	7	6	0.7	55	GUZ
2004 02 11.76		M	7.4	HD	7	R	6	26	6	5			SHU
2004 02 11.77		M	7.5	HD	7	R	6	26	& 6	5			NEK
2004 02 11.77		S	7.5	TI	5.0	B		15	10	3			CSO
2004 02 11.82		S	7.1	TK	5.0	B		7	10	6	0.2	60	GON05
2004 02 11.82		S	7.1	TK	8.0	B		11	10	6	0.2	60	GON05
2004 02 11.83		S	7.5	TK	10.0	B		25	6	6	0.3	60	GON05
2004 02 12.69	w	S	6.7	S	11	L	7	32	6	3/	0.6	55	SVE01
2004 02 12.72		M	7.2	AA	6.0	B		20	5	s6	0.13	59	CSU
2004 02 12.72		S	7.3	AA	5.0	B		7	8	3			KOS
2004 02 12.72		S	7.4	AA	8.0	R	6	48	10	4			KOS
2004 02 12.72		S	7.5	AA	5.0	B		10	7.0	6	1.5	48	SAJ
2004 02 12.72		S	7.6	TJ	8.0	B		18	5	3			CHE03
2004 02 12.72	w	S	6.7:	S	20	M	10	60	7	3/	0.7	55	SVE01
2004 02 12.74		M	7.0	TK	5.0	B		10	9	6	0.4	50	GUZ
2004 02 12.76		S	6.6	TI	5.0	B		7	10	s7	2.0	50	SCA02
2004 02 12.79		E	7.7	NP	6	L	7	33	8	6	0.1		ROM
2004 02 12.80		B	7.5	TI	8.0	B		11	7	5			LAB02
2004 02 12.81		S	7.1	TK	5.0	B		7	12	6	0.3	60	GON05
2004 02 12.82		S	7.0	TK	8.0	B		11	12	6	0.3	60	GON05
2004 02 12.82		S	7.3	TK	10.0	B		25	7	6	0.6	60	GON05
2004 02 12.99		S	7.0	TJ	5.0	B		12	&10	5/			GRE
2004 02 13.72		S	7.2	AA	5.0	B		7	8	3			KOS
2004 02 13.72		S	7.3	AA	8.0	R	6	48	12	4			KOS
2004 02 13.75		M	7.3	PA	41	L	4	89	& 4	5/	26 m	65	SHU
2004 02 13.81		S	7.1	TK	5.0	B		7	12	6	0.3	55	GON05
2004 02 13.82		S	7.0	TK	8.0	B		11	12	6	0.3	55	GON05
2004 02 14.75		M	7.1	HD	15	L	5	42	5	5/			SHU
2004 02 14.79		B	7.2	TI	8.0	B		11	7	6	5 m	60	LAB02
2004 02 14.81		M	7.2	TK	5.0	B		7	6	5			GRA04
2004 02 14.81		M	7.2	TK	7.0	R	7	15	6	5			GRA04
2004 02 14.82		M	6.9	S	3.0	B		6	13	6			MAR02
2004 02 14.82		M	7.4	S	3.0	B		6	10	4/			SAN04
2004 02 14.82		S	7.4	TK	10.0	T	10	38	5	5			DIJ
2004 02 15.03		M	7.0	HV	8.0	B		16	10	6	0.3	55	CRE01
2004 02 15.40		S	7.2	TJ	40.0	L	4	36	6.5	5			YOS04
2004 02 15.41	x	M	7.6	HV	15.0	B		25	6	5	20 m	50	MIT
2004 02 15.43	x	B	7.6	TJ	7.0	B		16	7.0	5	30 m	60	NAG04
2004 02 15.44	x	M	7.4	TK	10.0	B		20	6	4	10 m	50	YOS02
2004 02 15.72		S	7.1	AA	5.0	B		7	14	3			KOS
2004 02 15.74		M	7.2	TI	5.0	B		10	8	s5/	0.4	90	SAN07
2004 02 15.74		S	7.2	AA	6.0	B		20	4	5/			CSU
2004 02 15.77		M	7.1	TK	7.0	R	7	15	7	5			GRA04
2004 02 15.77		M	7.3	TK	8.0	B		15	6	5/			BOU
2004 02 15.77		S	7.2	TK	5.0	B		7	7	4			GRA04
2004 02 15.78		S	6.8	TT	5.0	B		10	10	6	0.5	50	RIE
2004 02 15.78		S	7.2:	TK	8.0	B		15		5			DIJ
2004 02 16.41	x	M	7.4	TJ	10.0	B		20	5	5/	15 m	60	NAG08

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 16.73		B	7.6	TJ	8.0	B		18	5	3			CHE03
2004 02 16.73		M	6.9	TT	5.0	B		10	10	5			LEH
2004 02 16.77		B	7.2	TK	5.0	B		10	2.3	4			HAS02
2004 02 16.79		S	7.2	HV	6.3	B		9	8	5			KAM01
2004 02 17.41	x	S	7.5	TJ	8.0	B		11	6.0	3/			MIY01
2004 02 17.74		M	7.0	TI	5.0	B		10	7	s4/	0.2	90	SAN07
2004 02 17.77		S	7.3	TK	8.0	B		15	6	6	0.2	52	DIJ
2004 02 17.78		M	7.2	TK	8.0	B		15	7.5	5	0.5	55	BOU
2004 02 17.78		S	7.2	TK	8.0	B		15	> 5	5/			COM
2004 02 17.94		S	7.5	TJ	8.0	B		11	5	7			SOU01
2004 02 18.41	xa	M	7.2	TJ	10.0	B		20	6	6	25 m	55	NAG08
2004 02 18.77		M	7.2	TK	8.0	B		15	6.5	6	0.5	57	BOU
2004 02 18.78		M	7.1	TK	7.0	R	7	15	6	5			GRA04
2004 02 18.78		S	6.8	TI	5.0	B		7	9	s6	1.5	50	SCA02
2004 02 18.78		S	6.9	TT	6.7	R	5	12	& 9	6			BUS01
2004 02 18.79		M	7.1	TK	10.0	T	10	38	6.5	5/	13 m	56	DIJ
2004 02 18.80		S	7.4	TK	8.0	B		15		5			COM
2004 02 18.84		S	7.0	TK	5.0	B		7	9	6	0.2	60	GON05
2004 02 18.85		S	7.0	TK	8.0	B		11	9	6	0.4	60	GON05
2004 02 19.71		M	7.0	HD	11	B		20	7	5			NEV
2004 02 19.74		B	7.5	TJ	8.0	B		18	5	5			CHE03
2004 02 19.77		M	7.3	TK	8.0	B		15	6	5/	0.6	57	BOU
2004 02 19.77		S	6.8	TT	6.7	R	5	12	& 9	6/	&0.2	50	BUS01
2004 02 19.78		M	7.3	TK	8.0	B		15	6.5	5/	19 m	55	DIJ
2004 02 19.79		S	6.7	TT	5.0	B		10	10	5	0.2	50	RIE
2004 02 19.80		M	7.1	TK	8.0	B		11	5.5	4/			GRA04
2004 02 19.81	&	S	6.9	TT	8.0	B		15	&10	5			SCH04
2004 02 20.44	x	B	7.7	TJ	7.0	B		16	3	4	23 m	55	NAG04
2004 02 20.71		E	7.0	NP	6	L	7	33	11	5	0.2		ROM
2004 02 20.71		M	7.3	HD	7	R	6	26	5	5/			SHU
2004 02 20.72		B	7.2	TK	5.0	B		10		4			HAS02
2004 02 20.72	x	M	7.2	TI	6.0	B		20	4	s7			SAR02
2004 02 20.73		S	6.9	AA	5.0	B		7	10	3			KOS
2004 02 20.73		S	7.0	AA	8.0	R	6	19	7	4	0.25	15	KOS
2004 02 20.74		M	6.8	TI	5.0	B		10	8	s4/	0.4	90	SAN07
2004 02 20.74		M	6.8	TT	5.0	B		10	10	5			LEH
2004 02 20.74		M	7.2	AA	6.0	B		20	4	S7			CSU
2004 02 20.76		M	6.7	TK	5.0	B		10	10	4			BAR06
2004 02 20.76		S	6.9	TJ	15.0	R	8	30	4	6			DIE02
2004 02 20.77		M	7.2	TK	8.0	B		15	6.5	6	0.5	57	BOU
2004 02 20.77		M	7.2	TK	8.0	B		15	7	6	0.5	50	DIJ
2004 02 20.77		S	7.2	HV	6.3	B		9	7	4			KAM01
2004 02 20.78		S	6.8	TT	6.7	R	5	12	& 9	6/	&0.2	50	BUS01
2004 02 20.78		S	6.8	TT	8.0	B		15	&10	5			SCH04
2004 02 20.81		S	6.9	TK	5.0	B		7	8	7	0.3	60	GON05
2004 02 20.82		S	7.0	TK	8.0	B		11	8	6	0.3	60	GON05
2004 02 20.83		S	7.2	TK	10.0	B		25	7	6	0.4	60	GON05
2004 02 20.84		S	7.4	TK	10.2	M	13	65	6	6	0.3	60	GON05
2004 02 21.72		S	7.5:	TJ	5.0	B		7					CHE03
2004 02 21.73		E	6.7	NP	6	L	7	33	12	5	0.7		ROM
2004 02 21.73		S	7.4:	AA	5.0	B		10	8.0	5	4.5	52	SAJ
2004 02 21.76		M	6.7	TK	5.0	B		10	10	s5	0.6	52	BAR06
2004 02 21.79		B	6.9	TT	5.0	B		7	9	6	0.3	50	KAR02
2004 02 22.78		M	7.1	TK	8.0	B		15	6	6	0.5	52	BOU
2004 02 22.78		M	7.2	TK	8.0	B		15	6.5	6			DIJ
2004 02 22.78		S	6.8	TT	6.7	R	5	12	&10	6/	&0.2	50	BUS01
2004 02 22.79		B	7.0	TI	8.0	B		11	6	6	10 m	70	LAB02
2004 02 22.79	&	S	6.9	TT	8.0	B		15	9	6	&0.2	50	SCH04
2004 02 22.81		S	6.9	TK	5.0	B		7	8	7	0.3	60	GON05
2004 02 22.82		S	6.9	TK	8.0	B		11	8	6	0.3	60	GON05
2004 02 22.82		S	7.1	TK	10.0	B		25	7	6	0.3	60	GON05
2004 02 23.44	xa	M	7.2	TK	10.0	B		20	6	5			YOS02
2004 02 23.76		S	6.9	TJ	15.0	R	8	30	4	6			DIE02
2004 02 23.78		M	7.1	TK	8.0	B		15	6	6	38 m	48	DIJ
2004 02 23.78		M	7.2	TK	8.0	B		15	6	6	0.5	52	BOU

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 23.78	&	S	6.8	TT	8.0	B		15	10	6			SCH04
2004 02 24.81		S	6.9	TK	5.0	B		7	7	7			GON05
2004 02 24.82		S	6.9	TK	8.0	B		11	7	6	0.2	60	GON05
2004 02 24.82		S	7.1	TK	10.0	B		25	6	6	0.2	60	GON05
2004 02 25.41	x	S	6.6	TJ	8.0	B		11	7.0	3/			MIY01
2004 02 25.42	xw	M	6.7	TJ	10.0	B		20	6	5	45 m	50	NAG08
2004 02 26.77		S	6.8	TJ	15.0	R	8	30	4	6			DIE02
2004 02 26.81		S	7.1:	HV	6.3	B		9	& 7	4			KAM01
2004 02 27.41	xa	M	6.7	TJ	10.0	B		20	6	5	30 m	50	NAG08
2004 02 27.41	x	M	7.1	HV	15.0	B		25	5	5	15 m	55	MIT
2004 02 27.44	xa	M	7.2:	TK	10.0	B		20	5	6			YOS02
2004 02 28.80		M	6.8	TK	7.0	R	7	15	6	5			GRA04
2004 02 28.80		S	6.9	TK	5.0	B		7	5	4			GRA04
2004 02 28.80		S	7.0	TI	8.0	B		11	5	7	5 m	65	LAB02
2004 02 29.41	xw	M	7.0	HV	15.0	B		25	4	5			MIT
2004 02 29.78		S	6.8	TK	7.0	R	7	24	6	4/			GRA04
2004 02 29.79		M	7.0	TK	15.6	L	5	36	6	5			BOU
2004 02 29.79		S	7.0:	TK	15.6	L	5	36	7	5			DIJ
2004 03 01.81		S	6.7	TK	8.0	B		11	6	6			GON05
2004 03 01.82		S	6.7	TK	5.0	B		7	6	7			GON05
2004 03 01.83		S	6.9	TK	10.0	B		25	5	6	0.1	60	GON05
2004 03 03.79		M	6.7	TK	7.0	R	7	24	5	5			GRA04
2004 03 04.72		S	6.6	AA	5.0	B		7	4	3			KOS
2004 03 04.72		S	6.6	AA	8.0	R	6	19	6	3			KOS
2004 03 04.73		S	7.3:	TJ	7.5	B		40	3	5			CHE03
2004 03 04.79		S	6.7:	TK	8.0	R	5	40	4	4/			GRA04
2004 03 05.73		[	7.0	TJ	7.5	B		40					CHE03
2004 03 05.73		S	6.3	AA	5.0	B		7	12	2			KOS
2004 03 05.73		S	6.4	AA	8.0	R	6	19	10	3			KOS
2004 03 06.73		S	6.2	AA	5.0	B		7	13	2			KOS
2004 03 06.73		S	6.3	AA	8.0	R	6	48	10	2			KOS
2004 03 07.72		M	6.7:	TK	5.0	B		10	6	4			BAR06
2004 03 07.77		S	6.7	TK	15.2	L	5	44	4	5			GRA04
2004 03 07.79		S	6.8	TK	6.0	B		15		6			DIJ
2004 03 10.78	!	S	6.5:	TK	20.3	T	10	62	3	4/			GRA04
2004 04 09.36		S	4.6:	YG	8.0	B		20	6	7			AMO01
2004 04 09.88	x	B	5.2	TT	8.0	B		20	4	7/			PEA
2004 04 10.89	x	B	5.0	TT	8.0	B		20	3.8	7/			PEA
2004 04 11.88	x	B	4.9	TT	4.0	B		8		8			PEA
2004 04 11.88	x	B	4.9	TT	8.0	B		20	4.5	8			PEA
2004 04 13.35		B	4.6	YG	5.0	B		7	5	7/			AMO01
2004 04 14.36		I	4.7:	YG	8.0	B		20	5	7/			AMO01
2004 04 14.82	xa	S	5.0:	TK	10.0	B		20		6			YOS02
2004 04 15.20		[	4.2	TK	8.0	B		11					GON05
2004 04 15.80		B	4.7	AA	3.5	B		6					SEA
2004 04 15.89	x	B	4.6	TT	4.0	B		8	4.5	8	2.5	259	PEA
2004 04 15.89	x	B	4.6	TT	8.0	B		20	3.5	8	2.5	259	PEA
2004 04 15.89	x	I	4.6	TT	0.0	E		1		9			PEA
2004 04 16.35		B	4.5	YG	5.0	B		7	5	7			AMO01
2004 04 16.80	!	B	4.3	TK	5.0	B		7	& 5	8	2.5	256	MAT08
2004 04 17.34		B	4.7	YG	5.0	B		7	4	7/	0.2	250	AMO01
2004 04 17.79	x	S	4.5:	TJ	20.0	C	9	60	> 4	6/			KON03
2004 04 17.80	x$	M	4.7	TJ	14.1	B		25	3	6			NAG08
2004 04 17.81	x&	M	4.5:	HV	15.0	B		25	& 3	6			MIT
2004 04 18.38	$	B	4.0	TK	5	R	7	10	6	7/	>0.33	260	ROB06
2004 04 19.14		B	4.6	S	5.0	B		10		7/			VAN15
2004 04 19.15		B	5.0	AA	5.0	B		10		8	0.3	234	COO02
2004 04 19.38		B	4.5	TI	5.2	B		7	5	7			MAN04
2004 04 20.80	x$	M	4.7	TJ	8.0	B		11		7			NAG08
2004 04 20.80	x	B	4.7	HV	7.0	B		16	3.2	6	10 m	300	NAG04
2004 04 21.17		B	4.2	TI	8.0	B		11	8	7			LAB02
2004 04 21.87	x	B	4.3	TT	4.0	B		8	6.5	8	4.9	260	PEA
2004 04 21.88	x	B	4.3	TT	8.0	B		20	5.5	8	4.9	260	PEA
2004 04 21.88	x	I	4.4	TT	0.0	E		1					PEA
2004 04 22.79		I	4.2	AA	0.0	E		1					SEA

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 22.87	x	I	4.3	TT	0.0	E		1					PEA
2004 04 22.88	x	B	4.2	TT	4.0	B		8	6.5	8	6.5	252	PEA
2004 04 22.88	x	B	4.3	TT	8.0	B		20	5.5	8	6.5	252	PEA
2004 04 23.79	x$	M	4.8	TJ	10.0	B		20	4	6/			NAG08
2004 04 23.88	x	B	4.2	TT	8.0	B		20	5.5	8	5.2	256	PEA
2004 04 23.89	x	B	4.1	TT	4.0	B		8	6.5	8	5.2	256	PEA
2004 04 23.89	x	I	4.3	TT	0.0	E		1					PEA
2004 04 24.17		B	4.1	TI	10.2	T	5	20	6	6			LAB02
2004 04 24.36		M	4.4	YG	5.0	B		7	5	8	0.2	250	AM001
2004 04 24.78		B	4.1	AA	0.0	E		1					SEA
2004 04 24.78	x$	M	4.3:	HV	15.0	B		25	3	6/			MIT
2004 04 24.79	x$	M	4.8	TJ	8.0	B		11		7			NAG08
2004 04 24.79	$	S	4.6:	HV	8.0	B		11	6	5			MIY01
2004 04 24.80	x	M	4.2	TT	10.0	B		26					TSU02
2004 04 25.17		B	4.1	TI	8.0	B		11	6	6	15 m	286	LAB02
2004 04 25.17	$	B	4.4	TK	8.0	B		11	3	7	0.2	255	GON05
2004 04 25.34		B	4.1	YG	5.0	B		7	5	7	1.0	250	AM001
2004 04 25.34		I	4.2	YG	0.0	E		1		8			AM001
2004 04 25.39	a	B	3.9	TK	5	R	7	10	5.5	7/	>1	250	ROB06
2004 04 25.78		B	4.1	AA	0.0	E		1					SEA
2004 04 25.80	x	M	4.5:	TT	3.5	B		7					TSU02
2004 04 25.87	x	I	4.2	TT	0.0	E		1					PEA
2004 04 25.88	x	B	4.1	TT	4.0	B		8	6	8	5.5	262	PEA
2004 04 25.88	x	B	4.1	TT	8.0	B		20	5.5	8	5.5	262	PEA
2004 04 26.33		I	4.2	YG	0.0	E		1		8			AM001
2004 04 26.34		B	4.1	YG	5.0	B		7	5	7	1.56	260	AM001
2004 04 26.37		M	4.1	TI	5.2	B		7	5	7			MAN04
2004 04 27.18	$	B	4.1	TK	20.3	T	10	77	3	7	0.2	255	GON05
2004 04 27.36		B	4.3	YG	5.0	B		7	4	8	1.3	245	AM001
2004 04 27.36		I	4.2	YG	0.0	E		1		8			AM001
2004 04 28.87	x	I	4.1	TT	0.0	E		1					PEA
2004 04 28.88	x	B	4.1	TT	4.0	B		8	7	8	5.0	250	PEA
2004 04 28.88	x	B	4.1	TT	8.0	B		20	5	8	5.0	250	PEA
2004 04 29.35		B	4.3	YG	5.0	B		7	8	7	1.5	250	AM001
2004 04 29.35		I	4.2	YG	0.0	E		1		8			AM001
2004 04 29.87	x	B	4.1	TT	4.0	B		8	4	8	7.6	251	PEA
2004 04 29.87	x	I	4.1	TT	0.0	E		1					PEA
2004 04 29.88	x	B	4.1	TT	8.0	B		20	3.5	8	7.6	251	PEA
2004 04 30.35		B	3.9	YG	0.0	E		1		8			AM001
2004 04 30.35		B	4.2	YG	5.0	B		7	8	7	1.6	240	AM001
2004 05 01.87	x	B	3.9	TT	0.0	E		1			6		PEA
2004 05 01.88	x	B	3.9	TT	4.0	B		8	4	8	8.4	248	PEA
2004 05 01.88	x	B	4.0	TT	8.0	B		20	4	8	8.4	248	PEA

Comet C/2002 V1 (NEAT)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2002 12 03.55	x	S	12.0	HS	28	T	6	84	2	3			PEA
2002 12 07.59		S	12.4	VN	41	L	4	200	1.2	2			PEA
2002 12 28.87		M	8.5	AA	15.0	L	8	50	7	5			BEG01
2003 01 02.78		S	8.7	S	20.0	L	8	89	1.5	1/			COD02
2003 01 02.82		M	7.5	AA	5.0	B		10	12	5			BEG01
2003 01 05.55	x	S	8.5	TT	8.0	B		20	5	4			PEA
2003 01 05.74		M	7.4	AA	5.0	B		7	12	5			BEG01
2003 01 06.57	x	S	8.4	TT	8.0	B		20	7.2	4			PEA
2003 01 06.75		S	9.0	S	11.2	L	8	72					GEY
2003 01 06.82		M	7.4	AA	5.0	B		7	12	6			BEG01
2003 01 07.56	x	S	8.2	TT	8.0	B		20	5.5	4			PEA
2003 01 07.80		M	7.3	AA	5.0	B		7	12	5			BEG01
2003 01 08.53	x	S	8.1	TT	8.0	B		20	6.5	4			PEA
2003 01 14.76		M	6.8	AA	5.0	B		7	7	6			BEG01
2003 01 15.75		S	6.9	AA	5.0	B		10	6	5			BEG01
2003 01 18.74		S	6.6:	AA	5.0	B		7	7	5			BEG01
2003 01 25.52	x	S	6.4	TT	8.0	B		20	4	5/			PEA
2003 01 26.52	x	S	6.4	TT	8.0	B		20	4	5			PEA

Comet C/2002 V1 (NEAT) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 02 26.97		B	3.1:	HI	5.0	B		8	4	7	30	m 150	BUS02
2003 03 03.77		S	4.0	S	5.0	B		10		8			C0002
2003 03 16.77		S	6.0	S	5.0	B		10		5/			C0002

Comet C/2002 X5 (Kudo-Fujikawa)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2002 12 18.08	w	S[	7.6	S	11	L	7	32	! 6				SVE01
2003 02 07.74		S	6.4	S	20.0	L	8	82		7/			C0002
2003 02 08.51	x	S	6.0	TT	8.0	B		20	3	6	2.0	172	PEA
2003 02 11.52	x	S	6.8	TT	8.0	B		20	3	6	0.5	182	PEA
2003 03 16.77		S	9.5	S	40.0	L	4	72		0			C0002

Comet C/2002 Y1 (Juels-Holvorcem)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 08 30.83		S	12.9	VN	41	L	4	200	1.0	1			PEA

Comet C/2003 H1 (LINEAR)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 01 23.69		S	12.8	TK	28	T	10	133	1	4			MAT08
2004 02 01.23		S	12.7	TK	20.3	T	10	100	1.2	3			GON05
2004 02 15.75		S	11.5	TJ	40.0	L	4	144	1.6	3			YOS04
2004 02 17.22		S	12.5	TK	20.3	T	10	77	1.5	4			GON05
2004 02 17.54		S	12.4	GA	25.4	L	4	71					SEA
2004 02 18.54		S	12.2	GA	25.4	L	4	71	4				SEA
2004 02 18.80	x	S	11.6	TJ	32.0	L	5	87	1.8	2			NAG08
2004 02 20.69		S	12.1	TK	28	T	10	133	1	4			MAT08
2004 02 21.08	x	S	12.5	HS	25.0	L	5	91	0.6	5/			SAR02
2004 02 23.77		S	11.9:	AU	40.0	L	4	144	1.2	4			YOS04
2004 02 28.60		S	11.7	TK	28	T	10	133	1	4			MAT08
2004 03 12.55		S	12.0	AU	25.4	L	4	113	1.5	3			YOS02
2004 03 13.60	x	B	13.5	HS	30.4	L	5	142	0.7	3			NAG04
2004 03 14.58		S	11.8	AU	32.0	L	5	87	1.5	3			NAG08
2004 03 14.58	x	S	12.2	HS	32.0	L	5	87	1.5	3			NAG08
2004 03 15.99		S	11.4	TK	20.3	T	10	77	1.7	5			GON05
2004 03 16.31		S	11.4:	TK	9	R	6	40	1.3	2			SHA02
2004 03 17.11		S	11.7	TK	9	R	6	40	1.3	3			SHA02
2004 03 17.79		S	12.2	HS	27.0	L	6	120	0.8	2			TOT03
2004 03 22.02		S	12.0	TK	14.3	L	6	225					AMO01
2004 03 23.04		S	12.0	TK	14.3	L	6	80					AMO01
2004 03 23.51		S	12.3	VN	41	L	4	90	1.2	4			PEA
2004 03 25.14		S	11.3	TK	9	R	6	40	2.4	2			SHA02
2004 03 25.53		S	12.2	VN	41	L	4	90	1.5	4			PEA
2004 03 26.60		S	11.7	AU	25.4	L	4	113	1.5	3			YOS02
2004 03 27.57		S	11.6	AU	32.0	L	5	87	1.5	2			NAG08
2004 03 28.54	x	S	12.5	HS	31.7	L	6	152	0.7	3			MIY01
2004 03 28.56		S	11.8	AU	40.0	L	4	144	1.2	3			YOS04
2004 04 08.81		S[	12.2	HS	20.0	L	5	111	! 1.0				NAG09
2004 04 11.86		S	12.3	TK	31.0	J	6	109	1.2	3/			BOU
2004 04 14.48		S	13.0	GA	25.4	L	4	71					SEA
2004 04 14.93		S	12.4	TK	20.3	T	10	100	1.0	5			GON05
2004 04 15.48		S	12.8	VN	41	L	4	90	1.2	1			PEA

Comet C/2003 K4 (LINEAR)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 08 24.91	x	S	14.0:	HS	25	L	5	180	0.4	2/			BOH02
2003 08 25.90	x	S	13.9:	HS	25	L	5	190	0.4	3			BOH02
2003 08 28.95	x	S	14.0:	HS	25	L	5	180	0.4	2/			BOH02
2004 02 17.24		S	12.7	TK	20.3	T	10	100	0.5	5			GON05
2004 02 21.15	x	S	13.3	HS	25.0	L	5	91	0.7	4			SAR02
2004 02 21.21		S	13.0	HN	31.0	J	6	143	0.8	3/			DIJ
2004 02 21.21		S	13.0	HN	31.0	J	6	143	0.6	4/			BOU

Comet C/2003 K4 (LINEAR) [cont.]

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 02 23.82		S	12.2	TJ	40.0	L	4	144	0.8	6/			YOS04
2004 03 16.18		S	12.4	TK	20.3	T	10	100	0.5	6			GON05
2004 03 18.15		M	11.8	TT	10	B	4	25	1.5	6			LEH
2004 03 18.82	x	B	11.8	TJ	30.4	L	5	142	0.5	5			NAG04
2004 03 20.15		S	12.3	HN	25.4	J	6	88	0.9	4/			BOU
2004 03 23.86		S	12.7	VN	41	L	4	90	0.6	5			PEA
2004 03 25.86		S	12.6	VN	41	L	4	90	0.6	5			PEA
2004 03 26.76		S	12.2	AU	32.0	L	5	87	0.5	7			NAG08
2004 03 27.14		S	12.3	HN	25.4	J	6	115	0.8	4/			BOU
2004 03 27.16		S	11.5	TK	30.0	L	4	120	1	4			VAN16
2004 03 28.75	x	B	11.8	TJ	30.4	L	5	142	0.25	5			NAG04
2004 03 30.14		S	12.2	HN	25.4	J	6	88	0.9	4/			BOU
2004 03 31.14		M	11.5	TT	10	B	4	25	1.5	6			LEH
2004 04 02.76		S	11.7	TJ	40.0	L	4	144	1.0	6			YOS04
2004 04 08.79		S	11.9	AU	32.0	L	5	87	0.7	6/			NAG08
2004 04 11.00		S	11.7	NP	30	L	5	60	0.8	3			NEV
2004 04 11.08		S	11.1	AC	13	L	7	45	1.1	3/			RES
2004 04 12.07		S	11.4	TJ	15.0	L	5	150	0.4	3			SHU
2004 04 12.09		S	11.0	AC	13	L	7	45	1.1	3			RES
2004 04 13.00		S	11.7	TK	30	L	5	100	0.6	3			NEV
2004 04 14.78	x	M	11.2	TK	25.4	L	4	113	0.9	6			YOS02
2004 04 15.14		S	11.6	TK	20.3	T	10	133	0.7	5			GON05
2004 04 15.78		S	11.9	GA	25.4	L	4	71	0.8				SEA
2004 04 15.85	x	S	12.1	TT	41	L	4	90	0.9	5			PEA
2004 04 16.00		S	12.0:	HS	20.0	L	5	111	0.8	6			NAG09
2004 04 16.73		S	11.2	TJ	40.0	L	4	144	0.8	6			YOS04
2004 04 16.79	x	S	11.3	TJ	32.0	L	5	87	0.7	6/			NAG08
2004 04 16.80	x	B	11.7	TJ	30.4	L	5	100	0.4	6			NAG04
2004 04 17.00		S	11.5	TK	30	L	5	60	0.7	4			NEV
2004 04 17.02		S	11.3	HS	36	L	6	80	1.7	3			BAR06
2004 04 17.71	x	S	11.5	TJ	40.6	L	4	90	0.9	6			KON03
2004 04 17.93		M	11.7	TJ	41	L	4		0.5	4			SHU
2004 04 19.00		S	11.2	HS	36	L	6	80	1.7	4			BAR06
2004 04 20.13		S	11.1:	TK	10	B		20	2.1	4			SHA02
2004 04 21.00		S	11.6	TK	30	L	5	100	0.7	4			NEV
2004 04 21.86	x	S	11.9	TT	20	L	4	90	0.8	5			PEA
2004 04 22.04		S	11.8	HS	20.0	L	5	111	1	6			NAG09
2004 04 22.86	x	S	11.8	TT	20	L	4	90	0.8	5			PEA
2004 04 23.77	x	S	11.2	TJ	32.0	L	5	58	0.9	6/			NAG08
2004 04 23.86	x	S	11.8	TT	20	L	4	90	0.6	6/			PEA
2004 04 25.14		S	11.4	TK	20.3	T	10	100	0.8	5			GON05
2004 04 25.15		S	11.1	TI	23.5	T	10	94	0.5	3			LAB02
2004 04 25.83	x	S	11.7	TT	20	L	4	90	1.0	6			PEA
2004 04 26.09		S	10.8:	TK	10	B		25	1.6	4			SHA02
2004 04 27.00		S	11.5	TK	30	L	5	60	0.7	3			NEV
2004 04 27.08		M	11.2	TK	25.4	J	6	88	1.1	6/			DIJ
2004 04 27.08		M	11.6	TK	25.4	J	6	88	1.0	5/			BOU
2004 04 28.85	x	S	11.5	TT	20	L	4	90	1.0	5/			PEA
2004 04 29.03		S	10.9	TK	20	L	5	70	1.7	3			BAR06
2004 04 29.85	x	S	11.5	TT	20	L	4	90	0.9	5			PEA
2004 04 30.03		S	10.8	AC	13	L	7	45	1.0	3			RES
2004 05 01.85	x	S	11.4	TT	20	L	4	90	1.0	5			PEA

Comet C/2003 T3 (Tabur)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2003 10 16.49		S	11.9	VN	41	L	4	200	0.9	3			PEA
2003 12 27.50		S	11.1	TK	28	T	10	133	1	4			MAT08
2004 04 23.16		S	9.5	TK	20.3	T	10	77	3	3			GON05
2004 04 24.16		S	9.4	TI	23.5	T	10	57	2	3			LAB02
2004 04 25.16		S	9.5	TI	23.5	T	10	57	2	3			LAB02
2004 04 25.16		S	9.6	TK	20.3	T	10	77	2	3			GON05
2004 04 29.03		S	9.2:	TK	20	L	5	70	2	3			BAR06

Comet P/2004 F3 (NEAT)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 15.70		S	[14.0	VN	41	L	4	200	! 0.5				PEA

Comet C/2004 F4 (Bradfield)

DATE (UT)	N	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
2004 04 23.14		S	2.6:	TK	8.0	B		20	0.5	8	5 m	320	SHA02
2004 04 23.21	$	B	3.9	TK	20.3	T	10	77	0.5	8	0.1	290	GON05
2004 04 23.79	x$	M	4.3:	HV	15.0	B		25	2	8	3	305	MIT
2004 04 23.80	x$	M	4.2	TJ	10.0	B		20	2	7/	&3	310	NAG08
2004 04 24.07		B	4.7	TK	5.0	B		7	1	8			GRA04
2004 04 24.07		B	4.7	TK	7.0	R	7	24	0.7	8			GRA04
2004 04 24.08		B	5.0	TK	6.3	B		9	0.5	8	0.06	305	DAH
2004 04 24.17		B	4.2	TI	10.2	T	5	20	1.5	8	50 m	302	LAB02
2004 04 24.39	a	B	4.0:	HV	8.0	B		16	2	8	2	295	CRE01
2004 04 24.79	x$	M	4.4	HV	15.0	B		25	1	8	3	305	MIT
2004 04 24.79	$	S	4.2:	HV	8.0	B		11	3	8	&3	300	MIY01
2004 04 24.80	x$	M	4.8	TJ	8.0	B		11		8	&3	300	NAG08
2004 04 24.81	x$	M	4.5:	TK	10.0	B		20		S7	&0.8	305	YOS02
2004 04 25.12	$	I	4.0	TK	0.0	E		1		9	8.5	300	GON05
2004 04 25.15	$	B	3.7	TK	5.0	B		7	2	8	11.5	300	GON05
2004 04 25.16		B	4.2	TI	8.0	B		11	2	8	60 m	300	LAB02
2004 04 25.80	x	B	5.0	HV	7.0	B		16		7/	1.5	310	NAG04
2004 04 25.80	x	M	4.2	TT	3.5	B		7					TSU02
2004 04 25.81	x$	M	4.6:	TK	3.5	B		7		7	2.5	305	YOS02
2004 04 25.81	x$	M	4.9:	TK	10.0	B		20		S7	&1.5	305	YOS02
2004 04 26.11	!	S	4.9	TK	8.0	B		20	3	8	2.8	300	SHA02
2004 04 26.14		B	4.4	TK	5.0	B		7	1	S8	&0.5	300	KUG
2004 04 27.02		B	4.8	HD	11	B		20	2	S8	3.5	305	NEV
2004 04 27.02		M	5.2	HD	6.0	R	2	11	&10	5	&20 m		SHU
2004 04 27.08		M	4.8:	TI	5.0	B		10	1	8	6	300	NAG09
2004 04 27.09		M	5.1	TK	8.0	B		15		8	3.0	300	BOU
2004 04 27.10		M	5.1	TK	8.0	B		15		8	3.8	298	DIJ
2004 04 27.16		B	5.1	TK	5.0	B		7	2	8	8.0	305	GON05
2004 04 27.37	a	B	4.9	HV	8.0	B		16	2	8	6	300	CRE01
2004 04 28.01		M	5.0	TK	5.0	B		10	7	7	5	301	BAR06
2004 04 28.01		M	5.4	HD	6.0	R	2	11	2	8	&50 m		SHU
2004 04 29.02		B	5.3	TK	4	R		8	5	8	4	303	BAR06
2004 04 29.02		M	5.3	TK	5.0	B		10	6	7	4.5	303	BAR06
2004 04 29.07		M	5.0	TI	5.0	B		10	2	S8	6	280	NAG09
2004 04 29.08	x	M	5.6	TI	6.0	B		20	4	S7	3	320	SAR02
2004 04 30.07		M	5.4	TI	5.0	B		10	2	7	5	280	NAG09
2004 04 30.08		S	5.6	AC	6.0	B		7	& 3	6	0.5	300	RES
2004 05 01.07		B	5.8	TK	5.0	B		10		7	2.8	300	MEY

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Non-Visual Data (new format)

TABULATED NON-VISUAL DATA

The new format for non-visual data was introduced in the October 2001 issue of the *ICQ*, chiefly to help researchers make more sense of comet photometry obtained with CCD cameras, to determine what effects various instrumental factors play (spectral responses, exposure times, photometric aperture sizes, etc.). As described in that issue, almost all of the new information is added to the original observation records in columns 81-129, thereby leaving the first 80 columns essentially unchanged (except that in the "coma-diameter" column, true coma diameters are now given without exception in the new format; the old format allowed CCD users to put instead an aperture size in the "coma-diameter" column, but this is now allowed for in columns 87-93 of the new-format records). See also page 208 of the July 2002 issue.

Most of the columns below are as for the visual data (described on pages 79-80 of this issue). While electronic magnitudes *can* be submitted to 0.01 magnitude, for many reasons it is highly advised to continue giving total comet magnitudes only to 0.1 mag. Similarly, it is advised to continue giving all times to 0.01 day, as 0.001 day is usually unnecessary for cometary photometry.

The headings for the tabulated data are as follows: The date (UT), notes, magnitude method (including filters for CCDs, and "P" for photographs), magnitude, reference, instrument aperture, instrument type, instrument *f*-ratio, exposure time, coma diameter, degree of condensation, tail length and position angle, and observer are all as described for the visual tabulation. The column headed "APERTUR" gives the photometric aperture, preceded by "S" for square aperture and "C" for circular aperture, and followed by "d" for degrees, "m" for arcmin, and "s" for arcsec. The column "Chp" contains the 3-character code for the computer chip, given to indicate spectral response of the CCD camera. This column will also be used to indicate photographic emulsion when such information is provided for photographic photometry. The column "Sfw" contains the 3-character code for the software used to actually perform the photometric measures (not solely to extract comparison-star magnitudes). A lower-case "a" between these two columns indicates an anti-blooming CCD. The column headed "C" gives a number as follows: 0 = no correction; 1 = correction for bias (bias subtracted); 2 = flat-field corrected (flat-fielded); 3 = 1 + 2; 4 = dark-subtracted (and bias-subtracted) 5 = 2 + 4. The column headed "P" includes a P if the images used to measure the photometry were also measured for astrometry *and* those astrometric measures were published in the *Minor Planet Circulars* (meaning they were refereed); a U in this column indicates that the respective astrometric was sent to the MPC for publication but that either (a) they are unpublished at the time of reporting the photometry or (b) the observer is unaware of the publication status; a blank in this column indicates that no astrometry was measured. The 3-character CCD-camera code is listed under "Cam".

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Comet 2P/Encke

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 24.76	d	k	13.6	LA	35	L	5	a660	2.4				C 2.40m	T24	GAI	5	P	ST6	HOR02
2003 10 24.76	d	k	13.8	LA	35	L	5	a660	2.4				C 2.00m	T24	GAI	5	P	ST6	HOR02
2003 10 24.76	d	k	14.4	LA	35	L	5	a660	2.4				C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 10 24.76	d	k	14.8	LA	35	L	5	a660	2.4				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 11 04.79	d	k	13.5	LA	35	L	5	a600	6				C 2.00m	T24	GAI	5	P	ST6	HOR02
2003 11 04.79	d	k	14.7	LA	35	L	5	a600	6				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 11 04.79	d	k	14.9	LA	35	L	5	a600	6				C 0.37m	T24	GAI	5	P	ST6	HOR02
2003 11 08.80	d	k	14.4	LA	35	L	5	A080	10				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 11 08.80	d	k	14.7	LA	35	L	5	A080	10				C 0.33m	T24	GAI	5	P	ST6	HOR02
2003 11 19.72	d	k	12.2	LA	35	L	5	a420	> 6.5				C 2.00m	T24	GAI	5	P	ST6	HOR02
2003 11 19.72	d	k	13.0	LA	35	L	5	a420	> 6.5				C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 11 19.72	d	k	14.0	LA	35	L	5	a420	> 6.5				C 0.50m	T24	GAI	5	P	ST6	HOR02

Comet 10P/Tempel

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 15.78		C	19.7	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 15.69		C	18.7	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 26.65		C	18.6	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.60		C	18.4	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 24.61		C	18.2	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01

Comet 28P/Neujmin

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 23.97	d	k	17.6	LA	35	L	5	a720	0.23				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 12 23.97	d	k	17.6	LA	35	L	5	a720	0.23				C 0.23m	T24	GAI	5	P	ST6	HOR02
2003 12 25.02	d	k	17.4	LA	35	L	5	a720	0.18				C 0.18m	T24	GAI	5	P	ST6	HOR02
2003 12 25.02	d	k	17.4	LA	35	L	5	a720	0.18				C 0.50m	T24	GAI	5	P	ST6	HOR02
2004 01 14.86	d	k	18.3	LA	35	L	5	B580	0.20				C 0.20m	T24	GAI	5	P	ST6	HOR02
2004 02 12.51		C	19.2	GA	60.0Y		6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAK01

Comet 29P/Schwassmann-Wachmann

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 07.78	d	k	13.9	LA	35	L	5	a660	1.8				C 1.80m	T24	GAI	5	P	ST6	HOR02
2003 12 07.78	d	k	14.3	LA	35	L	5	a660	1.8				C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 12 07.78	d	k	15.0	LA	35	L	5	a660	1.8				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 12 09.79	d	k	14.2	LA	35	L	5	a660	1.8				C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 12 09.79	d	k	15.0	LA	35	L	5	a660	1.8				C 0.50m	T24	GAI	5	P	ST6	HOR02
2003 12 23.77	d	k	13.9	LA	35	L	5	a600	1.1				C 1.10m	T24	GAI	5	P	ST6	HOR02
2003 12 23.77	d	k	14.6	LA	35	L	5	a600	1.1				C 0.50m	T24	GAI	5	P	ST6	HOR02

Comet 40P/Väisälä

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.78	x	C	14.5	TJ	25.0	L	5	a120	0.4		2.2m	283	S 0.4 m	K42	SI4	5	U	SE7	OHS
2004 01 31.84		C	15.3	GA	60.0	Y	6	a120	0.6		3.9m	285	S 0.6 m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 15.83		C	15.1	GA	60.0	Y	6	a120	0.7		4.0m	288	S 0.7 m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 20.69	x	C	15.1	TJ	25.0	L	5	a120	0.5		0.9m	284	S 0.5 m	K42	SI4	5	U	SE7	OHS
2004 03 18.78		C	14.9	GA	60.0	Y	6	a120	0.8		4.3m	283	S 0.8 m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 20.67	x	C	15.7	TJ	25.0	L	5	a120	0.4		3.8m	273	S 0.4 m	K42	SI4	5	U	SE7	OHS
2004 03 28.75		C	15.1	GA	60.0	Y	6	a120	0.6		3.5m	274	S 0.6 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 14.02		C	15.8	UO	15.0	L	5	a180	0.4	4			C 0.4 m	T25	A32	4		PIX	SHU
2004 04 15.30	a	V	14.9	LA	40.6	T	6	a500	0.38				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 17.71	x	C	15.3	TJ	25.0	L	5	a120	0.6		3.5m	256	S 0.6 m	K42	SI4	5	U	SE7	OHS
2004 04 20.03		C	16.2	UO	15.0	L	5	a150	0.75	2			C 0.75m	T25	A32	4		PIX	SHU
2004 04 23.69		C	15.3	GA	60.0	Y	6	a120	0.6		2.7m	258	S 0.6 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 26.98		C	16.5	UO	15.0	L	5	a300	0.5	2			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 27.99		C	16.0	UO	15.0	L	5	a180	0.5	2			C 0.5 m	T25	A32	4		PIX	SHU

Comet 43P/Wolf-Harrington

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 08 22.84		C	15.2	UO	35.0	L	5	a120					C 1.00m	K26	AfP	5	P	ST9	LIG
2003 08 31.88		C	15.0	UO	35.0	L	5	a240			1.0m	214	C 1.00m	K26	AfP	5	P	ST9	LIG
2003 09 20.92		C	14.0	UO	35.0	L	5	a240			1.0m	198	C 1.60m	K26	AfP	5	P	ST9	LIG
2003 09 25.79		k	14.4	TI	35.0	L	5	a120					C 0.50m	K26	AfP	5	P	ST9	LIG
2003 09 30.86		k	14.6	UO	35.0	L	5	a120					C 0.50m	K26	AfP	5	P	ST9	LIG
2003 10 15.78		k	14.0	TI	35.0	L	5	a240					C 1.00m	K26	AfP	5	P	ST9	LIG
2003 10 22.87		k	13.3	TI	35.0	L	5	a 60					C 1.80m	K26	AfP	5	P	ST9	LIG
2003 10 24.79	d	k	13.5	LA	35	L	5	a540	1.4		1.6m	126	C 1.40m	T24	GAI	5*P		ST6	HORO2
2003 10 24.79	d	k	13.8	LA	35	L	5	a540	1.4		1.6m	126	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 10 24.79	d	k	14.2	LA	35	L	5	a540	1.4		1.6m	126	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 11 08.86	d	k	13.2	LA	35	L	5	a480	1.6		2.1m	95	C 1.60m	T24	GAI	5*P		ST6	HORO2
2003 11 08.86	d	k	13.4	LA	35	L	5	a480	1.6		2.1m	95	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 11 08.86	d	k	13.9	LA	35	L	5	a480	1.6		2.1m	95	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 11 12.74		k	13.3	HI	35.0	L	5	a 60					C 1.70m	K26	AfP	5	P	ST9	LIG
2003 11 28.82		k	12.8	HI	35.0	L	5	a 20			1.4m	68	C 1.60m	K26	AfP	5	P	ST9	LIG
2003 11 29.94	d	k	13.3	LA	35	L	5	a540	1.3		2.6m	71	C 1.30m	T24	GAI	5*P		ST6	HORO2
2003 11 29.94	d	k	13.4	LA	35	L	5	a540	1.3		2.6m	71	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 11 29.94	d	k	13.9	LA	35	L	5	a540	1.3		2.6m	71	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 07.81	d	k	13.0	LA	35	L	5	a660	1.4		2.4m	58	C 2.00m	T24	GAI	5*P		ST6	HORO2
2003 12 07.81	d	k	13.1	LA	35	L	5	a660	1.4		2.4m	58	C 1.40m	T24	GAI	5*P		ST6	HORO2
2003 12 07.81	d	k	13.4	LA	35	L	5	a660	1.4		2.4m	58	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 12 07.81	d	k	13.9	LA	35	L	5	a660	1.4		2.4m	58	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 09.77	d	k	12.7	LA	35	L	5	a660	1.6		5.5m	67	C 2.00m	T24	GAI	5*P		ST6	HORO2
2003 12 09.77	d	k	13.0	LA	35	L	5	a660	1.6		5.5m	67	C 1.60m	T24	GAI	5*P		ST6	HORO2
2003 12 09.77	d	k	13.3	LA	35	L	5	a660	1.6		5.5m	67	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 12 09.77	d	k	13.8	LA	35	L	5	a660	1.6		5.5m	67	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 12.69		k	13.1	TI	35.0	L	5	a120			2.0m	60	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 16.74		H	12.7	TI	35.0	L	5	a120			2.0m	61	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 23.81	d	k	12.9	LA	35	L	5	a480	1.0		3.1m	57	C 2.00m	T24	GAI	5*P		ST6	HORO2
2003 12 23.81	d	k	13.4	LA	35	L	5	a480	1.0		3.1m	57	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 12 23.81	d	k	13.9	LA	35	L	5	a480	1.0		3.1m	57	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 24.80		k	12.5	TI	35.0	L	5	a 60			2.0m	57	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 24.88	d	k	12.7	LA	35	L	5	a420	1.1		3.0m	56	C 3.00m	T24	GAI	5*P		ST6	HORO2
2003 12 24.88	d	k	12.8	LA	35	L	5	a420	1.1		3.0m	56	C 2.00m	T24	GAI	5*P		ST6	HORO2
2003 12 24.88	d	k	13.3	LA	35	L	5	a420	1.1		3.0m	56	C 1.10m	T24	GAI	5*P		ST6	HORO2
2003 12 24.88	d	k	13.8	LA	35	L	5	a420	1.1		3.0m	56	C 0.50m	T24	GAI	5*P		ST6	HORO2
2004 01 05.84	d	k	12.9	LA	35	L	5	a600	0.68		4.1m	37	C 2.00m	T24	GAI	5*P		ST6	HORO2
2004 01 05.84	d	k	13.3	LA	35	L	5	a600	0.68		4.1m	37	C 1.00m	T24	GAI	5*P		ST6	HORO2
2004 01 05.84	d	k	13.5	LA	35	L	5	a600	0.68		4.1m	37	C 0.68m	T24	GAI	5*P		ST6	HORO2
2004 01 05.84	d	k	13.7	LA	35	L	5	a600	0.68		4.1m	37	C 0.50m	T24	GAI	5*P		ST6	HORO2
2004 01 15.84		k	12.9	TI	35.0	L	5	a120			1.5m	48	C 1.40m	K26	AfP	5	P	ST9	LIG
2004 01 21.85		k	12.8	TI	35.0	L	5	a 60					C 1.40m	K26	AfP	5	P	ST9	LIG
2004 02 10.48	wx	C	12.6	TJ	25.0	L	5	a120	0.7		1.8m	45	S 0.7 m	K42	SI4	5	U	SE7	OHS
2004 02 12.46		C	13.2	GA	60.0	Y	6	a120	1.1		2.0m	51	S 1.1 m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 16.45	ax	C	13.1	HV	35.0	C	9	a120	0.8	5	2.2m	42	S 1.27m	KAIa	SI3	558		ST2	TSUO2
2004 02 17.78		k	12.8	TI	35.0	L	5	a 60					C 1.20m	K26	AfP	5	P	ST9	LIG
2004 02 18.47	wx	C	13.4	TJ	25.0	L	5	a120	0.8		2.1m	43	S 0.8 m	K42	SI4	4	U	SE7	OHS

Comet 43P/Wolf-Harrington [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 25.44	ax	C	13.4	HV	35.0	C	9	a120	0.6	5	1.1m	53	S 0.77m	KAIa	SI3	509		ST2	TSU02
2004 03 09.42	ax	C	12.8	HV	35.0	C	9	a 90	0.6	5	1.2m	52	S 1.82m	KAIa	SI3	509		ST2	TSU02
2004 03 13.41	ax	C	13.2	HV	35.0	C	9	a120	0.8	5	1.4m	55	S 1.19m	KAIa	SI3	528		ST2	TSU02
2004 03 14.43	wx	C	13.6	TJ	25.0	L	5	a120	0.8				S 0.8 m	K42	SI4	5	U	SE7	OHS
2004 04 08.44	a	C	12.9	GA	60.0	Y	6	a120	1.25		2.3m	70	S 1.25m	SIA	IPL	5	U	Ap7	NAK01

Comet 81P/Wild

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 20.81	x	C	15.6	TJ	25.0	L	5	a120	0.3		0.9m	284	S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 04 17.75	ax	C	16.0	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS

Comet 88P/Howell

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 20.80	wx	C	13.3	TJ	25.0	L	5	a120	0.6				S 0.6 m	K42	SI4	5	U	SE7	OHS
2004 04 17.77	ax	C	13.3	TJ	25.0	L	5	a120	0.7				S 0.7 m	K42	SI4	5		SE7	OHS

Comet 104P/Kowal

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 23.75	d	k	18.5	LA	35	L	5	a600					C 0.25m	T24	GAI	5*		ST6	HOR02

Comet 117P/Helin-Roman-Alu

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.81		C	18.5	GA	60.0	Y	6	a240	0.25		0.9m	298	S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 02 15.77		C	18.3	GA	60.0	Y	6	a240	0.3		1.0m	297	S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 28.74	wx	C	18.5	TJ	25.0	L	5	a120	0.2		0.6m	293	S 0.2 m	K42	SI4	5	U	SE7	OHS
2004 03 15.65		C	17.7	GA	60.0	Y	6	a240	0.3		1.3m	290	S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 20.69	x	C	17.7	TJ	25.0	L	5	a300	0.2				S 0.2 m	K42	SI4	5	U	SE7	OHS
2004 03 26.62		C	17.7	GA	60.0	Y	6	a240	0.35		1.1m	293	S 0.35m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.56		C	17.5	GA	60.0	Y	6	a240	0.3		1.5m	293	S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 16.62	x	C	17.7	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 04 24.59		C	17.4	GA	60.0	Y	6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01

Comet 118P/Shoemaker-Levy

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.78		C	16.1	GA	60.0	Y	6	a120	0.6		4.2m	292	S 0.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 15.73		C	15.8	GA	60.0	Y	6	a120	0.7		2.9m	293	S 0.7 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 17.65	ax	C	15.8	HV	35.0	C	9	A440	0.4	5			S 0.85m	KAIa	SI3	5		ST2	TSU02
2004 02 28.70	wx	C	16.5	TJ	25.0	L	5	a120	0.3		3.5m	285	S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 03 13.57	ax	C	14.8	HV	35.0	C	9	a120	0.6	6			S 1.09m	KAIa	SI3	5		ST2	TSU02
2004 03 15.64		C	14.9	GA	60.0	Y	6	a120	0.85		3.3m	292	S 0.85m	SIA	IPL	5	U	Ap7	NAK01
2004 03 26.60		C	15.1	GA	60.0	Y	6	a120	0.8			290	S 0.8 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.55		C	15.9	GA	60.0	Y	6	a120	0.65				S 0.65m	SIA	IPL	5	U	Ap7	NAK01
2004 04 16.59	x	C	16.4	TJ	25.0	L	5	a120	0.4				S 0.4 m	K42	SI4	5	U	SE7	OHS
2004 04 24.56		C	16.4:	GA	60.0	Y	6	a120	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAK01

Comet 123P/West-Hartley

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.80		C	14.6	GA	60.0	Y	6	a120	0.75		4.7m	298	S 0.75m	SIA	IPL	5	U	Ap7	NAK01
2004 02 15.79		C	14.5	GA	60.0	Y	6	a120	0.8		4.6m	295	S 0.8 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 17.68	ax	C	14.7	HV	35.0	C	9	a900	0.5	5	2.5m	300	S 1.26m	KAIa	SI3	5		ST2	TSU02
2004 02 18.56	wx	C	14.7	TJ	25.0	L	5	a120	0.5		1.4m	44	S 0.5 m	K42	SI4	4	U	SE7	OHS
2004 03 13.64	ax	C	14.2	HV	35.0	C	9	a120	0.7	5	2.8m	287	S 1.12m	KAIa	SI3	5		ST2	TSU02
2004 03 15.70		C	14.1	GA	60.0	Y	6	a120	1.05		> 7.8m	298	S 1.05m	SIA	IPL	5	U	Ap7	NAK01
2004 03 20.65	x	C	14.6	TJ	25.0	L	5	a120	0.7		5.1m	287	S 0.7 m	K42	SI4	5	U	SE7	OHS
2004 03 20.95		C	15.0	UO	15.0	L	7	a120	0.30	9			C 0.30m	T25	A32	4		PIX	SHU
2004 03 22.99		C	14.8	UO	15.0	L	7	a180	0.36	9			C 0.36m	T25	A32	4		PIX	SHU
2004 03 26.66		C	14.1	GA	60.0	Y	6	a120	0.95		5.8m	294	S 0.95m	SIA	IPL	5	U	Ap7	NAK01
2004 03 30.88		C	14.8	UO	15.0	L	7	a150	0.5	4			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 11.61		C	14.1	GA	60.0	Y	6	a120	1.1		6.7m	298	S 1.1 m	SIA	IPL	5	U	Ap7	NAK01

Comet 123P/West-Hartley [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 12.88		C	15.4	UO	15.0L		5	a130	0.3	6			C 0.3 m	T25	A32	4		PIX	SHU
2004 04 13.92		C	15.9	UO	15.0L		5	a180	0.6	3			C 0.6 m	T25	A32	4		PIX	SHU
2004 04 14.94		C	16.1	UO	15.0L		5	a240	0.5	4			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 15.22		R	14.2	HS	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 15.22		R	14.3	LA	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 15.22		R	14.3	TJ	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 15.22		V	14.4	HS	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 15.22		V	14.5	LA	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 15.22		V	14.5	TJ	40.6T		6	a500	0.54				65.2 s	K26	MIm	5	U	ST9	MOR
2004 04 16.85		C	15.9	UO	15.0L		5	a240	0.5	4			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 17.63	x	C	14.4	TJ	25.0L		5	a120	0.9		5.0m	299	S 0.9 m	K42	SI4	5	U	SE7	OHS
2004 04 19.85		C	16.1	UO	15.0L		5	a240	0.75	6			C 0.75m	T25	A32	4		PIX	SHU
2004 04 24.59		C	14.3	GA	60.0Y		6	a120	1.2		5.7m	304	S 1.2 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 26.81		C	15.6	UO	15.0L		5	a180	0.5	4			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 27.91		C	15.5	UO	15.0L		5	a180	0.5	4			C 0.5 m	T25	A32	4		PIX	SHU

Comet 157P/Tritton

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.76	x	C	18.3	TJ	25.0L		5	a300	0.3		2.0m	296	S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 01 31.79		C	18.6	GA	60.0Y		6	a240	0.35		2.0m	299	S 0.35m	SIA	IPL	5	U	Ap7	NAKO1

Comet 158P/Kowal-LINEAR

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 18.48		C	19.2	GA	60.0Y		6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet 159P/LONEOS

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 12.48		C	19.6	GA	60.0Y		6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/1995 O1 (Hale-Bopp)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 21.62	axC		17.8	HV	20.0L		5	B400	0.5	4			S 0.76m	KAIa	SI4	5		ST2	TSUO2
2004 03 25.59	axC		18.0	HV	20.0L		5	B400	0.4	4			S 0.60m	KAIa	SI4	5		ST2	TSUO2

Comet C/1999 U4 (Catalina-Skiff)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 15.80		C	18.6	GA	60.0Y		6	a240	0.35		2.0m	342	S 0.35m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 15.71		C	18.6	GA	60.0Y		6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 11.64		C	18.5	GA	60.0Y		6	a240	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2000 SV74 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 15.81		C	17.1	GA	60.0Y		6	a240	0.5				S 0.5 m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 15.72		C	17.0	GA	60.0Y		6	a240	0.55				S 0.55m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 26.69		C	17.2	GA	60.0Y		6	a240	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 11.65		C	16.9	GA	60.0Y		6	a240	0.5				S 0.5 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 20.66		C	17.1	GA	60.0Y		6	a120	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2001 HT50 (LINEAR-NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 11 30.00	d	k	12.2	LA	35	L	5	a480	2.0		5.0m	75	C 3.00m	T24	GAI	5*P		ST6	HORO2
2003 11 30.00	d	k	12.3	LA	35	L	5	a480	2.0		5.0m	75	C 2.00m	T24	GAI	5*P		ST6	HORO2
2003 11 30.00	d	k	12.6	LA	35	L	5	a480	2.0		5.0m	75	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 11 30.00	d	k	12.9	LA	35	L	5	a480	2.0		5.0m	75	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 07.90	d	k	12.5	LA	35	L	5	a540	1.8		> 4.3m	78	C 1.80m	T24	GAI	5*P		ST6	HORO2
2003 12 07.90	d	k	12.8	LA	35	L	5	a540	1.8		> 4.3m	78	C 1.00m	T24	GAI	5*P		ST6	HORO2
2003 12 07.90	d	k	13.0	LA	35	L	5	a540	1.8		> 4.3m	78	C 0.50m	T24	GAI	5*P		ST6	HORO2
2003 12 09.92	d	k	12.3	LA	35	L	5	a480	1.9		> 5.6m	80	C 3.00m	T24	GAI	5*P		ST6	HORO2

Comet C/2001 HT50 (LINEAR-NEAT) [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 09.92	d	k	12.4	LA	35	L	5	a480	1.9		> 5.6m	80	C 1.90m	T24	GAI	5	*P	ST6	HORO2
2003 12 09.92	d	k	12.7	LA	35	L	5	a480	1.9		> 5.6m	80	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 09.92	d	k	13.0	LA	35	L	5	a480	1.9		> 5.6m	80	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2003 12 23.86	d	k	12.8	LA	35	L	5	a480	1.7		>11.9m	77	C 1.70m	T24	GAI	5	*P	ST6	HORO2
2003 12 23.86	d	k	13.0	LA	35	L	5	a480	1.7		>11.9m	77	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 23.86	d	k	13.3	LA	35	L	5	a480	1.7		>11.9m	77	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2003 12 24.89	d	k	12.5	LA	35	L	5	a420	1.3		7.4m	73	C 4.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 24.89	d	k	12.6	LA	35	L	5	a420	1.3		7.4m	73	C 2.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 24.89	d	k	12.8	LA	35	L	5	a420	1.3		7.4m	73	C 1.30m	T24	GAI	5	*P	ST6	HORO2
2003 12 24.89	d	k	12.9	LA	35	L	5	a420	1.3		7.4m	73	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 24.89	d	k	13.2	LA	35	L	5	a420	1.3		7.4m	73	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2003 12 26.85	d	k	12.8	LA	35	L	5	a480	1.4		8.1m	75	C 1.40m	T24	GAI	5	*P	ST6	HORO2
2003 12 26.85	d	k	13.0	LA	35	L	5	a480	1.4		8.1m	75	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 26.85	d	k	13.3	LA	35	L	5	a480	1.4		8.1m	75	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2004 01 05.86	d	k	13.0	LA	35	L	5	a540	1.2		7 m	73	C 2.00m	T24	GAI	5	*P	ST6	HORO2
2004 01 05.86	d	k	13.2	LA	35	L	5	a540	1.2		7 m	73	C 1.20m	T24	GAI	5	*P	ST6	HORO2
2004 01 05.86	d	k	13.5	LA	35	L	5	a540	1.2		7 m	73	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2004 01 14.84	d	k	13.0	LA	35	L	5	a480	1.1		9.4m	77	C 3.00m	T24	GAI	5	*P	ST6	HORO2
2004 01 14.84	d	k	13.1	LA	35	L	5	a480	1.1		9.4m	77	C 2.00m	T24	GAI	5	*P	ST6	HORO2
2004 01 14.84	d	k	13.3	LA	35	L	5	a480	1.1		9.4m	77	C 1.10m	T24	GAI	5	*P	ST6	HORO2
2004 01 14.84	d	k	13.6	LA	35	L	5	a480	1.1		9.4m	77	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2004 02 10.44	ax	C	13.5	HV	35.0	C	9	a 90	0.7	4	1.8m	80	S 2.36m	KAIa	SI3	5		ST2	TSU02
2004 02 10.44	x	C	13.8	HV	60.0	Y	6	a120	0.8		6.1m	81	S 0.8 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 10.46	wx	C	14.1	TJ	25.0	L	5	a120	0.6				S 0.6 m	K42	SI4	5		SE7	OHS

Comet C/2001 K5 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 24.81	d	k	15.0	LA	35	L	5	a600	0.52		8.5m	216	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 10 24.81	d	k	15.5	LA	35	L	5	a600	0.52		8.5m	216	C 0.52m	T24	GAI	5	*P	ST6	HORO2
2003 11 04.71	d	k	15.2	LA	35	L	5	a600	0.37		5.6m	219	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 11 04.71	d	k	15.7	LA	35	L	5	a600	0.37		5.6m	219	C 0.37m	T24	GAI	5	*P	ST6	HORO2
2003 11 08.76	d	k	15.0	LA	35	L	5	a720	0.40		4.7m	224	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 11 08.76	d	k	15.6	LA	35	L	5	a720	0.40		4.7m	224	C 0.40m	T24	GAI	5	*P	ST6	HORO2
2003 12 07.74	d	k	15.9	LA	35	L	5	a480	0.38		3.4m	233	C 0.38m	T24	GAI	5	*P	ST6	HORO2
2003 12 09.75	d	k	15.4	LA	35	L	5	a720	0.30		3.6m	231	C 1.00m	T24	GAI	5	*P	ST6	HORO2
2003 12 09.75	d	k	15.8	LA	35	L	5	a720	0.30		3.6m	231	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2003 12 09.75	d	k	16.1	LA	35	L	5	a720	0.30		3.6m	231	C 0.30m	T24	GAI	5	*P	ST6	HORO2
2003 12 23.79	d	k	15.8	LA	35	L	5	a660	0.37		2.0m	242	C 0.50m	T24	GAI	5	*P	ST6	HORO2
2003 12 23.79	d	k	16.1	LA	35	L	5	a660	0.37		2.0m	242	C 0.37m	T24	GAI	5	*P	ST6	HORO2
2004 02 28.77	wx	C	17.7	TJ	25.0	L	5	a120	0.2		1.4m	259	S 0.2 m	K42	SI4	5		SE7	OHS
2004 04 17.72	x	C	18.3	TJ	25.0	L	5	a120	0.2		3.0m	266	S 0.2 m	K42	SI4	5	U	SE7	OHS

Comet C/2001 Q4 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 25.50	ax	C	6.8	HV	20.0	L	5	a120	14	5	20	m177	S14.18m	KAIa	SI4	5		ST2	TSU02

Comet P/2001 YX_127 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 28.70	a	C	19.8	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.67	a	C	19.7	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2002 J5 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 18.79		C	16.8	GA	60.0	Y	6	a240	0.5		2.0m	125	S 0.5 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 20.70	x	C	17.1	TJ	25.0	L	5	a300	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 03 28.74		C	16.9	GA	60.0	Y	6	a240	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAK01
2004 04 20.72		C	17.0	GA	60.0	Y	6	a240	0.4		1.6m	120	S 0.4 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2002 R3 (LONEOS)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 23.73	d	k	16.4	LA	35	L	5	a660	0.45		24 s	62	C 1.00m	T24	GAI	5*		ST6	HOR02
2003 12 23.73	d	k	16.9	LA	35	L	5	a660	0.45		24 s	62	C 0.45m	T24	GAI	5*		ST6	HOR02

Comet P/2002 T5 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 16.62	x	C	16.3	TJ	25.0	L	5	a120	0.5				S 0.5 m	K42	SI4	5	U	SE7	OHS
2004 02 18.54		C	16.3	GA	60.0	Y	6	a240	0.6			230	S 0.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 12.50		C	16.3:	GA	60.0	Y	6	a240	0.6				S 0.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 14.56	x	C	17.2	TJ	25.0	L	5	a120	0.3				S 0.5 m	K42	SI4	5	U	SE7	OHS
2004 03 26.52		C	16.8	GA	60.0	Y	6	a240	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.49		C	17.2	GA	60.0	Y	6	a240	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2002 T6 (NEAT-LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 26.48	ax	C	15.6	HV	35.0	C	9	a360	0.3	5			S 0.56m	KAIa	SI4	5		ST2	TSU02
2004 02 10.55	ax	C	15.9	HV	35.0	C	9	a120	0.4	4			S 0.45m	KAIa	SI4	5		ST2	TSU02
2004 02 18.53		C	16.3:	GA	60.0	Y	6	a120	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 12.49		C	16.3	GA	60.0	Y	6	a240	0.55				S 0.55m	SIA	IPL	5	U	Ap7	NAK01
2004 03 14.55	wx	C	16.8	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 04 11.48		C	16.7	GA	60.0	Y	6	a240	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2002 T7 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2002 12 01.84		C	16.3	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2002 12 10.88		C	16.1	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 01 01.80		C	15.7	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 01 07.83		C	15.5	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 01 24.77		C	15.8	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 01 29.80		C	15.6	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 02 12.85		C	15.8	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 02 19.77		C	15.6	UO	35.0	L	5	a120					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 02 25.80		k	15.5	UO	35.0	L	5	a 30					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 03 19.78		k	15.4	UO	35.0	L	5	a 60					C 0.20m	K26	AfP	5	P	ST9	LIG
2003 04 04.79		k	15.7	UO	35.0	L	5	a 60					C 0.50m	K26	AfP	5	P	ST9	LIG
2003 08 02.03		C	13.5	UO	35.0	L	5	a120					C 0.50m	K26	AfP	5	P	ST9	LIG
2003 08 23.02		C	13.5	UO	35.0	L	5	a120					C 0.60m	K26	AfP	5	P	ST9	LIG
2003 08 27.03		C	13.2	UO	35.0	L	5	a120					C 0.60m	K26	AfP	5	P	ST9	LIG
2003 08 31.03		C	13.3	UO	35.0	L	5	a240					C 0.60m	K26	AfP	5	P	ST9	LIG
2003 09 04.10		C	13.8	UO	35.0	L	5	a240					C 0.60m	K26	AfP	5	P	ST9	LIG
2003 09 20.96		C	12.3	UO	35.0	L	5	a120					C 0.70m	K26	AfP	5	P	ST9	LIG
2003 09 25.08		k	12.7	UO	35.0	L	5	a120					C 0.70m	K26	AfP	5	P	ST9	LIG
2003 10 15.87		H	11.2	TI	35.0	L	5	a120					C 1.00m	K26	AfP	5	P	ST9	LIG
2003 10 25.11		k	11.2	TI	35.0	L	5	a 10					C 1.00m	K26	AfP	5	P	ST9	LIG
2003 11 04.87	d	k	10.7	LA	35	L	5	a600	2.0		2.1m	156	C 2.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 04.87	d	k	10.8	LA	35	L	5	a600	2.0		2.1m	156	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 04.87	d	k	11.2	LA	35	L	5	a600	2.0		2.1m	156	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 05.13		k	10.8	HI	35.0	L	5	a 60					C 1.10m	K26	AfP	5	P	ST9	LIG
2003 11 09.10	d	k	10.5	LA	35	L	5	a600	2.1		1.6m	138	C 2.10m	T24	GAI	5*	P	ST6	HOR02
2003 11 09.10	d	k	10.6	LA	35	L	5	a600	2.1		1.6m	138	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 09.10	d	k	11.1	LA	35	L	5	a600	2.1		1.6m	138	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 12.76		H	10.1	TI	35.0	L	5	a 60					C 1.20m	K26	AfP	5	P	ST9	LIG
2003 11 19.78	d	k	10.2	LA	35	L	5	a540	1.8		3.1m	124	C 1.80m	T24	GAI	5*	P	ST6	HOR02
2003 11 19.78	d	k	10.4	LA	35	L	5	a540	1.8		3.1m	124	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 19.78	d	k	10.9	LA	35	L	5	a540	1.8		3.1m	124	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 28.92		H	9.4	TI	35.0	L	5	a 60			2.4m	108	C 1.40m	K26	AfP	5	P	ST9	LIG
2003 11 29.97	d	k	9.8	LA	35	L	5	a600	2.7		> 9.4m	110	C 2.70m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.97	d	k	9.9	LA	35	L	5	a600	2.7		> 9.4m	110	C 2.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.97	d	k	10.2	LA	35	L	5	a600	2.7		> 9.4m	110	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.97	d	k	10.7	LA	35	L	5	a600	2.7		> 9.4m	110	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 30.75		H	9.6	HI	35.0	L	5	a 2			2.3m	104	C 1.40m	K26	AfP	5	P	ST9	LIG
2003 12 07.84	d	k	9.5	LA	35	L	5	a360	2.9		> 7 m	90	C 2.90m	T24	GAI	5*	P	ST6	HOR02
2003 12 07.84	d	k	9.7	LA	35	L	5	a360	2.9		> 7 m	90	C 2.00m	T24	GAI	5*	P	ST6	HOR02

Comet C/2002 T7 (LINEAR) [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 07.84	d	k	10.2	LA	35	L	5	a360	2.9		> 7 m	90	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 07.84	d	k	10.7	LA	35	L	5	a360	2.9		> 7 m	90	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.72	d	k	9.5	LA	35	L	5	a400	2.6		>10.9m	91	C 4.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.72	d	k	9.7	LA	35	L	5	a400	2.6		>10.9m	91	C 2.60m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.72	d	k	9.8	LA	35	L	5	a400	2.6		>10.9m	91	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.72	d	k	10.1	LA	35	L	5	a400	2.6		>10.9m	91	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.72	d	k	10.7	LA	35	L	5	a400	2.6		>10.9m	91	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2003 12 12.75		H	9.7	TI	35.0	L	5	a 60			3.3m	84	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 16.78		H	9.5	TI	35.0	L	5	a 60			5	79	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 18.73		H	10.1	TI	35.0	L	5	a 60			5	79	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 21.45	a	V	9.9	LA	30.0	L	6	A200	2.8		2.5m	80	S 2.8 m	SIA	MIm	5	*U	Ap7	EZA
2003 12 21.45	a	V	12.5	LA	30.0	L	6	A200	2.8		2.5m	80	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2003 12 21.47	a	H	9.3	LA	30.0	L	6	A200	2.3		4.0m	80	S 2.8 m	SIA	MIm	5	*U	Ap7	EZA
2003 12 21.47	a	H	11.6	LA	30.0	L	6	A200	2.3		4.0m	80	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2003 12 23.93	d	k	9.5	LA	35	L	5	a400	3.6		>11.9m	73	C 5.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.93	d	k	9.6	LA	35	L	5	a400	3.6		>11.9m	73	C 3.60m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.93	d	k	9.9	LA	35	L	5	a400	3.6		>11.9m	73	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.93	d	k	10.3	LA	35	L	5	a400	3.6		>11.9m	73	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.93	d	k	10.9	LA	35	L	5	a400	3.6		>11.9m	73	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2003 12 24.85		H	9.6	TI	35.0	L	5	a 60			8	76	C 1.50m	K26	AfP	5	P	ST9	LIG
2003 12 24.92	d	k	9.4	LA	35	L	5	a600	4.1		>10.5m	73	C 4.10m	T24	GAI	5	*P	ST6	HOR02
2003 12 24.92	d	k	9.8	LA	35	L	5	a600	4.1		>10.5m	73	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 24.92	d	k	10.2	LA	35	L	5	a600	4.1		>10.5m	73	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 24.92	d	k	10.7	LA	35	L	5	a600	4.1		>10.5m	73	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2003 12 26.84	d	k	9.4	LA	35	L	5	a320	4.0		>10.8m	72	C 4.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 26.84	d	k	9.7	LA	35	L	5	a320	4.0		>10.8m	72	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 26.84	d	k	10.1	LA	35	L	5	a320	4.0		>10.8m	72	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 26.84	d	k	10.7	LA	35	L	5	a320	4.0		>10.8m	72	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2004 01 03.77		H	10.0	TI	35.0	L	5	a 60			8	70	C 1.50m	K26	AfP	5	P	ST9	LIG
2004 01 05.88	d	k	9.6	LA	35	L	5	a480	4.1		12 m	67	C 4.10m	T24	GAI	5	*P	ST6	HOR02
2004 01 05.88	d	k	9.9	LA	35	L	5	a480	4.1		12 m	67	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2004 01 05.88	d	k	10.4	LA	35	L	5	a480	4.1		12 m	67	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2004 01 05.88	d	k	11.0	LA	35	L	5	a480	4.1		12 m	67	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2004 01 14.82	d	k	9.1	LA	35	L	5	a440	6.8		>12.2m	63	C 6.80m	T24	GAI	5	*P	ST6	HOR02
2004 01 14.82	d	k	9.4	LA	35	L	5	a440	6.8		>12.2m	63	C 4.00m	T24	GAI	5	*P	ST6	HOR02
2004 01 14.82	d	k	9.8	LA	35	L	5	a440	6.8		>12.2m	63	C 2.00m	T24	GAI	5	*P	ST6	HOR02
2004 01 14.82	d	k	10.2	LA	35	L	5	a440	6.8		>12.2m	63	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2004 01 14.82	d	k	10.8	LA	35	L	5	a440	6.8		>12.2m	63	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2004 01 15.79		H	9.7	TI	35.0	L	5	a 20			8.2m	66	C 1.30m	K26	AfP	5	P	ST9	LIG
2004 01 19.81		H	9.8	HI	35.0	L	5	a 60			8.5m	66	C 1.20m	K26	AfP	5	P	ST9	LIG
2004 01 21.81		H	9.7	TI	35.0	L	5	a 5			3.0m	63	C 1.20m	K26	AfP	5	P	ST9	LIG
2004 01 23.78		H	9.7	TI	35.0	L	5	a 20			8	64	C 1.20m	K26	AfP	5	P	ST9	LIG
2004 01 28.40	a	V	9.3	LA	30.0	L	6	A200	2.8		8.0m	65	S 2.8 m	SIA	MIm	5	*U	Ap7	EZA
2004 01 28.40	a	V	12.5	LA	30.0	L	6	A200	2.8		8.0m	65	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 01 28.42	a	H	9.1	LA	30.0	L	6	A200	2.3		8.0m	65	S 2.8 m	SIA	MIm	5	*U	Ap7	EZA
2004 01 28.42	a	H	11.8	LA	30.0	L	6	A200	2.3		8.0m	65	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 01 28.43	ax	C	9.0	HV	35.0	C	9	a 60					S 6.44m	KAIaSI4		5		ST2	TSU02
2004 02 07.41	a	V	8.6	LA	30.0	L	6	A200	4.2		8.0m	60	S 4.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 07.41	a	V	12.1	LA	30.0	L	6	A200	4.2		8.0m	60	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 07.43	a	H	8.7	LA	30.0	L	6	A200	2.8		8.0m	60	S 4.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 07.43	a	H	11.4	LA	30.0	L	6	A200	2.8		8.0m	60	C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 10.40	ax	C	8.5	HV	35.0	C	9	a 60					S 6.64m	KAIaSI4		5		ST2	TSU02
2004 02 16.39	ax	C	8.3	HV	35.0	C	9	a 30					S 7.75m	KAIaSI4		5		ST2	TSU02
2004 02 18.40	a	V	8.4	LA	30.0	L	6	a600	3.2				S 3.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 18.40	a	V	12.0	LA	30.0	L	6	a600	3.2				C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 18.43	a	H	8.5	LA	30.0	L	6	a600	2.3				S 3.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 02 18.43	a	H	11.4	LA	30.0	L	6	a600	2.3				C 0.2 m	SIA	MIm	5	*U	Ap7	EZA
2004 03 04.41	ax	C	7.5	HV	10.6	R	9	a 30					S 7.03m	KAIaSI4		5		ST2	TSU02

Comet P/2002 X2 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 01.79		C	19.8:G	A	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 01 31.76		C	20.0:G	A	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.63		C	20.1:G	A	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 A2 (Gleason)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.73		C	18.6	GA	60.0Y		6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.57		C	18.7	GA	60.0Y		6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 15.60		C	18.9	GA	60.0Y		6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.51		C	19.0	GA	60.0Y		6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 E1 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 18.83		C	17.5:GA		60.0Y		6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 G1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 28.76	wx	C	17.6	TJ	25.0L		5	a120	0.2				S 0.2 m	K42	SI4	5	U	SE7	OHS
2004 03 28.78		C	16.8:GA		60.0Y		6	a240	0.35			225	S 0.35m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 H1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 31.80	x	C	12.5	TJ	25.0L		5	a120	1.0		0.7m	350	S 1.0 m	K42	SI4	5	U	SE7	OHS
2004 02 15.75	a	C	12.6	GA	60.0Y		6	a120	1.6		3.8m	29	S 1.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 20.72	wx	C	12.8	TJ	25.0L		5	a120	1.0		1.7m	331	S 1.0 m	K42	SI4	5	U	SE7	OHS
2004 03 13.59	ax	C	12.2	HV	35.0C		9	a 90	1.2	5	6.0m	65	S 2.09m	KAIa	SI3	5		ST2	TSU02
2004 03 15.61	a	C	12.4	GA	60.0Y		6	a120	1.6		> 8.6m	61	S 1.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 20.59	x	C	12.5	TJ	60.0Y		6	a120	1.2		> 9.1m	64	S 1.2 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 20.59	x	C	12.7	TJ	25.0L		5	a120	1.1		9.0m	47	S 1.1 m	K42	SI4	5	U	SE7	OHS
2004 04 08.48	a	C	13.5	GA	60.0Y		6	a120	1.05		> 8.3m	84	S 1.05m	SIA	IPL	5	U	Ap7	NAK01
2004 04 15.17		V	14.0	TJ	40.6T		6	a500	0.27			65.2	s K26	MIm	5	U	ST9	MOR	
2004 04 17.50	ax	C	14.2	TJ	25.0L		5	a120	0.7		4.5m	90	S 0.7 m	K42	SI4	5	U	SE7	OHS

Comet C/2003 H3 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 28.82	wx	C	17.7	TJ	25.0L		5	a120	0.3				S 0.3 m	K42	SI4	5		SE7	OHS

Comet P/2003 K2 (Christensen)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 05 29.85	d	k	16.0	LA	35	L	5	a840	0.35				C 0.35m	T24	GAI	5	*P	ST6	HOR02

Comet C/2003 K4 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 24.82	d	k	15.0	LA	35	L	5	a540	0.47				C 0.47m	T24	GAI	5	*P	ST6	HOR02
2003 12 07.72	d	k	14.3	LA	35	L	5	a480	0.67		24	s 82	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 07.72	d	k	14.4	LA	35	L	5	a480	0.67		24	s 82	C 0.67m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.73	d	k	14.3	LA	35	L	5	a480	0.50		25	s 80	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 09.73	d	k	14.4	LA	35	L	5	a480	0.50		25	s 80	C 0.50m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.71	d	k	14.2	LA	35	L	5	a480	0.58		30	s 65	C 1.00m	T24	GAI	5	*P	ST6	HOR02
2003 12 23.71	d	k	14.3	LA	35	L	5	a480	0.58		30	s 65	C 0.58m	T24	GAI	5	*P	ST6	HOR02
2004 02 28.78	x	C	13.5	TJ	25.0L		5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 03 20.74	wx	C	12.8	TJ	25.0L		5	a120	0.6				S 0.6 m	K42	SI4	5	U	SE7	OHS
2004 03 28.82		C	12.9	GA	60.0Y		6	a120	0.75				S 0.75m	SIA	IPL	5	U	Ap7	NAK01
2004 04 12.02		C	13.4	UO	15.0L		5	a120	0.3	7			C 0.3 m	T25	A32	4		PIX	SHU
2004 04 14.06		C	13.7	UO	15.0L		5	a 70	0.5	9			C 0.5 m	T25	A32	4		PIX	SHU
2004 04 15.01		C	13.6	UO	15.0L		5	a120	0.35	9			C 0.35m	T25	A32	4		PIX	SHU
2004 04 17.06		C	13.6	UO	15.0L		5	a120	0.58	7			C 0.58m	T25	A32	4		PIX	SHU
2004 04 19.98		C	13.7	UO	15.0L		5	a150	0.66	7			C 0.66m	T25	A32	4		PIX	SHU
2004 04 23.80		C	11.8	GA	60.0Y		6	a120	1.8				S 1.8 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 26.90		C	13.8	UO	15.0L		5	a120	0.6	5			C 0.6 m	T25	A32	4		PIX	SHU
2004 04 27.94		C	13.8	UO	15.0L		5	a120	0.75	7			C 0.75m	T25	A32	4		PIX	SHU

Comet C/2003 L2 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 12.45		C	16.1	GA	60.0	Y	6	a120	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 O1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 28.77		C	17.6	GA	60.0	Y	6	a240	0.3		0.7m	114	S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 31.76		C	17.5	GA	60.0	Y	6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2003 O2 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 25.00	d	k	15.8	LA	35	L	5	A260	0.45		4.0m	243	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 10 25.00	d	k	16.3	LA	35	L	5	A260	0.45		4.0m	243	C 0.45m	T24	GAI	5*	P	ST6	HOR02

Comet P/2003 S1 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 10.45		C	18.3	GA	60.0	Y	6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2003 S2 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 10.47		C	19.1	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.46	a	C	19.1	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 T2 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 24.87	d	k	14.1	LA	35	L	5	a810	1.00		4.4m	36	C 1.50m	T24	GAI	5*	P	ST6	HOR02
2003 10 24.87	d	k	14.5	LA	35	L	5	a810	1.00		4.4m	36	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 10 24.87	d	k	15.3	LA	35	L	5	a810	1.00		4.4m	36	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 04.85	d	k	14.5	LA	35	L	5	a600	1.00		3 m	320	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 04.85	d	k	15.3	LA	35	L	5	a600	1.00		3 m	320	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.90	d	k	14.8	LA	35	L	5	a540	1.0				C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.90	d	k	15.4	LA	35	L	5	a540	1.0				C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 12 07.76	d	k	15.1	LA	35	L	5	a720	0.72				C 0.72m	T24	GAI	5*		ST6	HOR02
2003 12 07.76	d	k	15.3	LA	35	L	5	a720	0.72				C 0.50m	T24	GAI	5*		ST6	HOR02
2003 12 09.69	d	k	15.4	LA	35	L	5	a600	0.58				C 0.58m	T24	GAI	5*	P	ST6	HOR02
2003 12 23.84	d	k	14.7	LA	35	L	5	a900	1.0		2.4m	350	C 2.00m	T24	GAI	5*	P	ST6	HOR02
2003 12 23.84	d	k	15.3	LA	35	L	5	a900	1.0		2.4m	350	C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 12 23.84	d	k	16.1	LA	35	L	5	a900	1.0		2.4m	350	C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 12 24.91	d	k	15.3	LA	35	L	5	a600	0.73				C 1.00m	T24	GAI	5*		ST6	HOR02
2003 12 24.91	d	k	15.7	LA	35	L	5	a600	0.73				C 0.73m	T24	GAI	5*		ST6	HOR02
2003 12 24.91	d	k	16.1	LA	35	L	5	a600	0.73				C 0.50m	T24	GAI	5*		ST6	HOR02
2004 02 13.45	x	C	18.8	HV	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.45	a	C	19.4:	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 T4 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 10 24.90	d	k	16.9	LA	35	L	5	A710	0.38				C 0.50m	T24	GAI	5*	P	ST6	HOR02
2003 10 24.90	d	k	17.0	LA	35	L	5	A710	0.38				C 0.38m	T24	GAI	5*	P	ST6	HOR02
2003 11 09.06	d	k	17.3	LA	35	L	5	a720	0.35				C 0.35m	T24	GAI	5*	P	ST6	HOR02
2003 11 29.92	d	k	16.8	LA	35	L	5	a990	0.42				C 0.42m	T24	GAI	5*	P	ST6	HOR02
2003 12 23.95	d	k	16.2	LA	35	L	5	A080	0.58				C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 12 23.95	d	k	16.5	LA	35	L	5	A080	0.58				C 0.58m	T24	GAI	5*	P	ST6	HOR02
2003 12 24.95	d	k	16.0	LA	35	L	5	a900	0.67				C 1.00m	T24	GAI	5*	P	ST6	HOR02
2003 12 24.95	d	k	16.3	LA	35	L	5	a900	0.67				C 0.67m	T24	GAI	5*	P	ST6	HOR02
2003 12 24.95	d	k	16.4	LA	35	L	5	a900	0.67				C 0.50m	T24	GAI	5*	P	ST6	HOR02
2004 01 28.49	ax	C	16.6	HV	35.0	C	9	A440	0.4	3			S 0.57m	KAIa	SI3	5		ST2	TSU02
2004 02 10.54	ax	C	16.5	HV	35.0	C	9	A 80	0.4	4			S 0.53m	KAIa	SI3	5		ST2	TSU02
2004 02 13.52	x	C	16.4	TJ	60.0	Y	6	a240	0.6				S 0.6 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.52	x	C	17.0	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5		SE7	OHS
2004 03 07.46	w	H	16.4	LA	50.0	C	12	B160	0.2	4			S 0.2 m	K10	SI3	5		ST1	SUZ03
2004 03 07.49	w	V	17.0	LA	50.0	C	12	B160	0.2	3/			S 0.2 m	K10	SI3	5		ST1	SUZ03

Comet C/2003 T4 (LINEAR) [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 09.46	ax	C	15.9	HV	35.0	C	9	A720	0.4	4			S 0.67m	KAIa	SI3	5		ST2	TSU02
2004 03 14.62	x	C	16.8	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 04 08.46	a	C	16.1	GA	60.0	Y	6	a120	0.6				S 0.6 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 V1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 11 09.04	d	k	15.1	LA	35	L	5	a630	0.62		3.8m	310	C 1.50m	T24	GAI	5	P	ST6	HOR02
2003 11 09.04	d	k	15.5	LA	35	L	5	a630	0.62		3.8m	310	C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 11 09.04	d	k	15.8	LA	35	L	5	a630	0.62		3.8m	310	C 0.62m	T24	GAI	5	P	ST6	HOR02
2003 11 29.99	d	k	16.0	LA	35	L	5	a480	0.63				C 0.63m	T24	GAI	5	P	ST6	HOR02
2003 12 07.95	d	k	15.0	LA	35	L	5	A350	0.58		0.7m	315	C 1.50m	T24	GAI	5	P	ST6	HOR02
2003 12 07.95	d	k	15.4	LA	35	L	5	A350	0.58		0.7m	315	C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 12 07.95	d	k	15.9	LA	35	L	5	A350	0.58		0.7m	315	C 0.58m	T24	GAI	5	P	ST6	HOR02
2003 12 24.00	d	k	15.7	LA	35	L	5	a900	0.57		1.8m	288	C 2.00m	T24	GAI	5	P	ST6	HOR02
2003 12 24.00	d	k	15.8	LA	35	L	5	a900	0.57		1.8m	288	C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 12 24.00	d	k	16.1	LA	35	L	5	a900	0.57		1.8m	288	C 0.57m	T24	GAI	5	P	ST6	HOR02
2003 12 24.97	d	k	15.4	LA	35	L	5	a810	0.50		1.6m	302	C 2.00m	T24	GAI	5	P	ST6	HOR02
2003 12 24.97	d	k	15.8	LA	35	L	5	a810	0.50		1.6m	302	C 1.00m	T24	GAI	5	P	ST6	HOR02
2003 12 24.97	d	k	16.1	LA	35	L	5	a810	0.50		1.6m	302	C 0.50m	T24	GAI	5	P	ST6	HOR02
2004 01 28.51	ax	C	16.4	HV	35.0	C	9	a360	0.3	4			S 0.69m	KAIa	SI3	5		ST2	TSU02
2004 01 31.74		C	16.5	GA	60.0	Y	6	a240	0.55		1.5m	293	S 0.55m	SIA	IPL	5	U	Ap7	NAK01
2004 02 10.60	ax	C	17.1	HV	35.0	C	9	a540	0.3	4			S 0.37m	KAIa	SI3	5		ST2	TSU02
2004 02 16.66	x	C	16.9	TJ	25.0	L	5	a120	0.4				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 02 17.62	ax	C	16.7	HV	35.0	C	9	A080	0.3	4			S 0.58m	KAIa	SI3	5		ST2	TSU02
2004 02 18.62		C	16.5	GA	60.0	Y	6	a240	0.65		1.1m	286	S 0.65m	SIA	IPL	5	U	Ap7	NAK01
2004 03 13.55	ax	C	16.9	HV	35.0	C	9	A440	0.3	3			S 0.85m	KAIa	SI3	5		ST2	TSU02
2004 03 15.58		C	16.9	GA	60.0	Y	6	a240	0.55		1.1m	304	S 0.55m	SIA	IPL	5	U	Ap7	NAK01
2004 03 26.55		C	17.2	GA	60.0	Y	6	a240	0.45				S 0.45m	SIA	IPL	5	U	Ap7	NAK01
2004 04 08.56		C	17.6	GA	60.0	Y	6	a240	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 24.53		C	17.9	GA	60.0	Y	6	a240	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 W1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2003 12 23.91	d	k	16.0	LA	35	L	5	a810	0.55				C 1.00m	T24	GAI	5	*	ST6	HOR02
2003 12 23.91	d	k	16.6	LA	35	L	5	a810	0.55				C 0.55m	T24	GAI	5	*	ST6	HOR02
2003 12 24.87	d	k	16.7	LA	35	L	5	a810	0.42				C 0.42m	T24	GAI	5	*	ST6	HOR02
2004 02 10.49		C	19.8:	GA	60.0	Y	6	a240	0.2				S 0.2 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 13.48	x	C	19.1:	TJ	60.0	Y	6	a360	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2003 WC7 (LINEAR-Catalina)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 12.47		C	17.2	GA	60.0	Y	6	a240	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 02 18.50	wx	C	18.0	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 03 14.48	wx	C	17.3	TJ	25.0	L	5	a300	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 04 08.45	a	C	18.0	GA	60.0	Y	6	a120	0.35				S 0.35m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.46	a	C	17.9	GA	60.0	Y	6	a240	0.3			70	S 0.3 m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2003 WT42 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 10.51		C	17.8	GA	60.0	Y	6	a240		9			S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 03 13.43	ax	C	17.9	HV	35.0	C	9	B160	0.15				S 0.45m	KAIa	SI3	5		ST2	TSU02

Comet P/2004 A1

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 01 28.56	ax	C	18.0	HV	35.0	C	9	A440	0.3	4			S 0.30m	KAIa	SI3	5		ST2	TSU02
2004 01 31.70		C	18.4	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 02 10.49	x	C	19.0	TJ	25.0	L	5	a120	0.2				S 0.2 m	K42	SI4	5	U	SE7	OHS
2004 02 12.54		C	18.5	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 02 16.64	x	C	18.5	TJ	25.0	L	5	a120	0.3				S 0.3 m	K42	SI4	5	U	SE7	OHS
2004 02 18.55		C	18.4	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2004 A1 [cont.]

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 28.69	wx	C	18.8	TJ	25.0	L	5	a120	0.2				S 0.2 m	K42	SI4	5		SE7	OHS
2004 03 12.52		C	18.4	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 26.53		C	18.4	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 08.49		C	18.8	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 24.54		C	19.0	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2004 B1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 10.52		C	18.7:	GA	60.0	Y	6	a240	0.2				S 0.2 m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 12.50		C	18.8	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 18.49		C	18.9:	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2004 C1 (Larsen)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 02 15.71		C	19.2	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 02 18.60		C	19.2	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 15.57		C	19.7	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 20.54		C	19.3	GA	60.0	Y	6	a240	0.25			230	S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 26.57		C	19.7	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 08.51		C	19.9:	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 11.53		C	19.8:	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet P/2004 CB (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 23.81	a	C	16.7	GA	60.0	Y	6	a120	0.4		1.4m	257	S 0.4 m	SIA	IPL	5	U	Ap7	NAKO1

Comet P/2004 D029 (Spacewatch-LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 18.67		C	19.3	GA	60.0	Y	6	a240	0.25			250	S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 20.56		C	19.2	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 20.56		C	19.5	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2004 DZ61 (Catalina-LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 15.67		C	17.8	GA	60.0	Y	6	a240		9			S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 20.60		C	18.1	GA	60.0	Y	6	a240		9			S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet P/2004 EW38 (Catalina-LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 20.62		C	19.3	GA	60.0	Y	6	a240	0.25	8/			S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet P/2004 F1 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 20.60		C	18.8:	GA	60.0	Y	6	a240	0.25			250	S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 03 26.64		C	19.0	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 08.53		C	18.9	GA	60.0	Y	6	a240	0.3			250	S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 11.58		C	19.5	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 20.58		C	19.6	GA	60.0	Y	6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAKO1

Comet C/2004 F2 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 31.80		C	18.0:	GA	60.0	Y	6	a240	0.3				S 0.3 m	SIA	IPL	5	U	Ap7	NAKO1
2004 04 23.75		C	17.5	GA	60.0	Y	6	a240	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAKO1

Comet P/2004 F3 (NEAT)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 03 30.91		C	15.6	UO	15.0L		7	a150	0.20	9			C 0.20m	T25	A32	4		PIX	SHU
2004 03 31.71		C	16.2	GA	60.0Y		6	a120	0.5			270	S 0.5 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 08.55		C	16.0	GA	60.0Y		6	a240	0.4			0.6m266	S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 11.62		C	15.9	GA	60.0Y		6	a120	0.4			0.9m268	S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 12.92		C	16.0	UO	15.0L		5	a190	0.25	9			C 0.25m	T25	A32	4		PIX	SHU
2004 04 13.95		C	15.4	UO	15.0L		5	a180	0.3	3			C 0.3 m	T25	A32	4		PIX	SHU
2004 04 14.97		C	15.9	UO	15.0L		5	a300	0.3	9			C 0.3 m	T25	A32	4		PIX	SHU
2004 04 16.88		C	15.0	UO	15.0L		5	a240	0.26	9			C 0.26m	T25	A32	4		PIX	SHU
2004 04 19.87		C	15.0	UO	15.0L		5	a240	0.08	9			C 0.08m	T25	A32	4		PIX	SHU
2004 04 20.65		C	15.8	GA	60.0Y		6	a120	0.4			0.4m252	S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 24.63		C	15.8:GA		60.0Y		6	a120	0.4				S 0.4 m	SIA	IPL	5	U	Ap7	NAK01
2004 04 26.90		C	15.2	UO	15.0L		5	a360	0.16	8			C 0.16m	T25	A32	4		PIX	SHU
2004 04 27.92		C	15.1	UO	15.0L		5	a240	0.33	9			C 0.33m	T25	A32	4		PIX	SHU

Comet C/2004 G1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 11.70	a	C	17.1	GA	60.0Y		6	a240	0.55				S 0.55m	SIA	IPL	5	U	Ap7	NAK01

Comet C/2004 H1 (LINEAR)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 20.52	x	C	18.1:TJ		60.0Y		6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01
2004 04 24.51	x	C	18.5:TJ		60.0Y		6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

Comet P/2004 H2 (Larsen)

DATE (UT)	n	M	MAG.	RF	AP.	T	f/	EXP.	COMA	DC	TAIL	PA	APERTUR	Chp	Sfw	C	P	Cam	OBS.
2004 04 23.72		C	18.9	GA	60.0Y		6	a240	0.25				S 0.25m	SIA	IPL	5	U	Ap7	NAK01

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DESIGNATIONS OF RECENT COMETS

Listed below, for handy reference, are the last 22 comets to have been given designations in the new system. [This list updates that in the January 2004 issue, p. 54.]

	New-Style Designation	*P*	*T*	*q*	*IAUC*
★	C/2004 C1 (Larsen)	39.6	3/19/03	4.35	8286
★	C/2004 D1 (NEAT)		2/11/06	4.98	8294
★	P/2004 DO_{29} (Spacewatch-LINEAR)	20.3	10/9/04	4.1	8305
★	P/2004 F1 (NEAT)	9.45	10/19/03	2.45	8309
★	C/2004 F2 (LINEAR)		12/26/03	1.43	8313
★	P/2004 F3 (NEAT)	8.04	1/4/05	2.86	8313
★	P/2004 CB (LINEAR)	5.03	4/2/04	0.91	8314
★	C/2004 G1 (LINEAR)		6/4/04	1.20	8318
★	C/2004 F4 (Bradfield)		4/17/04	0.17	8319
★	C/2004 DZ_{61} (Catalina-LINEAR)		5/26/04	2.01	8321
★	P/2004 EW_{38} (Catalina-LINEAR)	6.8	11/19/03	1.79	8322
★	C/2004 H1 (LINEAR)		1/14/04	2.08	8325
★	P/2004 H2 (Larsen)	9.56	5/11/04	2.62	8328
★	P/2004 H3 (Larsen)	7.68	3/12/04	2.44	8332
★	P/2004 HC_{18} (LINEAR)	6.52	6/18/04	1.71	8333
★	C/2004 HV_{60} (Spacewatch)		12/21/03	3.10	8337
★	C/2004 K1 (Catalina)		7/4/05	3.40	8343
★	C/2004 H6 (SWAN)		5/12/04	0.78	8346
★	P/2004 K2 (McNaught)	5.40	6/16/04	1.55	8348
★	C/2004 K3 (LINEAR)		6/30/04	1.11	8350
★	C/2004 L1 (LINEAR)		3/30/05	2.07	8352
★	C/2004 L2 (LINEAR)		11/16/05	3.80	8356