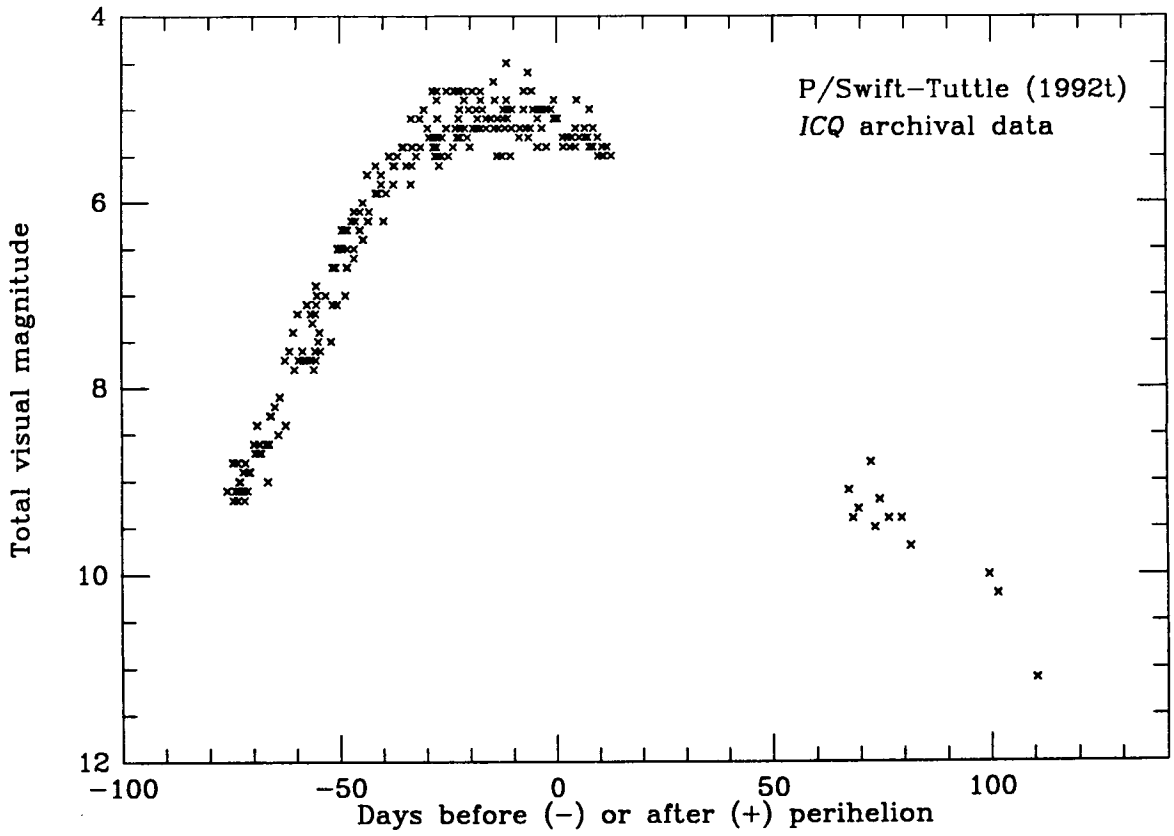
INTERNATIONAL COMET QUARTERLY

Whole Number 88 OCTOBER 1993 Vol. 15, No. 4



Light curve of periodic comet Swift-Tuttle, from visual observations submitted to the *ICQ*. See article on page 182 of this issue.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY
60 Garden Street · Cambridge, MA 02138 · U.S.A.

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 January issue (even-numbered years); the *ICQ* is also indexed in *Astronomy and Astrophysics Abstracts* and in *Science Abstracts Section A*.

The regular (invoiced) subscription rate is US$31.00 per year for surface-mail delivery (price includes the annual *Comet Handbook*; the price without the *Handbook* is US$23.00 per year). Subscribers who do not wish to be billed may subscribe at the special rate of US$23.00 per year for surface-mail delivery (rate is $15.00 without *Handbook*). Add $15.00/year to each of these rates for airmail delivery outside of the United States. [The last set of digits (after the hyphen) on the top line of the mailing address label gives the Whole Number that signifies the last *ICQ* issue which will be sent under the current subscription status.] Make checks or money orders payable in U.S. funds (and drawn on a U.S. bank) to *International Comet Quarterly* and send to Daniel Green; Smithsonian Astrophysical Observatory; 60 Garden St.; Cambridge, MA 02138, U.S.A. [Group subscription rates available upon request.] Back issues are $4.00 each — *except* for "current" *Comet Handbooks*, which are available for $15.00 ($8.00 to subscribers if ordered with their *ICQ* subscription; see above). Up-to-date information concerning comet discoveries, orbital elements, and ephemerides can be obtained by subscribing to the *IAU Circulars* and/or the *Minor Planet Circulars* (via postal mail and also available via computer access); for further information, contact the *ICQ* Editor at the above address.

Cometary observations also 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 via the computer networks *SPAN* (CFAPS2::GREEN), *BITNET* (GREEN@CFA), or Internet (GREEN@CFA.HARVARD.EDU), or via floppy disks that can be read on an IBM PC], and should contact the Editor for further information.

Among the Observation Coordinators (OCs) listed below, those with postal addresses have e-mail contacts with the *ICQ* Editor (or regularly send data to the Editor on IBM PC-compatible floppy disks); 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.

ICQ EDITORIAL STAFF::

Daniel W. E. Green.....Editor
Syuichi Nakano.....*Comet Handbook* Editor
Charles S. Morris.....Associate Editor
Veronica L. Passalacqua.....Assistant Editor

OBSERVATION COORDINATORS::

AUSTRALIA.....Paul Camilleri (RMB 2013; Cottons Rd.; Cobram 3644, Victoria); David A. J. Seargent
BRAZIL.....José Guilherme de S. Aguiar (R. Candido Portinari, 241; 13089-070 - Campinas - S.P.)
CZECH REPUBLIC.....Petr Pravec (Astronomical Institute; CS-25165 Ondrejov)
GERMANY.....Jost Jahn (Neustaedter Str. 11; D-29389 Bodenteich)
HUNGARY.....Krisztián Sárneczky
JAPAN.....Akimasa Nakamura (P.O. Box 9, Kuma Post Office; Kuma-cho, Ehime 791-12)
Syuichi Nakano (P.O. Box 32; Sumoto Post Office; Hyogo-Ken, 656-91)
THE NETHERLANDS.....A. H. Scholten (Horsterdijk 6a; NL-6961 KP Eerbeek)
NEW ZEALAND.....Alan C. Gilmore and Pamela Kilmartin (P.O. Box 57; Lake Tekapo 8770)
NORWAY.....Bjoern H. Granslo (Postboks 1029; Blindern; N-0315 Oslo 3)
POLAND.....Jerzy Rafalski and Krzysztof Jaroszewski (Institute of Astronomy; Nicolaus Copernicus University; ul. Chopina 12/18; 87-100 Torun)
PORTUGAL.....Alfredo Pereira (R. Antero de Quental 8, 2 dto; Carnaxide; 2795 Linda-a-Velha)
SLOVENIA.....Herman Mikuz (Kersnikova 11; 61000 Ljubljana)
SWEDEN.....Joergen Danielsson (Hasselstigen 2D; 386 00 Farjestaden)
UNITED KINGDOM.....Jonathan Shanklin (11 City Road; Cambridge CB1 1DP, England)
Guy M. Hurst (16 Westminster Close; Kempshott Rise; Basingstoke, Hants RG22 4PP, England)

EDITORIAL ADVISORY BOARD::

Michael F. A'Hearn, *University of Maryland*
Ľubor Kresák, *Astronomical Institute, Slovak Academy of Sciences, Bratislava*
Brian G. Marsden, *Harvard-Smithsonian Center for Astrophysics*
David D. Meisel, *State University College of New York, Geneseo*
Zdenek Sekanina, *Jet Propulsion Laboratory*

++++++++++++

This issue is No. 88 of the publication originally called *The Comet* (founded March 1973) and is Vol. 15, No. 4, of the *ICQ*. *[ISSN 0736-6922]*

****

SUBSCRIPTION RATE INCREASE

Effective immediately, due to sudden increases in distribution costs, the subscription costs to the *ICQ* are increasing for all subscribers, as detailed above. Also, we must change to sending the *ICQ* by surface mail to non-U.S. subscribers, unless an additional airmail surcharge is paid by the subscriber. Back issues will remain at $4.00 per issue if sent by surface mail, for one year; beginning Oct. 1, 1994, all back issues will cost $6.00 per issue if sent by surface mail.

◇ ◇ ◇

— CORRIGENDA —

- In the July 1992 issue, page 60, eleventh paragraph, *for* /tt.t *read* /t.tt
- In the Oct. 1992 issue, p. 125, the 3-digit code for P/Ashbrook-Jackson *should read* 710
- On page 107 of the July 1993 issue, there were several errors in the Key to Observers. Brian Marsden (MAR03) was living and observing in England for the observation attributed to him in that issue (comet 1957 V, 1957 Aug. 24.9). Queensland is in Australia (observers HOD and MAT01). The country (U.K.) was truncated from observer ORD's location; likewise, part of 'Sri Lanka' was truncated from observer BRI's location.
- Also in the July 1993 issue, page 138, line 9, *for* recently-discoveried *read* recently-discovered
- In the *1994 Comet Handbook* (June 1993 special issue of the *ICQ*), page H2, "Introduction: Orbital Elements.", line 10, *for* MEcNE = Mercury to Pluto including Ceres *read* MEcNE = Mercury to Neptune including Ceres
- Also in the *1994 Comet Handbook*, page H2, "Introduction", second paragraph, line 5, *for* page H52 *read* page H56

PERIODIC COMETS FOR THE VISUAL OBSERVER IN 1994

Alan Hale
Southwest Institute for Space Research

From a scientific standpoint, the cometary highlight of 1994 will almost certainly be the impacts of the various fragments of P/Shoemaker-Levy 9 (1993e) with Jupiter in late July (cf. *IAUC* 5800, 5801, 5807; Chapman 1993). Thorough discussions and predictions of the times and visibility conditions of the impact events will become available as that time approaches, and interested *ICQ* readers are advised to keep abreast of the relevant information through the *IAU Circulars* (*IAUCs*) and the *Minor Planet Circulars* (*MPCs*). As far as observing of the comet itself prior to the impact is concerned, the most recent 1994 orbit available at this writing (*MPC* 22383) indicates that it will be at opposition near the end of April. Ostensibly, the comet's brightness then should be similar to that at its discovery in March 1993, when it was near total visual magnitude $m_1 \sim 13$; however, additional factors such as spreading and intrinsic fading of the nuclei make any brightness predictions problematical. Observers are urged to monitor this most unusual object throughout its period of visibility.

Among the predicted short-period comets, perhaps five are expected to become visible in small to medium-sized telescopes during 1994. Several fainter ones will be worthwhile for observation attempts with larger instruments. Consult the *ICQ*'s *1994 Comet Handbook* for more specific information.

THE BRIGHTER COMETS

P/West-Kohoutek-Ikemura (1993o)

This comet passes perihelion on 1993 December 25, at $q = 1.58$ AU, under exceptionally good geometrical conditions. If the comet maintains the same brightness behavior that it did at its discovery apparition in 1975, a peak brightness near $m_1 \sim 10.5$ may be expected in mid-December, with the brightness remaining near magnitude 11-12 for the first one to two months of 1994; a fairly high northern declination will allow for convenient observation from the northern hemisphere. It is possible, however, that the brightness exhibited in 1975 was anomalous, since the comet had passed close to Jupiter shortly prior to its discovery, and this was evidently the comet's first "close" perihelion. It was not visually observed at the two interim returns, both of which, however, occurred under unfavorable conditions. Nevertheless, even if the comet is fainter than it was in 1975, the favorable geometry in 1993-94 should allow it to become bright enough to be visually observable.

P/Schwassmann-Wachmann 2

The 1994 return of this 6.4-year comet is extremely favorable, with opposition occurring less than two days after its January 23 perihelion ($q = 2.07$ AU). The comet will probably become observable visually during the latter part of 1993 and should remain visible for the first several months of 1994; a peak brightness near $m_1 \sim 11$ should be maintained throughout January and February.

This may well be the last time that visual observations of P/Schwassmann-Wachmann 2 are obtained, at least for the next several decades. An approach to within 0.25 AU of Jupiter at the comet's next aphelion in 1997 will cause the orbital period to increase to over 8.5 years and the perihelion distance to increase to 3.4 AU; at such a distance, the comet will probably remain too faint for visual observations even at the most favorable of returns. Not until another approach to Jupiter in the mid-21st century will the perihelion distance decrease to the point at which visual observations again become possible (Belyaev 1967). P/Schwassmann-Wachmann 2 is now considered an 'annual comet', with near-aphelic observations being obtained in 1991 by Luu and Jewitt (1992).

P/Encke

With perihelion occurring on February 9 ($q = 0.33$ AU), this comet's 1994 return is relatively favorable for northern-hemisphere observers, with the comet being conveniently visible in the evening sky prior to perihelion. It should become visually observable by the end of November 1993, and should be near $m_1 \sim$ 9-10 by the beginning of 1994. The comet should brighten to about 8th magnitude by mid-January, and will probably reach $m_1 \sim 7$ by the time it enters the solar glare at the end of the month.

P/Encke may become visible to observers in the southern hemisphere by early- to mid-March. Historically, the comet tends to remain faint and diffuse after perihelion; thus it is unlikely to be any brighter than $m_1 \sim$ 9-10 when it does become visible, and it will probably fade quite rapidly.

P/Tempel 1 (1993c)

This comet passes perihelion on July 3 ($q = 1.49$ AU), under circumstances almost identical to those at the returns of 1972 and 1983. Based upon those returns, the comet will probably become visually observable ($m_1 \sim 12$) by about March, will reach opposition in early April at $m_1 \sim$ 10-11, and should achieve a peak brightness of $m_1 \sim$ 9-10 in June. After perihelion the comet will fade and travel south (reaching $\delta \sim -30°$ by early September), making observation difficult for observers in the northern hemisphere; those in the southern hemisphere should be able to follow the comet until it fades below the visual threshold sometime about October.

(continued on next page...)

P/Borrelly

This comet's 1994 return, with perihelion occurring on November 1 (q = 1.37 AU), is only slightly less favorable than its previous return in 1987, when it reached a peak brightness of 7th magnitude. The comet should become visually observable at about 12th magnitude sometime in June, and should reach mag 10 by September and mag 8 by mid-October. A peak brightness near $m_1 \sim$ 7.5-8 should be achieved in late November and early December. At the end of 1994, it will be far north at $\delta \sim +59°$ and still as bright as $m_1 \sim$ 8-9. Opposition will occur in February 1995.

THE FAINTER COMETS

P/Schwassmann-Wachmann 1

This object is at opposition in early January, and will remain accessible in the evening sky until about early June. It then emerges into the morning sky in September, enroute to its next opposition in February 1995. The comet continues to exhibit 1-2 outburst events per year; thus observers are always encouraged to monitor it for such events.

P/Kojima (1992z)

No visual observations of this comet have apparently been reported. The 1994 return, with perihelion occurring on February 17 (q = 2.40 AU), is extremely favorable, however — opposition occurring only one week before perihelion. Photographic estimates made at the comet's discovery apparition in 1970 (when the perihelion distance was 1.63 AU) suggest a peak brightness of $m_1 \sim$ 14 occurring around the time of perihelion.

P/Tempel 2

This comet is in solar conjunction in December 1993, and even by the time of perihelion (March 16, at q = 1.48 AU), the solar elongation is still $< 30°$. P/Tempel 2 normally exhibits an asymmetric light curve, being several magnitudes brighter after perihelion than before; since the comet's elongation does increase in the months after perihelion, this does allow for the possibility of visual observations at this return, despite the unfavorable geometry. Nevertheless, the comet's brightness will probably not exceed $m_1 \sim$ 12-13, and its location south of the sun will limit any observation attempts to the southern hemisphere. Like P/Schwassmann-Wachmann 2, P/Tempel 2 is now an annual comet, having been observed at aphelion in 1991 by Mueller (1991).

P/Tuttle (1992r)

Although on most returns this comet becomes rather bright, the geometrical conditions of the 1994 return (perihelion June 25, q = 1.00 AU) are very poor, and the prospects for visual observations are not good. Because of the high orbital inclination (55°), it is possible that northern-hemisphere observers may obtain observations prior to perihelion, but the comet is unlikely to be any brighter than $m_1 \sim$ 12 by the time the elongation goes under 30° in mid-April. Southern-hemisphere observers may fare slightly better, with the brightness perhaps being near $m_1 \sim$ 10-11 when the elongation exceeds 30° in early August; however, the elongation will remain less than 40° throughout the post-perihelion apparition, and the viewing "window" will remain quite short.

P/Reinmuth 2 (1993g)

This comet passes perihelion on June 29, at q = 1.89 AU. The 1994 return is similar in quality to that in 1987, when visual observations near $m_1 \sim$ 13-13.5 were obtained; the primary difference is that the 1987 apparition was an evening-sky return, while the present one is in the morning sky. Opposition is in October, and if the comet behaves in brightness similarly to what it exhibited in 1987, a peak brightness near $m_1 \sim$ 13.5 may occur in August and September.

P/Harrington

Perihelion passage for this comet occurs on August 23, at q = 1.57 AU. A handful of visual observations, at $m_1 \sim$ 13, were obtained at the previous return in 1987, and since the 1994 return is slightly better geometrically, the comet may become slightly brighter, perhaps to $m_1 \sim$ 12.5. The 1987 observations suggest the possibility that the light curve of P/Harrington may be asymmetric, with the post-perihelion brightness being greater than that of pre-perihelion. If this is true, the viewing conditions at this return are enhanced, since the comet will pass opposition two months after perihelion.

P/Brooks 2

This comet is at perihelion on September 1, at q = 1.84 AU. Like the previous two comets, P/Brooks 2 was visually observed (at a peak brightness of $m_1 \sim$ 12.5) at its last return in 1987, but since the viewing conditions in 1994 are slightly inferior to those in 1987, the comet is unlikely to be as bright. A peak brightness of $m_1 \sim$ 13 may be reached between the time of perihelion passage and opposition, which occurs in early November.

(2060) Chiron

This object emerges into the morning sky in late 1993, enroute to opposition in late February 1994, and then will be accessible in the evening sky until about July. By November it should again be accessible, as it approaches its next opposition in March 1995. If Chiron behaves normally, its brightness during both viewing seasons should be near 15th magnitude, although its past behavior suggests that small outbursts (perhaps 1-2 magnitudes) may occur occasionally. Thus, monitoring of this object by observers with larger visual instruments is warranted and encouraged.

REFERENCES

Belyaev, N. A. (1967). *Sov. Astr.* **11**, 366.
Chapman, C. R. (1993). *Nature* **363**, 492.
Luu, J. X.; and D. C. Jewitt (1992). *A.J.* **104**, 2243.
Mueller, B. E. A. (1991). *Minor Planet Circ.* 18491.

TABULATION OF COMET OBSERVATIONS

This issue contains some older, previously-unpublished observations of several observers. One of these observers, Vladimir Znojil, makes the following remarks about his data, which go back to the 1950s: "The observations of comet 1955 V were mentioned in an article by V. Vanysek and J. Rajchl (1956, *Publ. Astron. Inst. Brno*, No. 3, 1). [In compiling the data for publication in the *ICQ*,] some sources of comparison stars can [no longer] be identified reliably — they are usually HD, Revised Harvard Photometry, polar sequence, and similar reliable sources of comparison stars."

Descriptive Information (to complement the Tabulated Data):

◇ *Comet West 1976 VI* ⟹ 1976 Mar. 4.18: w/ naked eye, 25′ coma, 5° tail in p.a. 330° [MOE].

◇ *Comet Bradfield 1975 XI [obs. by SHA02 w/ 20-cm f/14 R (40×)]* ⟹ 1976 Jan. 29.77: DC = 1-2. Jan. 30.78: DC = 1.

◇ *Comet Panther 1981 II* ⟹ 1980 Nov. 26.80: "accidental pre-discovery" visual observation (*cf. QJRAS* **26**, 164-165, 1985) appears to rather have been a pre-discovery photograph; the following notes are from Shanklin's log book: 50-mm camera lens, 5-min exposure at Nov. 26.78 UT on Ektachrome 400 film, comet mag = 10.3 (ref: = star 'B' of BAA AY Lyr sequence), coma dia. 2′.5, DC = 1; revision of observation in *ICQ* No. 42 [SHA02].

◇ *Comet Austin 1982 VI* ⟹ 1982 Sept. 8.83: in 20×80 B, also 0°.42 tail in p.a. 19° [SHA02]. Sept. 8.84: in 20-cm *f*/14 R (40×), 0°.12 tail in p.a. 21° [SHA02].

◇ *Comet Austin 1990 V [all notes by DES01]* ⟹ 1990 Feb. 16.95: coma not circular. Feb. 17.97: elliptical, diffuse coma. Feb. 22.96: tail was very faint. Mar. 5.96: parabolic coma. Apr. 28.34: fan-shaped tail. May 5.32: comet visible to naked eye; in binoculars, gas tail very large. May 7.31: comet visible to naked eye; in binoculars, bright central cond. and diffuse fan tail. May 8.31: small central cond. of size 4′; fan tail. May 10.31: coma very diffuse. May 22.30: blue filter reveals a very large gas tail, and prominent central cond. of size 3′. May 27.22: diffuse coma, small bright cond. May 29.16: diffuse coma w/ small cond. May 30.06: aspect of coma more diffuse with gradual brightening toward center. June 4.04: faint fan tail. June 12.90: coma suspected to be blue. June 15.90: comet very diffuse. June 17.93: in 6.0-cm *f*/11 R (116×), 5′ coma, DC = 7. June 26.87: comet very vague and diffuse.

◇ *Comet Levy 1990 XX [all notes by DES01]* ⟹ 1990 Aug. 1.33: diffuse coma; central cond. of size 3′. Aug. 3-Sept. 27: comet had distinctly blue color. Aug. 14.16: fan-shaped tail. Aug. 25.03: in telescope, coma had one jet in p.a. 30°; visually, the central cond. had dia. 4′. Aug. 26.95: broad fan tail, with dust and plasma components evident. Sept. 9.91: also a dust tail; central cond. of size 4′. Sept. 16.89: blue filter reveals a jet in p.a. 15°.

◇ *Comet Shoemaker-Levy 1991a*$_1$ ⟹ 1992 July 19.50: exp. on TP 2415 film w/ 16-cm *f*/3.8 W shows type-I tail > 70′ long in p.a. 78° and 18′ type-II tail in p.a. 42°-80° [TSU02].

◇ *Comet Tanaka-Machholz 1992d* ⟹ 1992 Apr. 28.77: TP 2415 film exp. w/ 16-cm *f*/3.8 W shows 8′ tail in p.a. 300° [TSU02].

◇ *Comet Mueller 1993a* ⟹ 1993 Mar. 13.26: "probable outburst" [MOR]. July 2.94-Aug. 15.97: diffuse 'nebula' w/ central cond. [LEH]. July 29.08: fan-like tail in sunward direction [MIK]. Aug. 13.04: moderately condensed, coma dia. 1′.8; total mag obtained through aperture of 1′.75; (anti)tail 4′.1 long in p.a. 140° (± 1°); coma extension in p.a. 352° (1′.7 from central cond.) — ~ anti-sun direction (the difference between the longitude of the sun and Ω was −4°.4, and the earth crossed the comet's orbital plane on Aug. 17.6); exp. w/ 18-cm *f*/5.6 reflector + CCD (total integration time was 7 min, but the tail was apparent already on 1-min exposures) [PRA01 and M. Wolf]. Aug. 13.97: at 123×, central cond. of mag 13.0 (ref. AAVSO SU UMa chart) [GRA04]. Aug. 14.10: sunward fan-like tail; photometry obtained with 19-cm *f*/4 flat-field camera + *V* filter + ST-6 CCD [MIK]. Aug. 15.01: "comet brighter and slightly enhanced using a Lumicon Swan Band Filter" [MEY]. Aug. 22.09: starlike central cond. of size ~ 1′ w/ delicate halo of coma; weak sunward, slightly-curved tail ~ 9′ long in p.a. ~ 150°; also ~ 2′ jet extending in p.a. ~ 330° (the anti-solar direction) [MIK]. Aug. 24.04: interference from nearby star of mag 9.1 [MEY]. Aug. 29.05: all observations showed a definite brightness peak at the center [MEY]. Sept. 4.97: CCD images (120-sec exp.) show 4′ main tail in p.a. 317° and a diffuse, broad anti-tail (more evident than the main tail) 0°.1 (5′) long in p.a. 160° [CAV]. Sept. 19.01: 8′ tail in p.a. 311°, anomalous tail 10′ long in p.a. 177° w/ surface brightness similar to the "normal" tail; faint structure visible between these two tails (from p.a. 177° to 311°) extends up to distance of 7′ from the coma cond.; measured on composite image of 5 min total integration time [PRA01].

◇ *Comet Mueller 1993p* ⟹ 1993 Aug. 19.98: fan-shaped tail ~ 1′.5 long in p.a. ~ 325°; photometry obtained with 20-cm *f*/2 Baker-Schmidt camera + *V* filter + ST-6 CCD [MIK]. Aug. 21.90: tail 0′.5 in p.a. 280° ± 5°, faintest part extending to 1′.3; coma dia. < 15″ [PRA01]. Aug. 21.94: no trace of comet on twin, 5-min exposures (obtained as on Aug. 19.98) [MIK]. Sept. 19.05: fan-tail 1′.6 long between p.a. 230° and 305°, its brightest part at p.a. 233°; measured on composite image, 6 min total integration time [PRA01].

◇ *Periodic Comet Ashbrook-Jackson (1992j)* ⟹ 1993 July 22.407: tail curving through p.a. 258° at 0′.8, continuing through p.a. 249° at 4′.9 and out to 8′.7 at p.a. 245°; cirrus clouds present — m_1 should thus be considered brighter than 15.5 [SCO01]. July 23.433: tail curving through p.a. 267° at 0′.6 from the nucleus, continuing through p.a. 249° at 2′.4 and out to 18′.9 at p.a. 241°; sharp tailward spike extending ~ 1′.34 in p.a. 245° [SCO01]. Aug. 13.01: m_1 = 12.7 incl.

[cont. from previous page] tail in aperture of dia. 2′.3 (mag 13.8 in aperture of 0′.5; both ref: HS); on composite image (9 min total exposure), small well-condensed coma w/ dia. 0′.5, tail system spans p.a. 214°-306° (length 0′.9 in p.a. 214°, 1′.2 at p.a. 228°, 2′.3 at 240°, 4′.8 at 249°, 2′.8 at 254°, 2′.1 at 275°, 0′.9 at 293°, and 0′.5 at p.a. 306°) [PRA01]. Aug. 13.46: fan-shaped tail curves from p.a. 274° at a distance of 0′.57 from the nucleus, and continues as a narrow tail 22′.0 in p.a. 243°; a sharp tailward spike extends 2′.0 in p.a. 248° [SCO01]. Aug. 14.41 and 15.40: comet elongated toward the W [MOR]. Sept. 14.48: m_2 = 17.5; tail extends 27′.3, curving from p.a. 265° at 0′.6 from the nucleus to 241°.1 near the end; sharp tailward spike extends 1′.32 in p.a. 245° [SCO01]. Sept. 19.00: m_1 = 13.7 for the small coma (0′.5) w/ strong cond.; well-developed tail [PRA01]. Sept. 19.01: magnitude sequence BAA RX And chart; comet was faint and extended — somewhat fainter and larger than nearby galaxy NGC 514 — and its visibility was confirmed by several observers [GRA04].

◇ *Periodic Comet Forbes (1993f)* ⟹ 1993 July 23.442: tail extending faintly beyond 17′.2 in p.a. 247° [SCO01]. Aug. 14.01: measurement of a co-added image of 10-min total integration time; apparent central cond.; tail visible up to distance of 12′ in p.a. 245° from nucleus [PRA01].

◇ *Periodic Comet Howell (1992c)* ⟹ 1993 July 23.451: inner coma dia. 53″ w/ an extension to 95″; tail extends more than 13′.0 [SCO01]. July 25.08: photometry obtained with 20-cm *f*/2 Baker-Schmidt camera + *V* filter + ST-6 CCD; comet was weak, diffuse object with cond.; some cirrus clouds present, so that the magnitude might be off by few tenths [MIK]. July 29.06: comet diffuse w/ cond. [MIK]. Aug. 14.03: fan-shaped tail between p.a. 192° and 251°; length of tail ranged from 1′.0 at 192°, to 1′.6 at 223°, to 2′.0 at 236°, to 2′.7 at 242°, to 5′.2 at 250° [PRA01].

◇ *Periodic comet Neujmin 3 (1993j)* ⟹ 1993 July 21: object essentially stellar in appearance; magnitude is average of three values published on *MPC* 22440; integration time is ∼ 150 sec, *vs.* ∼ 450 sec for images obtained July 25 — meaning lower *S/N* (and thus more uncertain magnitudes) on July 21 [SCO01]. Aug. 16.16: faint tail extends 0′.3 in p.a. 90° [SCO01].

◇ *Periodic Comet Schaumasse (1992x)* ⟹ 1992 Dec. 29.90 and 1993 Jan. 14.83: comet observed visually with an image intensifier [MER]. 1993 Mar. 11.18: "poor conditions" [MOR].

◇ *P/Schwassmann-Wachmann 1* ⟹ 1993 Feb. 26.819: w/ 14.0-cm *f*/1.65 A, 4-min exp. on TP 2415 hypered film shows comet at $m_1 \simeq 14.0$, coma < 1′ [HAS02]. Aug. 22.11: field low in sky [MIK].

◇ *P/Schwassmann-Wachmann 2* ⟹ 1993 Aug. 17.1: diffuse coma w/ stellar central cond. [CAV and C. Gualdoni, Sormano, Italy].

◇ *Periodic Comet Shoemaker-Levy 9 (1993e)* ⟹ 1993 Apr. 21.31: coma 0′.5 × 1′.2, elongated E-W [KEE]. Apr. 23.92: comet only glimpsed w/ averted vision, but detection confirmed w/ 40-min exp. on TP 2415 hypered film w/ Celestron 8 telescope at *f*/6; photo shows comet as a 1′-long, 0′.2-wide trail oriented in p.a. 77°-257° [GAR02].

◇ *Periodic comet Singer Brewster (1992e)* ⟹ 1993 Aug. 16.37: faint tail; m_2 was intended for the '22.2' magnitude value given on *MPC* 22520 [SCO01].

◇ *Periodic Comet Swift-Tuttle (1992t)* ⟹ 1992 Oct. 17.43: exp. on TP2415 film w/ 16-cm *f*/3.8 W shows fan-shaped coma in p.a. 160-320° [TSU02]. Oct. 26.44: exp. on TP2415 film w/ 20-cm *f*/5 L shows 30′ type-I tail in p.a. 32° and fan-shaped coma in p.a. 200-330° [TSU02]. Oct. 27.41: exp. on Ektar 1000 film w/ 20-cm *f*/5 L shows > 50′ type-I tail in p.a. 31° [TSU02]. Oct. 31.42: exp. on TP2415 film w/ 4.8-cm *f*/2.8 A shows 140′ type-I tail in p.a. 33°; exp. on TP2415 film w/ 20-cm *f*/5 L shows fan-shaped coma in p.a. 160-20° [TSU02]. Nov. 14.99: w/ 36-cm L (151×), nucleus of m_2 = 9.5 (ref: AA) off-center to the S [STE01]. Nov. 17.35: exp. on TP2415 film w/ 4.8-cm *f*/2.8 A shows 3.0° type-I tail in p.a. 41°; exp. on TP2415 film w/ 20-cm *f*/5 L shows 13′ type-II tail in p.a. 29° [TSU02]. Nov. 22.40: exp. on TP2415 film w/ 4.8-cm *f*/2.8 A shows 5.7° type-I tail in p.a. 44°; exp. on TP2415 film w/ 20-cm *f*/5 L shows 17′ type-II tail in p.a. 27° [TSU02]. Nov. 29.42: exp. on TP2415 film w/ 8.6-cm *f*/3.5 A shows > 4.2° type-I tail in p.a. 45°; exp. on TP2415 film w/ 20-cm *f*/5 L shows 30′ type-II tail in p.a. 30-35° [TSU02]. Dec. 14.39: exp. on TP2415 film w/ 20-cm *f*/5 L shows 80′ type-I tail in p.a. 53° and 37′ type-II tail in p.a. 41° [TSU02]. Dec. 19.38: exp. on TP2415 film w/ 20-cm *f*/5 L shows 40′ type-I tail in p.a. 54° and 30′ type-II tail in p.a. 40° [TSU02].

◇ *Periodic Comet Väisälä (1992u)* ⟹ 1993 July 22.173: faint sunward spike extending 1′.2 in p.a. 286° [SCO01]. July 24.175: faint sunward spike extends 1′.28 in p.a. 288° [SCO01].

◇ ◇ ◇

TABULATED DATA

The headings for the tabulated data are as follows: "DATE (UT)" = Date and time to hundredths of a day in Universal Time; "MM" = the method employed for estimating the total visual magnitude [B = Bobrovnikoff, M = Morris, S = Sidgwick/In-out — see October 1980 issue of *ICQ*, pages 69-73 — etc.; also, P stands for photographic magnitude, and photoelectrically-determined values fall under U, L, and V for the standard *U*, *B*, and *V*, respectively]. "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 magnitude estimates (see pages 98-100 of the October 1992

[cont. from previous page] issue, and page 60 of the April 1993 issue, for the 1- and 2-letter codes). "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).

"COMA" = estimated coma diameter of the comet 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; 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. "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).

An asterisk between the published DATE and MM columns indicates that the observation is an updated version of one already published in a previous issue of the *ICQ*, *The Comet Quarterly*, or *The Comet*. 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 then only for situations where the observed comet is at altitude > 10°. Here again are the new special symbols: '&' = 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', 'w', or 's', respectively, should be used.

A complete list of the Keys to abbrevations used in the *ICQ* is available from the Editor for $4.00 postpaid. *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 for further information [note correction on page 140 of this issue]. Further guidelines concerning reporting of data may be found on pages 59-60 of the April 1993 issue.

◇ ◇ ◇

Key to observers with observations published in this issue, *with 2-digit numbers between Observer Code and Observer's Name indicating source [16 = Japanese observers (c/o Akimasa Nakamura, Aichi, Japan); 35 = Brazilian observers (c/o Jose G. de Souza Aguiar, Campinas, S.P.); etc.]. Those with asterisks (*) preceding the 5-character code are new additions to the Observer Key:*

CODE	S	OBSERVER, LOCATION
AKI	16	Isao Akita, Japan
BOE		Leo Boethin, The Philippines
CAM03		Paul Camilleri, Australia
CAV		Marco Cavagna, Italy
*CHU03	13	Francisco Huete Chugunowa, Spain
COM	11	Georg Comello, The Netherlands
DES01		Jose Guilherme de Souza Aguiar, Brazil
DIA	13	Francisco Garcia Diaz, Spain
*DVO	23	Denisa Dvorakova, Czech Republic
GAR02		Stephane Garro, France
GRA04	24	Bjoern Haakon Granslo, Norway
HAS07	16	Akie Hashimoto, Japan
HAY01	16	Hironori Hayashi, Japan
HIR01	16	Kazuyoshi Hirayama, Japan
HIS	16	Tsutomu Hishikura, Japan
HOR02	23	Kamil Hornoch, Czechoslovakia
ISH02	16	Akiyoshi Ishikawa, Japan
IWA01	16	Yoshitaka Iwaki, Japan
KAK01	16	Wataru Kakei, Japan
KAM03	16	Toshiyuki Kamijima, Japan
KAN03	16	Toshikazu Kanno, Japan
KAN04	16	Shigemi Kanbara, Japan
KEE		Richard A. Keen, CO, U.S.A.
KON03	16	Eitoshi Konno, Japan
*KUB	23	Pavel Kubicek, Czech Republic
KYS	23	J. Kysely, Czech Republic
*LAR02	35	Marcos F. Lara, Brazil
LEH		Martin Lehky, Czechoslovakia
*LOU	35	Romualdo Lourencon, Brazil
MER		Jean-Claude Merlin, France
MEY		Maik Meyer, Germany
MID01	24	Oernulf Midtskogen, Norway

CODE	S	OBSERVER, LOCATION
MIK		Herman Mikuz, Slovenia
MIT	16	Shigeo Mitsuma, Japan
MIY	16	Shuuichi Miyata, Japan
MOE		Michael Moeller, Germany
MOM	16	Masahiko Momose, Japan
MOR		Charles S. Morris, U.S.A.
NAG02	16	T. Nagata, Japan
NAG04	16	Kazuro Nagashima, Japan
NAK01	16	Akimasa Nakamura, Japan
NAK07		Syuichi Nakano, Japan
*NAP	35	Tasso A. Napoleao, Brazil
OBU	16	Yasushi Obuchi, Japan
OKA03	16	Akio Oka, Japan
ONO	16	Osamu Onodera, Japan
PAN	07	Roy N. Panther, England
PER01		Alfredo Jose Serra Pereira, Portugal
PRA01	23	Petr Pravec, Czech Republic
*PRI03	35	Walter Prini, Jr., Brazil
*RAA01	08	Herbert Raab, Austria
*SAN03		Sang Ho Cho, South Korea
SCO01	08	James V. Scotti, AZ, U.S.A.
SHA02	07	Jonathan D. Shanklin, England
SPR		Christopher E. Spratt, BC, Canada
STE01		Christopher Stephan, OH, U.S.A.
TOM	16	Akira Tominaga, Japan
TSU02	16	Mitsunori Tsumura, Japan
WAS	16	Shinsyo (Shinsho) Washi, Japan
WAS01	16	Izumi Washi, Japan
YAM01	16	Tetsuya Yamamoto, Japan
YOS02	16	Katsumi Yoshimoto, Japan
YOS03	16	Hitoshi Yoshida, Japan
ZNO	23	Vladimir Znojil, Czech Republic

Comet Mrkos 1955 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1955 07 15.88	B	7.2		10	R		25	2	6			ZNO
1955 07 17.84	B	7.5		10	R		25	1.5	6			ZNO
1955 07 18.90	B	7.6		10	R		25	& 2	6			ZNO
1955 07 19.91	B	7.7		10	R		25	& 2	6			ZNO
1955 07 21.87	B	7.9		10	R		25	2.2	6			ZNO
1955 07 22.85	B	8.0		10	R		25	2.2	5			ZNO

Comet Mrkos 1955 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1955 07 25.86	B	8.2		10	R		25	2.5	7			ZNO
1955 07 27.88	B	8.5		10	R		25	2.7	6			ZNO
1955 07 28.86	B	8.7		10	R		25	& 2.5				ZNO

Comet Bakharev-Macfarlane-Krienke 1955 IV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1955 07 21.88	B	7.6		10	R		25	& 4	4			ZNO
1955 07 22.86	B	7.6		10	R		25	4.5	4			ZNO
1955 07 25.89	B	7.4		10	R		25	4.5	4			ZNO
1955 07 27.86	B	7.5		10	R		25	& 4	4			ZNO
1955 07 28.84	B	7.6		10	R		25	& 4				ZNO
1955 07 29.85	B	7.8		10	R		25	& 4	4			ZNO
1955 07 31.86	B	8.2		10	R		25	3.4				ZNO
1955 08 01.83	B	8.2		10	R		25	3.5				ZNO
1955 08 03.90	B	8.3		10	R		25	3.0				ZNO

Comet Honda 1955 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1955 08 22.82	B	6.1		10	R		25	& 8	4	0.4		ZNO
1955 08 25.84	B	6.5		10	R		25	& 7	4	0.4		ZNO
1955 08 26.81	B	6.7		10	R		25	& 6	4	0.4		ZNO
1955 08 27.90	B	6.8		10	R		25	8	5	0.3		ZNO
1955 08 29.81	B	7.4		10	R		25	6		0.3		ZNO
1955 09 01.84	B	8.0		10	R		25	> 3				ZNO
1955 09 02.83	B	8.1		10	R		25	> 3				ZNO
1955 09 04.80	B	5.0	SP	10	R		25	8		0.3		ZNO
1955 09 05.79	B	4.9	SP	10	R		25	8		0.2		ZNO
1955 09 07.79	B	5.9	SP	10	R		25	7		0.2		ZNO
1955 09 08.79	B	6.1	SP	10	R		25	7		0.2		ZNO
1955 09 09.79	B	5.9	SP	10	R		25	6.5		0.2		ZNO
1955 09 10.81	B	6.1	SP	10	R		25	6.5		0.2		ZNO
1955 09 12.80	B	6.7		10	R		25	5.5		0.2		ZNO
1955 09 15.80	B	7.3		10	R		25	6		0.2		ZNO
1955 09 16.80	B	7.5		10	R		25	5		0.1		ZNO
1955 09 18.88	B	7.8		10	R		25	4.5		0.1		ZNO
1955 09 19.83	B	7.0		10	R		25	4		0.1		ZNO
1955 09 22.83	B	7.8		10	R		25	4		0.1		ZNO

Comet Mrkos 1956 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1956 04 05.79	B	7.5:		10	R		25	&10	0			ZNO

Comet Arend-Roland 1957 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 04 21.80		1.4	SP	0.0	E		1			>4		ZNO
1957 04 21.80	B	2.5:	SP	10	R		25		5			ZNO
1957 04 23.83		2.0	SP	0.0	E		1			18		ZNO
1957 04 23.83	B	3.0:	SP	10	R		25		6			ZNO
1957 04 26.86		2.0	SP	0.0	E		1					ZNO
1957 04 26.86	B	2.7	SP	10	R		16		6			ZNO
1957 04 27.81		2.0	SP	0.0	E		1			20		ZNO
1957 04 27.86	B	3.3	SP	10	R		25		6			ZNO
1957 04 27.88	B	2.9	SP	10	R		16					ZNO
1957 04 28.83		2.2	SP	0.0	E		1			15		ZNO
1957 04 28.83	B	3.1	SP	10	R		16					ZNO

Comet Arend-Roland 1957 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 04 28.83	B	3.4	SP	10	R		25					ZNO
1957 04 29.88		2.3	SP	0.0	E		1		6	20		ZNO
1957 04 29.88	B	3.5	SP	10	R		25		5			ZNO
1957 05 02.83		3.4	SP	0.0	E		1					ZNO
1957 05 02.84	B	4.2	SP	10	R		25					ZNO
1957 05 04.83		3.6	SP	0.0	E		1			15		ZNO
1957 05 04.91	B	4.4	SP	10	R		25		5			ZNO
1957 05 06.85		4.3	SP	0.0	E		1					ZNO
1957 05 08.82		4.6	SP	0.0	E		1					ZNO
1957 05 08.83	B	5.7	SP	10	R		25					ZNO
1957 05 09.84		4.4	SP	0.0	E		1			>8		ZNO
1957 05 09.87	B	5.5	SP	10	R		25					ZNO
1957 05 13.91		5.2	SP	0.0	E		1			10		ZNO
1957 05 13.93	B	6.3	SP	10	R		25					ZNO
1957 05 15.81		5.5	SP	0.0	E		1					ZNO
1957 05 15.81	B	6.6	SP	10	R		25					ZNO
1957 05 18.81		5.1	SP	0.0	E		1					ZNO
1957 05 18.92	B	6.0	SP	10	R		25		6	7		ZNO
1957 05 25.89	B	6.7		10	R		25					ZNO
1957 05 28.86	B	7.0		10	R		25			3		ZNO
1957 06 01.88	B	7.5		10	R		25			1		ZNO
1957 06 06.87	B	8.1		10	R		25			0.5		ZNO
1957 06 08.87	B	8.3		10	R		25			0.5		ZNO
1957 06 13.88	B	8.9		10	R		25			0.5		ZNO
1957 06 22.87	B	9.7		10	R		25			0.3		ZNO
1957 06 27.96	B	10.0		10	R		25					ZNO
1957 06 28.91	B	10.1		10	R		25			0.4		ZNO
1957 07 03.91	B	10.4		10	R		25			0.3		ZNO
1957 07 04.91	B	10.1		10	R		25		4	0.5		ZNO

Comet Mrkos 1957 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 08 10.87		0.3	SP	0.0	E		1			9		ZNO
1957 08 10.87	B	0.9	SP	10	R		25					ZNO
1957 08 11.84		0.7	SP	0.0	E		1					ZNO
1957 08 11.84	B	1.3	SP	10	R		25					ZNO
1957 08 14.85		0.7	SP	0.0	E		1					ZNO
1957 08 14.85	B	1.3	SP	10	R		25					ZNO
1957 08 15.83		0.6	SP	0.0	E		1					ZNO
1957 08 16.82		0.9	SP	0.0	E		1					ZNO
1957 08 17.84		1.2	SP	0.0	E		1					ZNO
1957 08 17.84	B	2.0	SP	10	R		25					ZNO
1957 08 18.83		1.2	SP	0.0	E		1					ZNO
1957 08 18.83	B	2.0	SP	10	R		25					ZNO
1957 08 20.83		1.5	SP	0.0	E		1					ZNO
1957 08 20.83	B	2.3	SP	10	R		25					ZNO
1957 08 22.83		1.9	SP	0.0	E		1			7		ZNO
1957 08 22.83	B	2.6	SP	10	R		25		6			ZNO
1957 08 23.81		2.2	SP	0.0	E		1			6		ZNO
1957 08 23.81	B	2.9	SP	10	R		25		6			ZNO
1957 08 25.82		2.5	SP	0.0	E		1					ZNO
1957 08 25.82	B	3.2	SP	10	R		25		6			ZNO
1957 08 26.81		2.7	SP	0.0	E		1					ZNO
1957 08 26.81	B	3.4	SP	10	R		25		6			ZNO
1957 08 29.80		3.4	SP	0.0	E		1			5		ZNO
1957 08 29.80	B	4.1	SP	10	R		25		5			ZNO
1957 09 06.78		4.8	SP	0.0	E		1			2		ZNO
1957 09 06.78	B	5.2	SP	10	R		25		4			ZNO

Comet Mrkos 1957 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 09 12.79	B	5.8	SP	10	R		25					ZNO
1957 09 21.82	B	7.5:		10	R		25					ZNO

Comet Burnham 1958 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1958 05 17.93	B	9.3		10	R		25	18	2			ZNO
1958 05 19.87	B	10.1		10	R		25	16	3			ZNO
1958 05 20.88	B	9.0		10	R		25	16	5			ZNO
1958 05 21.92	B	9.6		10	R		25	13	3			ZNO
1958 06 06.87	B	10.3		10	R		25	15	3			ZNO
1958 06 07.95	B	10.9		10	R		25	&11				ZNO
1958 06 09.89	B	10.8		10	R		25	&10				ZNO
1958 06 15.91	B	11.3		10	R		25	& 9				ZNO
1958 06 16.93	B	10.7		10	R		25	10				ZNO
1958 06 17.90	B	10.5		10	R		25	10				ZNO
1958 06 23.92	B	10.5		10	R		25	11				ZNO
1958 07 07.91	B	11.4		10	R		25	4.5				ZNO
1958 07 08.89	B	10.9		10	R		25	6				ZNO

Comet Burnham 1960 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1960 04 20.10	B	4.5	SP	10	R		25	10		0.6		ZNO
1960 04 25.96		4.8	SP	0.0	E		1					ZNO
1960 04 25.96	B	4.9	SP	10	R		25	25		0.3		ZNO
1960 04 27.91	B	5.0	SP	10	R		25	20		0.5		ZNO
1960 04 27.93		5.0	SP	0.0	E		1					ZNO
1960 05 02.88		4.5	SP	0.0	E		1			1		ZNO
1960 05 02.88	B	4.7	SP	10	R		25	18		0.6		ZNO
1960 05 03.92		5.2	SP	0.0	E		1					ZNO
1960 05 03.92	B	5.3	SP	10	R		25	15		0.3		ZNO
1960 05 04.89	B	5.8	SP	10	R		25	12				ZNO
1960 05 06.92	B	6.6	S	10	R		25	12				ZNO
1960 05 15.93	B	9.2	S	10	R		25	5				ZNO
1960 05 19.92	B	9.3	S	10	R		25	6				ZNO
1960 05 23.89	B	9.9		10	R		25	3.5	2			ZNO

Comet Kohoutek 1973 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 11 14.22	B	6.3	SP	4.0	B		8	8.3				MOE
1973 11 21.19	B	6.0	SP	8.0	B		10	8				MOE
1973 11 27.25	S	6.9	S	5.0	B		7					SHA02
1974 01 06.73	S	3.7	SP	5.0	B		7					SHA02
1974 01 10.75	S	4.7	SP	5.0	B		7			5		SHA02
1974 01 11.74	S	4.5	SP	5.0	B		7					SHA02
1974 01 13.79	S	4.6	SP	5.0	B		7			6		SHA02
1974 01 14.69	B	4.5	SP	8.0	B		10	15		>1		MOE
1974 01 17.73	B	5.0	SP	8.0	B		10	12		2.5		MOE
1974 01 19.75	S	5.2	SP	5.0	B		7			5		SHA02
1974 01 24.75	S	6.2	SP	5.0	B		7			2.5		SHA02
1974 01 25.75	S	5.9	SP	5.0	B		7			3		SHA02
1974 01 26.71	B	6.5	SP	8.0	B		10	8				MOE
1974 01 27.78	B	6.5	SP	8.0	B		10	8		>1		MOE
1974 01 29.79	S	7.1	S	8.0	B		10			2		SHA02
1974 01 31.76	S	8.0:	S	5.0	B		7			0.5		SHA02
1974 02 02.77	S	9.2	S	8.0	B		10					SHA02
1974 02 07.83	S	10.0:	S	32	R	18	80	4				SHA02

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 02 09.79	S	7.5	S	5.0	B		7					SHA02
1974 02 10.83	S	7.7	S	5.0	B		7			0.75		SHA02
1974 02 22.80	S	10.0:	S	32	R	18	80					SHA02
1974 02 23.84	S	9.0	S	32	R	18	80	5				SHA02

Comet Bradfield 1974 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 03 28.82	B	4.8	SP	8.0	B		10					MOE
1974 03 30.83	B	5.0	SP	8.0	B		10					MOE
1974 04 01.84	B	5.2	SP	8.0	B		10					MOE
1974 04 03.84	B	5.5	SP	8.0	B		10					MOE
1974 04 06.85	B	5.7	SP	8.0	B		10					MOE
1974 04 08.83	B	5.9	SP	8.0	B		10					MOE
1974 04 09.83	B	6.0	SP	8.0	B		10					MOE
1974 04 10.84	B	6.0	SP	8.0	B		10					MOE
1974 04 11.85	B	6.2	SP	8.0	B		10					MOE
1974 04 12.87	B	6.2	SP	8.0	B		10					MOE
1974 04 13.85	B	6.3	SP	8.0	B		10					MOE
1974 04 16.85	B	6.5	SP	8.0	B		10					MOE
1974 04 17.86	B	6.8	SP	8.0	B		10					MOE
1974 04 18.85	B	6.6	SP	8.0	B		10					MOE
1974 04 20.85	B	6.8	SP	8.0	B		10					MOE
1974 04 21.85	B	6.9	SP	8.0	B		10					MOE
1974 04 22.85	B	7.0	SP	8.0	B		10					MOE

Comet Kobayashi-Berger-Milon 1975 IX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 12.00	S	7.7	S	8.0	B		10	8	6			SHA02
1975 07 13.93	S	6.5	S	5.0	B		7	20	5			SHA02
1975 07 14.96	S	6.4	S	5.0	B		7	40	5			SHA02
1975 07 15.96	S	6.1	S	5.0	B		7		4/			SHA02
1975 07 16.96	S	5.6	S	5.0	B		7		5/			SHA02
1975 07 17.91	S	5.7	S	5.0	B		7		4			SHA02
1975 07 17.94	B	6.5	SP	8.0	B		10	20				MOE
1975 07 18.91	S	6.0	S	5.0	B		7		3/			SHA02
1975 07 20.00	S	5.2	S	5.0	B		7		4/			SHA02
1975 07 21.94	S	5.3	S	5.0	B		7	20	5/			SHA02
1975 07 22.94	S	5.1	S	8.0	B		10		6	3		SHA02
1975 07 23.95	S	5.5	S	5.0	B		7		6			SHA02
1975 07 24.92	B	6.0	SP	8.0	B		10	20				MOE
1975 07 24.93	S	5.5	S	5.0	B		7		6			SHA02
1975 07 25.92	B	5.9	SP	8.0	B		10	20				MOE
1975 07 25.97	S	5.2	S	8.0	B		10	60	6/		315	SHA02
1975 07 26.92	B	5.5	SP	8.0	B		10	23		0.8		MOE
1975 07 26.93	S	6.3	S	8.0	B		10		6			SHA02
1975 07 27.90	B	5.3	SP	8.0	B		10	25		1.0		MOE
1975 07 27.91	S	5.7	S	8.0	B		10	30	6			SHA02
1975 07 28.90	B	5.1	SP	8.0	B		10	24		1.2		MOE
1975 07 28.91	S	5.3	S	8.0	B		10	30	7			SHA02
1975 07 29.90	B	4.9	SP	8.0	B		10	20		1.2		MOE
1975 07 29.93	S	5.1	S	5.0	B		7	30	6			SHA02
1975 07 30.96	S	5.2	S	5.0	B		7	15	6			SHA02
1975 08 01.89	B	5.0	SP	8.0	B		10	20		1.2		MOE
1975 08 01.91	S	5.3	S	8.0	B		10	30	6/			SHA02
1975 08 02.91	B	5.2	SP	8.0	B		10	18		1.0		MOE
1975 08 03.01	S	5.1	S	8.0	B		10	12	7/	0.3	270	SHA02
1975 08 03.88	B	5.0	SP	8.0	B		10	20		1.0		MOE

Comet Kobayashi-Berger-Milon 1975 IX [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 08 03.91	S	4.7	S	8.0	B		10	8	7/	0.4		SHA02
1975 08 04.88	B	4.9	SP	8.0	B		10	20		1.2		MOE
1975 08 05.01	S	4.7	S	8.0	B		10	8	7/	0.3		SHA02
1975 08 05.87	B	4.9	SP	8.0	B		10	20		1.3		MOE
1975 08 05.91	S	4.8	S	8.0	B		10	8	7	0.2		SHA02
1975 08 06.87	B	4.8	SP	8.0	B		10	20		1.3		MOE
1975 08 06.91	S	5.0	S	8.0	B		10	8	7	0.2		SHA02
1975 08 07.90	B	4.8	SP	8.0	B		10	20		1.5		MOE
1975 08 07.91	S	5.4	S	8.0	B		10	6	7	0.2		SHA02
1975 08 08.88	B	4.7	SP	8.0	B		10	20		1.3		MOE
1975 08 08.93	S	5.0	S	8.0	B		10	4	6/			SHA02
1975 08 09.87	B	4.7	SP	8.0	B		10	20		1.3		MOE
1975 08 09.89	S	5.2	S	5.0	B		7	6	7	0.4		SHA02
1975 08 11.87	S	5.2	S	8.0	B		10	6	7	0.3		SHA02
1975 08 11.88	B	4.5	SP	8.0	B		10					MOE
1975 08 12.87	S	5.2	S	8.0	B		10	4	7			SHA02
1975 08 13.88	B	4.3	SP	8.0	B		10	20		1.5		MOE
1975 08 13.89	S	4.9	S	8.0	B		10	4	7	0.07		SHA02
1975 08 14.88	B	4.3	SP	8.0	B		10	20		1.5		MOE
1975 08 15.92	S	4.9	SP	5.0	B		7		7			SHA02
1975 08 16.92	S	4.7	SP	5.0	B		7		8	1		SHA02
1975 08 17.87	S	4.9	SP	5.0	B		7	4	7	0.2		SHA02
1975 08 20.85	B	4.1	SP	8.0	B		10	15		1.5		MOE
1975 08 21.90	S	5.1	SP	5.0	B		7	3	7			SHA02
1975 08 22.91	S	5.0	SP	5.0	B		7	2.4	7/			SHA02
1975 08 23.84	B	4.0	SP	8.0	B		10	20		1.8		MOE
1975 08 23.93	S	5.0	SP	5.0	B		7	2.4	7/			SHA02
1975 08 24.88	S	4.8	SP	5.0	B		7	3	8			SHA02
1975 08 25.84	B	4.0	SP	8.0	B		10	15		1.8		MOE
1975 08 26.85	B	4.0	SP	8.0	B		10	15		2.0		MOE
1975 08 26.87	S	4.6	SP	5.0	B		7	5	8	1		SHA02
1975 08 27.84	B	3.9	SP	8.0	B		10	15		2.0		MOE
1975 08 28.84	B	3.9	SP	8.0	B		10	15		2.0		MOE
1975 08 29.82	B	3.9	SP	8.0	B		10	15		1.0		MOE
1975 08 31.86	S	4.8	SP	5.0	B		7	2	8/	0.5		SHA02
1975 09 01.87 !	S	4.7	SP	5.0	B		7	2	8/			SHA02
1975 09 02.85 !	S	4.7	SP	5.0	B		7	1.5	8/			SHA02
1975 09 03.86	S	5.2	SP	5.0	B		7		9			SHA02

Comet Suzuki-Saigusa-Mori 1975 X

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 10 23.8	S	6.5:	S	12.7	R							SHA02
1975 10 27.8	S	6.5:	S	8.0	B		10					SHA02

Comet Bradfield 1975 XI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 12 29.74	S[	4.0:	SP	5.0	B		7					SHA02
1976 01 03.74	S	6.8	S	15	L	8	67		4/			SHA02
1976 01 14.74	S	8.3	S	20	R	14	40		3			SHA02

Comet Mori-Sato-Fujikawa 1975 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 11 01.15	S	9.0	S	20	R	14	40		2/			SHA02

Comet Bradfield 1976 IV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 03 22.75	S[	9.0	S	20	R	14	40					SHA02
1976 03 23.75	S[	9.5	S	20	R	14	40					SHA02
1976 03 26.85	S[	9.0	S	20	R	14	40					SHA02

Comet West 1976 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 03 01.26	S	-1.0:		5.0	B		7	2	9	1.5		SHA02
1976 03 03.25	! S	0.5	SP	5.0	B		7	2	9	2.0	340	SHA02
1976 03 04.18	I	-1.5	SP	0.0	E		1	25		25	30	MOE
1976 03 04.23	! S	1.5	SP	5.0	B		7	5	9	3.0	320	SHA02
1976 03 05.17	I	-1.0	SP	0.0	E		1	23		20		MOE
1976 03 05.23	S	2.0	SP	5.0	B		7	5	9	4.0	325	SHA02
1976 03 06.22	S	1.7	SP	5.0	B		7	5	9	4.0	330	SHA02
1976 03 19.21	S	4.4	SP	5.0	B		7	5	8	3.0	310	SHA02
1976 03 24.17	S	4.4	SP	5.0	B		7	5	7	4.0	280	SHA02
1976 03 28.17	S	5.1	SP	5.0	B		7	5	7	5.0	285	SHA02
1976 04 01.17	S	5.7	SP	5.0	B		7	4	6	4.0	285	SHA02
1976 04 03.17	S	4.4	SP	0.0	E		1					SHA02
1976 04 03.17	S	5.8	SP	5.0	B		7	5	6	3.0	285	SHA02
1976 04 03.17	S	5.8	SP	6	R	12						SHA02
1976 04 03.17	S	6.1	SP	15	L	8						SHA02
1976 04 04.15	S	5.8	SP	5.0	B		7	5	6	3.0	285	SHA02
1976 04 08.08	S	5.9	SP	5.0	B		7	4	4/	2.0	285	SHA02
1976 04 11.13	S	6.4	SP	5.0	B		7	5	4	2.0	285	SHA02
1976 04 16.13	S	6.8	S	5.0	B		7	4	3	0.25	285	SHA02
1976 04 20.11	S	7.1	S	5.0	B		7	5	4	1.0	285	SHA02
1976 04 23.08	S	7.5	S	5.0	B		7	6	2/			SHA02
1976 04 28.04	S	8.0	SP	8.0	B		10	8		2		MOE
1976 04 28.11	S	8.0	S	5.0	B		7	6	3	1.0	290	SHA02
1976 05 04.06	S	8.4	S	8.0	B		10	5	2	1.0	280	SHA02
1976 05 07.07	S	9.0:	S	20	R	14	40		3			SHA02
1976 05 11.10	S	9.0	S	20	R	14	40		3			SHA02
1976 05 16.99	S	9.0:	S	32	R	18	95	3	3			SHA02
1976 05 23.00	S	8.5:	S	32	R	18	95	4	3			SHA02
1976 06 08.00	S	10.0:	S	32	R	18	95	5	2			SHA02
1976 06 23.99	S	10.5:		32	R	18	95		2			SHA02
1976 06 24.97	S	10.7:		32	R	18	95	3	1			SHA02
1976 06 25.98	S	11.0:		32	R	18	95	2	1			SHA02
1976 06 27.99	S	10.8:		15	L	8	67	3	1			SHA02
1976 06 28.98	S	11.0:		15	L	8	67	2	1			SHA02
1976 06 30.01	S	11.2:		15	L	8	67	2	1			SHA02
1976 06 30.98	S	11.3:		15	L	8	67	2	1/			SHA02
1976 07 01.99	S	11.3:		15	L	8	67	2	0/			SHA02

Comet Bradfield 1979 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 09 14.0	S[	11.0:		20	R	14	40	3	2			SHA02

Comet Meier 1980 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 16.75	S	11.3	VB	20.0	R		95		1			SHA02

Comet Panther 1981 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 26.80	* S	10.3:	VB	2.8	R	2		2.5	1			SHA02

Comet Panther 1981 II [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 02 14.20	S	9.1	S	10.0	R	28	40	3	6/			SHA02

Comet Bowell 1982 I

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 05 24.04	S	11.5:		32	R	18	95	0.8	2			SHA02
1982 08 13.91	S	[11.0		32	R	18	95					SHA02

Comet Austin 1982 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 08 14.13	S	3.1:	AA	8.0	B		10	6	4/	0.5	10	SHA02
1982 08 17.13	S	5.1	AA	8.0	B		20	12	4/	1	10	SHA02
1982 08 18.85	S	5.0	AA	8.0	B		10					SHA02
1982 08 19.91	S	4.6	AA	8.0	B		10	4	6/	0.83	14	SHA02
1982 08 22.93	S	5.3	AA	5.0	B		7					SHA02
1982 08 31.85	S	5.8	AA	33.3	L	4	45	2.5	8	0.6	24	SHA02
1982 08 31.85	S	5.9	AA	5.0	B		7					SHA02
1982 09 02.83	S	5.9	AA	8.0	B		10	3	8			SHA02
1982 09 02.84	S	6.7	AA	32	R	18	95	1.6	7	0.15	28	SHA02
1982 09 02.86	S	6.0	AA	8.0	B		20	3	8	0.27	44	SHA02
1982 09 02.87	S	6.5	AA	20	R	14	40	1.6	7	0.18	33	SHA02
1982 09 02.88	S	6.4	AA	10	R	28	120	1.6				SHA02
1982 09 02.88	S	6.4	AA	20	R	14	120	1.3				SHA02
1982 09 02.88	S	6.6	AA	10	R	28	40	1.4				SHA02
1982 09 02.89	S	6.0	AA	15	L	8	67	1.4				SHA02
1982 09 02.90	S	6.1	AA	5.0	B		7	2				SHA02
1982 09 07.83	S	6.5	AA	8.0	B		10	2	7	0.67	47	SHA02
1982 09 07.84	S	6.7	AA	20	R	14	40	4.5	6/	0.4	20	SHA02
1982 09 08.83	S	6.8	AA	8.0	B		10					SHA02
1982 09 08.83	S	7.1	AA	8.0	B		20	3	6	1.2	44	SHA02
1982 09 08.84	S	6.7	AA	5.0	B		7					SHA02
1982 09 08.84	S	7.3	AA	20	R	14	40	1.2	6/	0.5	46	SHA02
1982 09 10.86	S	6.7	AA	5.0	B		7					SHA02
1982 09 10.86	S	6.7	AA	8.0	B		10	2	7			SHA02
1982 09 10.86	S	7.3	AA	20	R	14	40	1.7	7			SHA02
1982 09 11.84	S	6.9	AA	8.0	B		10	1.5	8	0.42	45	SHA02
1982 09 11.85	S	7.3	AA	20	R	14	40	1.7	7	0.17	40	SHA02
1982 09 11.86	S	7.0	AA	5.0	B		7					SHA02
1982 09 12.84	S	6.7	AA	5.0	B		7	1.5	8			SHA02
1982 09 12.84	S	6.9	AA	8.0	B		20	2.5	7	0.28	48	SHA02
1982 09 13.82	S	6.9	AA	5.0	B		7	1.5	8			SHA02
1982 09 13.82	S	7.2	AA	8.0	B		20	3	6	0.22	52	SHA02
1982 09 14.91	! S	7.3	AA	8.0	B		20	4	6			SHA02
1982 09 16.87	S	7.5:	AA	8.0	B		20	2.5	4/			SHA02
1982 09 18.84	S	7.4	AA	8.0	B		10	1	8			SHA02
1982 09 18.84	S	7.4	AA	8.0	B		20	2	6			SHA02
1982 09 18.85	S	7.6	AA	20	R	14	40	1.5	7/	0.17	60	SHA02
1982 09 21.84	S	7.6	AA	8.0	B		10	2	7			SHA02
1982 09 21.84	S	7.6	AA	8.0	B		20	3	6/	0.2	65	SHA02
1982 09 21.85	S	8.1	AA	20	R	14	40	1.7	6/	0.1	30	SHA02
1982 09 23.82	S	7.5	AA	8.0	B		10	2	6/			SHA02
1982 09 23.82	S	8.3	AA	33	L	4	45	1.6	6			SHA02
1982 09 23.82	S	8.6	AA	20	R	14	40	2.1	7/	0.27	25	SHA02
1982 09 24.85	S	8.2	AA	8.0	B		20	4	6	0.08	55	SHA02
1982 09 26.91	S	7.7	AA	8.0	B		20	2	5			SHA02
1982 09 27.92	S	7.8	AA	8.0	B		20	3	5			SHA02
1982 09 28.91	S	8.0:	AA	8.0	B		20	4	3			SHA02
1982 09 29.80	S	8.2	AA	8.0	B		20	3	4			SHA02

Comet Austin 1982 VI [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 10 13.78	S	9.8	AA	20	R	14	40	2	5			SHA02
1982 10 13.79	S	9.3	AA	8.0	B		20	2.8	3			SHA02
1982 10 15.78	S	10.2	AA	20	R	14	40	3.2	4			SHA02
1982 10 17.77	S	9.6	AA	8.0	B		20	4.7	4			SHA02
1982 10 17.77	S	10.4	AA	20	R	14	40	3.1	5			SHA02
1982 10 18.77	S	10.3	AA	20	R	14	40	2.3	4			SHA02
1982 10 23.76	S	10.5	AA	20	R	14	40	3.0	4			SHA02
1982 10 24.22	S	10.3	AA	20	R	14	40	2.3	3			SHA02
1982 10 27.21	S	11.9	V	20	R	14	40	1.5	3			SHA02
1982 10 28.22	S	11.4	V	32	R	18	95	1.8	5			SHA02
1982 11 14.21	S	12.5	V	32	R	18	95	2	2			SHA02
1982 11 19.24	S	13 :	V	32	R	18	95	2.1	2			SHA02
1982 11 20.21	S	12.6	V	32	R	18	95	2.0	1			SHA02
1982 11 26.23	S	12.6	V	32	R	18	95	3.1	0			SHA02

Comet Sugano-Saigusa-Fujikawa 1983 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 10.08	S[	8 :	V	8.0	B		20					SHA02
1983 05 12.07	S	8.3	AA	20	R	14	40	2.5	6			SHA02
1983 05 12.08	S	7.9	AA	8.0	B		20	1.8	6			SHA02
1983 05 13.07	S	7.8	S	20	R	14	40	2.4	7			SHA02
1983 05 13.08	S	7.6	S	8.0	B		20	1.4	7			SHA02
1983 05 15.08	S	8.9	AA	20	R	14	40	1.3	5			SHA02
1983 05 15.10	S	8.8	AA	8.0	B		20	1	5			SHA02
1983 05 16.06	S	8.9	AA	20	R	14	40	1.7	6/			SHA02
1983 05 16.07	S	8.9	AA	8.0	B		20	2.5	6			SHA02
1983 05 17.07	S	8.8	AA	20	R	14	40	2.0	6/			SHA02
1983 05 17.08	S	8.9	AA	8.0	B		20	2.1	5			SHA02
1983 05 20.06	S	8.9	AA	20	R	14	40	2.5	4			SHA02
1983 05 20.07	S	8.7	AA	8.0	B		20	1.6	4/			SHA02
1983 05 25.09	S	9.7	AA	20	R	14	40	1.4	2/			SHA02
1983 05 26.05	S	10.0	VB	20	R	14	95	1.4	1			SHA02
1983 06 03.03	S	9.8	VB	20	R	14	95	1.1	3			SHA02
1983 06 03.04	S	9.7	VB	20	R	14	40	3.6	2			SHA02
1983 06 07.04	S[	10.6	VB	20	R	14	40					SHA02
1983 06 13.00	S[	10.5	VB	20	R	14	40					SHA02

Comet IRAS-Araki-Alcock 1983 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 06.88	S	5.6	AA	8.0	B		10	12	4			SHA02
1983 05 06.89	S	5.4	AA	0.0	E		1	15	3			SHA02
1983 05 06.90	S	5.6	AA	5.0	B		7	18	3/			SHA02
1983 05 06.91	S	5.4	AA	8.0	B		20	15	4			SHA02
1983 05 08.88	S	4.9	AA	8.0	B		10	18	3			SHA02
1983 05 08.89	S	4.7	AA	5.0	B		7	18	3			SHA02
1983 05 09.01	S	3.6	AA	0.0	E		1	55				SHA02
1983 05 09.03	S	4.4	AA	5.0	B		7					SHA02
1983 05 09.90	S	2.7	AA	0.0	E		1	80	3/			SHA02
1983 05 09.90	S	3.4	AA	5.0	B		7	100	3			SHA02
1983 05 10.91	S	3.8	AA	5.0	B		7	95	2			SHA02
1983 05 10.92	S	3.0	AA	0.0	E		1	95	2			SHA02
1983 05 11.87	S	3.0	AA	0.0	E		1	60	2			SHA02
1983 05 11.87	S	4.3	AA	8.0	B		10	60	3			SHA02
1983 05 11.88	S	3.5	AA	5.0	B		7	60	3			SHA02
1983 05 11.89	S	3.6	AA	8.0	B		10					SHA02
1983 05 11.93	S	2.7	AA	0.0	E		1	90	3			SHA02
1983 05 11.93	S	3.6	AA	5.0	B		7	65	3			SHA02

Comet IRAS-Araki-Alcock 1983 VII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 12.90	S	5.3	AA	8.0	B		10	25	3			SHA02

Comet Shoemaker 1983 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 09 25.81	S[	10.9	VB	20	R	14	120					SHA02
1983 10 04.83	S[	11.3	VB	33	L	4	45					SHA02
1983 10 07.94	S[	12.2	VB	33	L	4	45					SHA02
1983 10 11.87	S[	11.9	VB	33	L	4	45					SHA02
1983 10 14.06	S[	11.5	VB	33	L	4	45					SHA02

Comet Austin 1984 XIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 11 02.18	S	10.3	VB	33	L	4	45	4.0	0			SHA02

Comet Levy-Rudenko 1984 XXIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 11 24.77	S	9.5	VB	33	L	4	45	3.6	4/			SHA02
1984 11 24.81	S	9.4	VB	8.0	B		20	2.7	3/			SHA02
1984 11 26.76	S	9.3	VB	33	L	4	45	3.9	4			SHA02
1984 11 28.74	S	9.4	VB	20	R	14	40	3.6	3/			SHA02
1984 12 06.75	S	8.8	AA	20	R	14	40	2.9	4			SHA02
1984 12 10.73	S	8.6	AA	33	L	4	45	3.7	4/			SHA02
1984 12 10.75	S	8.9	VB	8.0	B		20	2.7	4/			SHA02
1984 12 11.77	S	8.6	AA	20	R	14	40	3.6	4	0.15	330	SHA02
1984 12 11.78	S	8.8	AA	8.0	B		20	2.7	4			SHA02
1984 12 14.74	S	8.8	AA	33	L	4	45	4.1	5			SHA02
1984 12 14.78	S	9.1	AA	8.0	B		20	2.7	4			SHA02
1984 12 15.74	S	8.9	AA	20	R	14	40	3.6	5			SHA02
1984 12 15.76	S	8.9	AA	8.0	B		20	2.7	4			SHA02
1984 12 23.75	S	8.2	AA	8.0	B		20	3.5	6			SHA02
1984 12 24.75	S	8.3	AA	8.0	B		20	3.5	5			SHA02
1984 12 26.27	S	8.4	AA	8.0	B		20	4.3	5			SHA02
1984 12 31.76	S	8.4	AA	20	R	14	40	2.8	4/			SHA02
1985 01 09.75	S	8.9	AA	20	R	14	40	2.8	2/			SHA02
1985 01 22.76	S	9.7	AA	20	R	14	40	1.8	2/			SHA02
1985 01 24.23	S	8.8	AA	33	L	4	45	2.8	4			SHA02
1985 01 24.25	S	8.7	AA	8.0	B		10	3.5	4			SHA02
1985 01 27.21	S	8.6	AA	8.0	B		10	3.5	2/			SHA02
1985 01 27.26	S	8.6	AA	33	L	4	45	2.8	4			SHA02
1985 02 10.81	S	9.8	VB	15	L	8	67	1.8	1/			SHA02
1985 02 17.23	S	10.4	VB	33	L	4	45	2.3	2			SHA02
1985 02 23.88	S	11.0	VB	20	R	14	40	2.7	1			SHA02
1985 03 14.99	S	12.7	VB	33	L	4	45	1.3	3			SHA02

Comet Hartley-Good 1985 XVII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 10 04.82	S[	9.5:		20	R	14	40					SHA02
1985 10 12.85	S	8.5	VB	8.0	B		20	5.9	1			SHA02
1985 11 03.80	S	7.2	VB	8.0	B		20	8.8	3	0.33	310	SHA02
1985 11 11.75	S	8.2	VB	8.0	B		20	6.0	4			SHA02
1985 11 11.76	S	8.4	VB	20	R	14	120	4.0	5	0.07	40	SHA02
1985 11 12.75	S	7.9	VB	8.0	B		20	6.5	5			SHA02
1985 11 12.75	S	7.9	VB	20	R	14	40	4.0	5	0.08	50	SHA02
1985 11 13.75	S	7.7	VB	8.0	B		20	6.4	5			SHA02
1985 12 07.75	S	7.6	VB	8.0	B		20	1.3	7			SHA02

Comet Hartley-Good 1985 XVII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 12 19.26	S	8.6	VB	8.0	B		20	1.8	7/			SHA02
1985 12 23.24	S	7.9	VB	8.0	B		20	3.3	6/			SHA02
1985 12 25.24	S	7.9	AA	8.0	B		20	2.9	4/			SHA02
1986 01 11.22	S	9.3	VB	20	R	14	40	3.7	4/			SHA02
1986 01 11.23	S	9.1	VB	8.0	B		20	2.3	4/			SHA02
1986 01 16.23	S	9.2	VB	8.0	B		20	3.6	3			SHA02
1986 01 16.23	S	9.9	VB	20	R	14	40	4.2	3/			SHA02
1986 01 20.19	S	9.4	VB	20	R	14	40	5.0	3/			SHA02
1986 01 24.25	S	10.7	VB	20	R	14	40	3.3	3			SHA02

Comet Thiele 1985 XIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 11 02.94	S	9.7	VB	20	R	14	40	1.3	3			SHA02
1985 11 03.82	S	9.8	VB	20	R	14	40	2.2	2			SHA02
1985 11 06.03	S	9.8	VB	20	R	14	40	2.7	3			SHA02
1985 11 06.04	S	8.7	VB	8.0	B		10	3.6	2			SHA02
1985 11 06.09	S	9.2	VB	8.0	B		20	5.4	2			SHA02
1985 11 09.92	S	9.0	VB	33	L	4	45	6.4	5			SHA02
1985 11 09.95	S	8.9	VB	8.0	B		20	9.6	3			SHA02
1985 11 11.78	S	9.5	VB	20	R	14	40	3.7	3			SHA02
1985 11 11.80	S	9.3	VB	8.0	B		20	6.5	2			SHA02
1985 11 12.76	S	9.5	VB	20	R	14	40	4.9	2/			SHA02
1985 11 12.77	S	9.2	VB	8.0	B		20	6.0	2			SHA02
1985 11 13.77	S	9.4	VB	20	R	14	40	5.7	2			SHA02
1985 11 16.03	S	9.6	VB	20	R	14	40	3.7	3			SHA02

Comet Levy 1986 XVII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 02 25.22	S	13.1	VB	20	R	14	120	1	3			SHA02

Comet Terasako 1986 XVIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 02 20.79	S	11 :	VB	20	R	14	95	0.5	5			SHA02

Comet Sorrells 1987 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 11 06.28	S	11.9	VB	20	R	14	120	1.1	5			SHA02
1986 11 12.13	S	11.6	VB	20	R	14	40	1.3	6			SHA02
1986 11 14.20	S	11.4	VB	20	R	14	40	1.8	6			SHA02
1986 11 26.77	S	10.3	VB	32	R	18	95	1.3	6			SHA02
1986 11 27.00	S	10.1	VB	20	R	14	120	1.2	7			SHA02
1987 02 18.80	S	10.5	VB	20	R	14	40	1.0	5			SHA02
1987 06 16.01	S[	10.5	VB	32	R	18	90					SHA02
1987 06 22.00	S	11.1	VB	33	L	4	60	1.4	3			SHA02
1987 07 06.00	S	11.0	VB	20	R	14	40	1.8	2			SHA02

Comet Wilson 1987 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 08 14.93	S	12.1	VB	20	R	14	120	0.5	7			SHA02
1986 08 15.94	S	12.0	VB	20	R	14	120	0.7	5			SHA02
1986 09 01.87	S	12.5	VB	20	R	14	170	0.5	6			SHA02
1986 09 03.92	S	12.5	VB	20	R	14	120	0.4	8			SHA02
1986 09 07.88	S	12.3	VB	20	R	14	120	0.5	7			SHA02
1986 09 12.93	S	11.5	VB	20	R	14	120	0.8	6			SHA02

Comet Wilson 1987 VII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 09 24.93	S	11.6	VB	20	R	14	120	1.0	4/			SHA02
1986 09 25.84	S	11.7	VB	20	R	14	120	0.9	4/			SHA02
1986 09 28.89	S	11.8	VB	20	R	14	120	0.8	4/			SHA02
1986 10 03.98	S	11.3	VB	20	R	14	120	0.7	3			SHA02
1986 10 04.81	S	11.8	VB	20	R	14	120	0.8	3			SHA02
1986 10 08.86	S	12.5	VB	20	R	14	150	0.6	4			SHA02
1986 10 22.77	S	12.5	VB	20	R	14	120	0.7	6			SHA02
1986 11 03.77	S	11.2	VB	20	R	14	120	0.6	4			SHA02
1986 11 06.75	S	11.5	VB	20	R	14	120	0.9	4			SHA02
1986 11 20.75	S	12.0:	VB	20	R	14	120	1	3			SHA02
1986 11 26.74	S	11.1	VB	20	R	14	120	0.7	4			SHA02
1987 03 07.33	S	7.5	AA	6.0	R	11	58	6	5			DES01
1987 03 27.33	S	6.4	AA	6.0	R	11	58	10	5/			DES01
1987 04 05.24	S	6.3	AA	6.0	R	11	58	12	5	0.10		DES01
1987 04 18.25	S	6.0	AA	6.0	R	11	58	14	5			DES01
1987 04 28.24	S	5.5	AA	6.0	R	11	58	12	6			DES01
1987 05 02.23	S	5.3	AA	6.0	R	11	58	10	6			DES01
1987 05 06.23	S	5.8	AA	6.0	R	11	58	10	6			DES01
1987 05 15.24	S	6.2	AA	6.0	R	11	58	9	7			DES01
1987 05 22.25	S	6.9	AA	6.0	R	11	58	7	7			DES01
1987 10 22.20	S	12.3	VB	33	L	4	83	0.6	4			SHA02
1987 10 23.20	S	11.7	VB	33	L	4	125	1.0	3			SHA02
1987 10 25.20	S	12.9	VB	33	L	4	125	0.6	3			SHA02

Comet Levy 1987 XXI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 13.81	S	8.9	AA	33	L	4	45	2.0	4			SHA02
1987 10 16.82	S[	9.5	AA	33	L	4	45					SHA02
1987 10 17.78	S	9.6	VB	33	L	4	45	1.6	4			SHA02
1987 10 21.77	S	11.2	VB	33	L	4	45	1.6	3			SHA02
1987 10 24.79	S	11.2	VB	33	L	4	45	1.2	2			SHA02

Comet Rudenko 1987 XXIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 03.87	S	10.2	VB	20	R	14	40	3	2			SHA02
1987 10 23.21	S	7.1	S	33	L	4	45	3.7	5			SHA02
1987 10 24.22	S	7.4	AA	33	L	4	45	2.8	6			SHA02
1987 10 25.22	S	7.1	AA	8.0	B		20	2.7	6			SHA02
1987 10 25.22	S	7.3	AA	33	L	4	45	2.7	5			SHA02
1987 10 29.22	S	7.9	AA	33	L	4	45	2.9	5			SHA02

Comet Bradfield 1987 XXIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 06.78 !	S	7.3	AA	8.0	B		20	1.8	5			SHA02
1987 10 06.79	S	8.7	S	20	R	14	40	2.0	4			SHA02
1987 10 08.78	S	7.0	AA	8.0	B		20	1.8	5			SHA02
1987 10 08.79	S	7.8	AA	20	R	14	40	2.1	6			SHA02
1987 10 12.77	S	7.0	AA	20	R	14	40	3.0	6	0.78	102	SHA02
1987 10 12.78	S	6.5	AA	8.0	B		10					SHA02
1987 10 12.78	S	6.8	AA	8.0	B		20	2.7	5	0.65	81	SHA02
1987 10 13.80	S	6.9	AA	8.0	B		20	2.7	6	0.31	118	SHA02
1987 10 17.77	S	6.5	AA	8.0	B		20	3.4	6	0.77	82	SHA02
1987 10 21.77	S	5.9	AA	8.0	B		20	3.7	7	1.08	99	SHA02
1987 10 22.76	S	5.9	AA	8.0	B		20	3.7	7	0.75	98	SHA02
1987 10 24.77	S	6.0	AA	8.0	B		20	4.1	7	1.17	88	SHA02
1987 10 25.80	S	6.1	AA	8.0	B		20	3.6	5			SHA02

Comet Bradfield 1987 XXIX [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 11 05.74	S	5.7	AA	8.0	B		20	3.2	4	0.17	46	SHA02
1987 11 10.82	S	5.7	AA	8.0	B		10	4.3	5	0.60	83	SHA02
1987 11 12.74	S	5.9	AA	8.0	B		10	3.2	7	1.59	69	SHA02

Comet Furuyama 1988 IV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 12 21.87	S	[11.0:	VB	20.0	R	14	40					SHA02

Comet Shoemaker 1989 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 26.90	S	[12 :	VB	30	R	18	235					SHA02
1989 01 29.98	S	[13 :	VB	30	R	18	235					SHA02
1989 02 10.99	S	[13.4	VB	30	R	18	235					SHA02

Comet Okazaki-Levy-Rudenko 1989 XIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 10 16.43	M	7.5	SC	10.1	R	5	18	1	4			SAN03
1989 10 17.42	M	7.5	SC	25.0	L	6	47	2	6			SAN03
1989 11 18.88	M	6.4	AA	10.1	R	5	38	2	5			SAN03
1989 11 27.29	S	5.0	AA	5.0	B		7					LOU
1989 12 01.28	S	5.6	AA	5.0	B		7					LOU
1989 12 03.27	B	6.3	AA	5.0	B		7	2				NAP
1989 12 03.29	S	5.7	AA	6.0	R	15	30	2.0				LOU
1989 12 07.29	S	6.7	AA	5.0	B		7					LOU
1989 12 09.27	S	7.0	AA	5.0	B		7					LOU
1989 12 17.27	B	7.8	AA	5.0	B		7					NAP

Comet Austin 1990 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 02 16.95	S	7.2	AA	5.0	B		20	4	7			DES01
1990 02 17.94	B	7.5	AA	5.0	B		7	4				NAP
1990 02 17.97	S	7.1	AA	5.0	B		20	4	7			DES01
1990 02 17.99	B	7.8	AA	5.0	B		7					LOU
1990 02 18.97	S	7.0	AA	5.0	B		20	4	7			DES01
1990 02 18.98	B	7.5	AA	5.0	B		7			0.5	120	LOU
1990 02 19.96	S	7.0	AA	5.0	B		20	5	7			DES01
1990 02 20.97	B	7.6	AA	5.0	B		7					LOU
1990 02 20.97	S	6.9	AA	5.0	B		20	5	7			DES01
1990 02 21.95	S	6.8	AA	5.0	B		20	6	6			DES01
1990 02 22.96	S	6.8	AA	5.0	B		20	7	6	0.10		DES01
1990 02 23.77	B	7.2	AA	40.0	L	5	81	5	4			MER
1990 02 26.97	B	7.3	AA	5.0	B		7			1.0	36	LOU
1990 03 01.46		6.9	S	20.3	L	8	38	4	5			BOE
1990 03 04.93	S	6.2	AA	5.0	B		20	8	5			DES01
1990 03 05.96	S	6.1	AA	5.0	B		20	8	5			DES01
1990 03 26.79	B	5.7	AA	40.0	L	5	81	3	5			MER
1990 04 05.45	M	4.5	AA	10.1	R	5	18					SAN03
1990 04 23.82	M	4.4	AA	10.1	R	5	16	2	6	2.5		SAN03
1990 04 24.74	M	3.8	AA	10.1	R	5	16		6			SAN03
1990 04 26.77	M	5.3	AA	10.1	R	5	16	3	7			SAN03
1990 04 28.34	S	4.5	AA	5.0	B		20	9	5	0.30	40	DES01
1990 04 30.80	M	4.9	AA	10.1	R	5	16	3	7			SAN03
1990 05 05.32	S	4.6	AA	5.0	B		20	15	5	0.30	37	DES01
1990 05 05.77	M	4.7	AA	10.1	R	5	16	4	6			SAN03
1990 05 07.31	S	4.6	AA	5.0	B		20	18	5	0.35	35	DES01

Comet Austin 1990 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 08.31	S	4.6	AA	5.0	B		20	16	5	0.20	35	DES01
1990 05 09.32	S	4.7	AA	5.0	B		20	16	5	0.15	30	DES01
1990 05 10.31	S	4.7	AA	5.0	B		20	13	5	0.20	28	DES01
1990 05 13.32	B	3.8	AA	5.0	B		7					LOU
1990 05 19.25	B	5.6	AA	5.0	B		7	8		0.15	20	LOU
1990 05 19.29	S	5.0	AA	5.0	B		20	12	5	0.20	23	DES01
1990 05 20.26	B	5.6	AA	5.0	B		7	10				LOU
1990 05 20.27	S	5.0	AA	5.0	B		20	11	5	0.20	18	DES01
1990 05 20.70	M	5.4	AA	10.1	R	5	16	5	3			SAN03
1990 05 21.26	B	5.7	AA	5.0	B		7					LOU
1990 05 21.27	S	5.1	AA	5.0	B		20	10	5	0.15	15	DES01
1990 05 22.25	B	5.9	AA	5.0	B		7					LOU
1990 05 22.28	S	5.2	AA	5.0	B		20	12	5	0.15		DES01
1990 05 22.30				6.0	R	11	58	15		0.25		DES01
1990 05 23.24	B	6.1	AA	5.0	B		7	15				LOU
1990 05 23.25	B	6.3	AA	5.0	B		7					NAP
1990 05 23.29	S	5.1	AA	5.0	B		20	12	5	0.15		DES01
1990 05 24.16	B	6.3	AA	5.0	B		7	15				LOU
1990 05 24.24	S	5.2	AA	5.0	B		20	11	5	0.20		DES01
1990 05 25.16	B	6.5	AA	5.0	B		7					LOU
1990 05 25.24	S	5.4	AA	5.0	B		20	13	5	0.20		DES01
1990 05 25.76	M	6.1	SC	10.1	R	5	16	5	3			SAN03
1990 05 25.97	B	5.4	AA	5.0	B		7	20	3			MER
1990 05 26.13	B	6.4	AA	5.0	B		7	3		0.5	8	LOU
1990 05 26.22	S	5.3	AA	5.0	B		20	10	5	0.15		DES01
1990 05 26.76	M	6.1	SC	10.1	R	5	16	5	3			SAN03
1990 05 26.96	B	5.3	AA	5.0	B		7	14.5	3			MER
1990 05 27.14	B	6.2	AA	5.0	B		7					LOU
1990 05 27.22	S	5.3	AA	5.0	B		20	10	5	0.18		DES01
1990 05 28.16	S	5.3	AA	5.0	B		20	10	5	0.20		DES01
1990 05 29.16	S	5.4	AA	5.0	B		20	10	5	0.20		DES01
1990 05 30.06	S	5.5	AA	5.0	B		20	15	5	0.25		DES01
1990 05 31.06	S	5.7	AA	5.0	B		20	15	4	0.20		DES01
1990 06 02.07	S	5.8	AA	5.0	B		20	10	5			DES01
1990 06 03.04	S	6.1	AA	5.0	B		20	8	5			DES01
1990 06 04.04	S	6.5	AA	5.0	B		20	8	5			DES01
1990 06 10.91	S	7.3	AA	5.0	B		20	7	6			DES01
1990 06 11.92	S	7.4	AA	5.0	B		20	7	6			DES01
1990 06 12.90	S	7.5	AA	5.0	B		20	6	6			DES01
1990 06 15.90	S	7.8	AA	5.0	B		20	5	7			DES01
1990 06 16.89	S	8.0	AA	5.0	B		20	4	7			DES01
1990 06 17.91	S	8.1	AA	5.0	B		20	4	7			DES01
1990 06 18.65		7.5	S	20.3	L	8	38	6	2			BOE
1990 06 18.91	S	8.3	AA	5.0	B		20		8			DES01
1990 06 19.92	S	8.5	AA	6.0	R	11	116	3	8			DES01

Comet Tsuchiya-Kiuchi 1990 XVII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 21.91	B	8.4	AA	5.0	B		7	12.6	1			MER
1990 10 25.83		7.0	S	20.3	L	8	38	5	8			BOE
1990 10 28.83		6.9	S	20.3	L	8	38	5	7			BOE

Comet Levy 1990 XX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 26.04	B	10.4	AC	40.0	L	5	81	1.2	5			MER
1990 07 11.90	B	7.8	AA	5.0	B		7	6	2			MER
1990 07 13.91	B	7.6	AA	5.0	B		7	7	2			MER

Comet Levy 1990 XX [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 18.18	B	6.6	AA	5.0	B		7					PRI03
1990 07 18.65		6.8	S	20.3	L	8	38	4	8	<1		BOE
1990 07 19.20	B	6.7	AA	5.0	B		7					PRI03
1990 07 20.62		6.8	S	20.3	L	8	38	4	6	>1		BOE
1990 07 21.04	B	6.8	AA	5.0	B		7	11.3	3			MER
1990 07 21.94	B	6.7	AA	5.0	B		7	10.4	4	2	258	MER
1990 07 25.95	B	6.7	AA	5.0	B		7	15.1	3			MER
1990 07 27.67	M	7.2	AA	15.0	L	6	38		6			SAN03
1990 07 30.70	M	6.8	SC	10.1	R	5	38	3	5			SAN03
1990 08 01.33	S	6.1	AA	5.0	B		20	17	4	0.30	34	DES01
1990 08 02.32	S	6.1	AA	5.0	B		20	18	4	0.30	30	DES01
1990 08 03.30	S	6.0	AA	5.0	B		20	18	4	0.35	30	DES01
1990 08 04.22	S	6.0	AA	5.0	B		20	18	4	0.20	28	DES01
1990 08 05.14	S	6.1	AA	5.0	B		20	15	4			DES01
1990 08 08.29	S	5.8	AA	5.0	B		20	12	4			DES01
1990 08 09.29	S	5.7	AA	5.0	B		20	10	4			DES01
1990 08 10.28	S	5.6	AA	5.0	B		20	12	4			DES01
1990 08 11.24	S	5.5	AA	5.0	B		20	16	4	0.20		DES01
1990 08 12.09	B	5.7	AA	5.0	B		7	3				LOU
1990 08 13.09	B	5.9	AA	5.0	B		7			0.5		LOU
1990 08 13.24	S	5.4	AA	5.0	B		20	17	4	0.40		DES01
1990 08 14.16	S	5.2	AA	5.0	B		20	20	4	0.45		DES01
1990 08 15.16	S	5.0	AA	5.0	B		20	22	4	0.50		DES01
1990 08 15.85	B	4.5	AA	5.0	B		7	10.8	3	0.45	183	MER
1990 08 16.06	S	5.4	AA	4.0	B		10	10				LAR02
1990 08 17.58	M	4.5	AA	10.1	R	5	38	8	4			SAN03
1990 08 19.96	B	3.7	AA	5.0	B		7	18.6	3	1.0	144	MER
1990 08 21.96	B	3.6	AA	5.0	B		7	30	3	3	140	MER
1990 08 24.91	S	4.0	AA	5.0	B		20	35	4	2.50		DES01
1990 08 24.96	S	4.7	AA	4.0	B		10	13		1.0		LAR02
1990 08 24.99	B	3.9	AA	5.0	B		7	5		1.0	138	LOU
1990 08 25.02	B	3.7	AA	5.0	B		7					PRI03
1990 08 25.03	S	3.9	AA	5.0	B		20	40	4	2.30		DES01
1990 08 25.45	M	5.0	SC	15.0	L	6	34	6	3			SAN03
1990 08 25.95	S	4.8	AA	4.0	B		10	12		1.3		LAR02
1990 08 25.99	B	3.7	AA	5.0	B		7					LOU
1990 08 26.93	B	3.8	AA	5.0	B		7					PRI03
1990 08 26.95	S	4.0	AA	5.0	B		20	45	4	2.30		DES01
1990 08 26.95	S	4.9	AA	4.0	B		10	12				LAR02
1990 09 02.90	S[	4.8	SC	5.0	B		7					SHA02
1990 09 07.94	B	4.2	AA	5.0	B		7	6				LOU
1990 09 08.97	B	3.4	AA	5.0	B		7	6				LOU
1990 09 09.92	B	3.4	AA	5.0	B		7					LOU
1990 09 09.92	S	4.7	AA	5.0	B		20	30	4	2.00		DES01
1990 09 10.91	S	4.5	AA	5.0	B		20	28	4	1.50		DES01
1990 09 10.91	S	4.9	AA	4.0	B		10	12		1.0		LAR02
1990 09 10.97	B	3.7	AA	5.0	B		7					LOU
1990 09 11.91	S	4.6	AA	5.0	B		20	30	4	2.00		DES01
1990 09 11.92	S	5.2	AA	4.0	B		10	12		1.0		LAR02
1990 09 11.98	B	3.7	AA	5.0	B		7					LOU
1990 09 13.48		3.9	S	5.0	B		7	5	8	0.5		BOE
1990 09 15.87	S	5.0	AA	5.0	B		20	20	4	1.30		DES01
1990 09 15.97	B	3.6	AA	5.0	B		7					LOU
1990 09 16.89	S	5.1	AA	5.0	B		20	20	4	1.20		DES01
1990 09 16.91	S	5.2	AA	4.0	B		10	10		1.0		LAR02
1990 09 16.97	B	3.5	AA	5.0	B		7	6				LOU
1990 09 17.48		5.1	S	20.3	L	8	38			1.33		BOE
1990 09 17.89	S	5.1	AA	5.0	B		20	25	4	1.30		DES01
1990 09 17.95	B	3.8	AA	5.0	B		7					LOU

Comet Levy 1990 XX [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 18.90	S	5.2	AA	5.0	B		20	25	4	1.25		DES01
1990 09 18.90	S	5.3	AA	4.0	B		10	8		0.4		LAR02
1990 09 18.98	B	4.1	AA	5.0	B		7	3		1.0	150	LOU
1990 09 19.89	S	5.2	AA	5.0	B		20	20	4	1.10		DES01
1990 09 20.91	S	5.2	AA	5.0	B		20	22	4	1.10		DES01
1990 09 21.89	S	5.3	AA	5.0	B		20	20	4	1.00		DES01
1990 09 24.87	S	5.3	AA	5.0	B		20	20	4	0.50		DES01
1990 09 25.87	S	5.3	AA	5.0	B		20	20	4	0.50		DES01
1990 09 25.97	B	4.5	AA	5.0	B		7					LOU
1990 09 26.88	S	5.4	AA	5.0	B		20	18	4	0.40		DES01
1990 09 27.88	S	5.4	AA	5.0	B		20	18	4	0.45		DES01
1990 10 02.91	S	5.6	AA	5.0	B		20	15	4	0.20		DES01
1990 10 05.88	S	5.8	AA	5.0	B		20	10	4			DES01
1990 10 05.93	S	6.3	AA	4.0	B		10	8				LAR02
1990 10 06.93	B	6.3	AA	5.0	B		7					LOU
1990 10 07.87	S	5.9	AA	5.0	B		20	10	4			DES01
1990 10 08.87	S	5.9	AA	5.0	B		20	10	4			DES01
1990 10 10.91	S	6.5	AA	4.0	B		10	6				LAR02
1990 10 11.92	S	6.6	AA	4.0	B		10	6				LAR02
1990 10 13.86	S	6.0	AA	5.0	B		20	8	4			DES01
1990 10 14.86	S	6.0	AA	5.0	B		20	8	4			DES01
1990 10 22.87	S	6.2	AA	5.0	B		20	10	4			DES01
1990 10 23.87	S	6.2	AA	5.0	B		20	10	4			DES01
1990 10 24.87	S	6.2	AA	5.0	B		20	9	4			DES01
1990 10 25.87	S	6.2	AA	5.0	B		20	8	4			DES01
1990 12 22.29	S	6.9	AA	5.0	B		20	10	5	0.20	320	DES01
1990 12 23.29	S	7.0	AA	5.0	B		20	10	5	0.25	320	DES01
1990 12 24.29	S	7.0	AA	5.0	B		20	10	5	0.25	320	DES01
1990 12 26.24	S	7.1	AA	5.0	B		20	9	5	0.25	325	DES01
1990 12 27.27	S	7.1	AA	5.0	B		20	9	5	0.25	325	DES01
1990 12 28.30	S	7.2	AA	5.0	B		20	9	5	0.20	325	DES01
1990 12 30.24	S	7.3	AA	5.0	B		20	9	5	0.20	330	DES01
1990 12 31.27	S	7.3	AA	5.0	B		20	8	5	0.20	330	DES01
1991 01 06.18	S	7.5	AA	5.0	B		20	8	5	0.15	350	DES01
1991 01 07.18	S	7.5	AA	5.0	B		20	10	5	0.15	350	DES01
1991 01 08.20	S	7.6	AA	5.0	B		20	9	5	0.15	350	DES01
1991 01 09.20	S	7.6	AA	5.0	B		20	9	5	0.10	355	DES01
1991 01 13.15	S	7.6	AA	5.0	B		20	8	6	0.10		DES01
1991 02 13.64		7.5	S	20.3	L	8	38	8	6			BOE
1991 02 15.59		7.4	S	20.3	L	8	38	8	5			BOE
1991 02 16.57		7.3	S	20.3	L	8	38	8	5			BOE
1991 02 17.67		7.2	S	20.3	L	8	38	8	5			BOE
1991 02 19.61		7.3	S	20.3	L	8	38		4			BOE

Comet Arai 1990 XXVI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 07.96	S	11.7	AA	20	L	4	37	6	1			PAN
1991 01 09.05	S	11.3	AA	20	L	4	37	4.5	1			PAN
1991 01 11.93	S[	10.9	VB	20	R	14	95					SHA02
1991 01 13.92	S	11.7	AA	20	L	4	37	7	1			PAN

Comet Shoemaker-Levy 1991a1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 06 12.74	M	10.0	AC	16	L	6	40	5	3			TOM
1992 06 20.91	B	9.4	HS	13	L	8	69	2.0				HOR02

Comet Shoemaker-Levy 1991a1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 06 21.54	B	9.4	S	15.0	B		25	1.5	2			NAG04
1992 06 26.54	S	8.2	S	40	L	5	60	5	3/			KON03
1992 06 26.91	B	9.3	S	13	L	8	69					HOR02
1992 06 26.94	B	9.0	S	10	B		25	3				KUB
1992 06 27.71	S	8.5	S	40	L	5	60	5	3			KON03
1992 06 27.93	B	8.7	S	10	B		25	4				KUB
1992 06 28.48	S	7.8	AA	15	L	5	38	4	4			ONO
1992 06 28.91	B	8.8	S	10	B		25	3.1				KUB
1992 06 28.92	B	8.6:	S	8.0	B		10					HOR02
1992 06 29.92	B	8.5	S	10	B		25	3				KUB
1992 06 30.90	B	8.1	S	8.0	B		10					HOR02
1992 07 01.58	S	8.4	S	40	L	5	60	5	4			KON03
1992 07 01.90	B	8.7	S	8.0	B		10					HOR02
1992 07 04.54	S	8.5:	AC	16	L	6	40	4	4			TOM
1992 07 06.65	B	8.0	S	15.0	B		25	1.9	4	0.33	30	NAG04
1992 07 07.93	M	8.3	AA	15.0	L	4	26					PER01
1992 07 07.93	S	7.9	AA	15.0	L	4	26	& 3	6			PER01
1992 07 08.06	S	8.1	AA	3.4	B		9	& 3				PER01
1992 07 08.54	B	7.7	S	10.0	B		20	5	5			OKA03
1992 07 08.92	B	8.3	S	10	B		25	4.5				KUB
1992 07 09.57	S	8.1	AA	10.0	B		20	5	4			ISH02
1992 07 09.59	S	8.1	AA	13	L	6	44	5	4			ISH02
1992 07 09.96	B	9.0	S	10	B		25	3.6				KUB
1992 07 18.48	M	8.0	S	12.0	B		20	3	4			MIT
1992 07 18.52	S	7.5	S	16	L		55	3	4			MOM
1992 07 18.90	B	8.7	S	6.0	B		20					HOR02
1992 07 19.48	M	7.7	AA	12.0	B		20	5	5/	0.17		MIT
1992 07 19.48	S	6.9	AA	15	L	5	38	6	4			ONO
1992 07 19.49	S	7.5	S	16	H	3	44	4	5	0.13	55	KON03
1992 07 19.50	B	7.5	S	12.0	B		20	4	4/			HAS07
1992 07 19.50	M	7.8	S	16	W	4	19	4	4			TSU02
1992 07 19.50	S	7.4	AA	10.0	B		20	5	5			ISH02
1992 07 19.52	S	7.4	AA	13	L	6	24	5	5			ISH02
1992 07 19.91	B	8.5:	S	6.0	B		20					HOR02
1992 07 20.47	S	7.5	AA	10.0	B		20	4	4			ISH02
1992 07 20.48	S	7.5	AA	13	L	6	44	4	4			ISH02
1992 07 20.49	B	7.6	S	15	L	6	36	4	5/	0.17	70	YOS02
1992 07 20.50	B	7.2	AA	10.0	B		20	5	5			OKA03
1992 07 20.50	S	7.4	S	40	L	5	60	6	5	0.17	50	KON03
1992 07 21.89	M	8.0	AA	15.0	L	4	26					PER01
1992 07 21.89	S	7.7	AA	15.0	L	4	26	& 3	5/			PER01
1992 07 21.90	S	7.8	AA	3.4	B		9	& 3	5			PER01
1992 07 22.52	B	6.8	AA	10.0	B		20	5	5	0.25		OKA03
1992 07 22.90	B	8.3	S	6.0	B		20					HOR02
1992 07 23.49	S	7.5:	S	10.0	B		14	5				IWA01
1992 07 26.49	B	7.8	S	15	L	6	36	4	5	0.08	80	YOS02
1992 07 29.52	B	7.1	AA	10.0	B		20	3	5			OKA03
1992 07 29.52	B	8.2	AA	15.0	B		25	1.4	6	0.25	65	NAG04
1992 07 30.52	B	7.1	AA	10.0	B		20	3	5			OKA03
1992 07 30.89	S	8.2:	AA	15.0	L	4	26	& 5	2			PER01
1992 08 01.89	S	7.8	AA	15.0	L	4	26	& 4	4			PER01

Comet Zanotta-Brewington 1991g1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 25.72	B	8.6	S	13	L	8	69	3.5				HOR02
1992 02 29.95	B	6.9	AA	5.0	B		7					LOU

Comet Tanaka-Machholz 1992d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 04 07.79	S	8.5	S	15	R	5	23	4				NAG02
1992 04 07.80	B	8.5	AA	15.0	B		25	2.5	5			NAG04
1992 04 12.78	M	8.7	AA	12.0	B		20	3.5	4			MIT
1992 04 13.79	M	8.0	S	16	W	4	19	3.5	4			TSU02
1992 04 13.81	B	8.3	S	15.0	B		25	2.2	4/			NAG04
1992 04 25.75	M	8.5	AA	12.0	B		20	4	4			MIT
1992 04 25.77	S	8.6	S	15	R	5	23	5				NAG02
1992 04 26.77	S	8.6	AA	10.0	B		20	6	3			ISH02
1992 04 26.78	S	8.5	AA	13	L	6	24	6.5	4			ISH02
1992 04 28.77	M	7.8	S	16	W	4	19		3			TSU02
1992 05 01.76	S	8.6	AA	10.0	B		20	4	3			ISH02
1992 05 01.77	S	8.6	AA	13	L	6	44	4	3			ISH02
1992 05 03.77	S	8.8	AA	15	L	5	38	4	3/			ONO
1992 05 04.73	S	8.3	AA	15.3	L	9	52	3	1/			IWA01
1992 05 04.75	E	8.5	S	23	W	4	40	4	6			WAS
1992 05 04.77	B	9.3	AA	15.0	B		25	2.0	4			NAG04
1992 05 05.75	S	8.3	S	15.3	L	9	52	3	1/			IWA01
1992 05 05.78	B	9.4	AA	15.0	B		25	1.9	3			NAG04
1992 05 10.73	S	7.8	S	15.3	L	9	33	5.0	4			IWA01
1992 05 11.71	M	7.1	S	3.5	B		7	9	5			TSU02
1992 05 11.74	B	7.3	S	20.3	T	6	43	4.8	4/			NAG04
1992 05 11.75	B	7.9	AC	16	L	6	40	5	5			TOM
1992 05 11.75 *	B	8.0	AA	6.0	R	7	25	< 5	3/			OBU
1992 05 11.75	S	7.2	AA	10.0	B		20	6	6			ISH02
1992 05 11.76	S	7.1	AA	13	L	6	24	6	6			ISH02
1992 05 11.77	S	7.1	S	7.0	B		14	6	5			KAN04
1992 05 11.78	S	7.8	S	15.3	L	9	33	5.0	4			IWA01
1992 05 12.77	S	8.0	S	7.0	B		14	8	4			KAN04
1992 05 15.86	B	8.4:	S	13	L	8	69	& 4.5				HOR02
1992 05 16.85	B	8.9:	S	13	L	8	69	& 3.5				HOR02
1992 05 21.86	B	9.3	S	13	L	8	69	3.5				HOR02
1992 05 22.75	S	8.5	AA	15	L	5	38	4	4			ONO
1992 05 23.89	B	8.9	S	13	L	8	69	3		0.2	130	HOR02
1992 05 24.89	B	8.6	S	13	L	8	69	3.5				HOR02
1992 05 25.87	B	8.8	S	13	L	8	69					HOR02
1992 05 26.89	B	8.9	S	13	L	8	69	4.0				HOR02
1992 05 28.71	S	8.9	S	20.3	T	6	43	2.0	2/			NAG04
1992 05 29.91	B	8.7	S	13	L	8	69	3.5				HOR02
1992 05 31.75	M	8.5	S	20	L	5	31	4	2			TSU02
1992 06 03.76	B	9.5:	S	20.3	T	6	43	1.5	1			NAG04

Comet Mueller 1993d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 24.91	C	18.4	HS	30	T	5						RAA01

Comet Spacewatch 1992h

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 05 23.58	C	16.0	HS	20.3	T	6						NAK07
1993 05 24.61	C	15.6	HS	20.3	T	6						NAK07
1993 05 24.62	C	15.9	HS	20.3	T	6						NAK07
1993 05 25.61	C	15.6	HS	20.3	T	6						NAK07

Comet Shoemaker 1992y

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 12 22.10	S[	13.0	AC	31.8	L	4	150	! 1				KEE

Comet Mueller 1993a

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 02 11.25	S	13.3:	NP	25.6	L	4	156		1			MOR
1993 03 13.26	M	12.0	NP	25.6	L	4	111	1.1	3			MOR
1993 04 10.23	S	13.0:	NP	25.6	L	4	111	1.4				MOR
1993 04 17.19	S	13.1	NP	25.6	L	4	156	1.5	2/			MOR
1993 06 13.21	a S	12.6	NP	50.8	L	4	120	1.0	3/			MOR
1993 06 19.21	a S	12.7	NP	50.8	L	4	120	1.4	3			MOR
1993 07 02.92	M	11.5	HS	15	R	13	80	1.3	3			ZNO
1993 07 02.94	M	11.1:	S	20.0	R	17	87	2	2			LEH
1993 07 04.92	M	11.1:	S	20.0	R	17	87	2.5	2			LEH
1993 07 07.89	M	11.9	HS	15	R	13	80	1.6	2			ZNO
1993 07 29.08	! V	12.3	YF	20.0	T	2		& 4	6	0.12	130	MIK
1993 07 29.90	C	11.7	HS	30	T	5						RAA01
1993 08 06.87	M	11.2	HS	15	R	13	80	2.5	1			ZNO
1993 08 08.85	M	10.6	HS	10.0	B		25	3	2			ZNO
1993 08 09.98	M	11.0	HS	10	B		25	3	1			ZNO
1993 08 11.83	M	10.8	HS	10	B		25	2	2			ZNO
1993 08 12.84	M	11.1	HS	10	B		25	2.5	1			ZNO
1993 08 12.85	I	11.8	HS	11	L	8	32	1.5	0			KYS
1993 08 12.96	M	9.5	S	10.0	B	4	25	5	2			LEH
1993 08 13.04	C	11.4	HS	18	L	6		1.8		0.1	140	PRA01
1993 08 13.09	M	9.4	S	10.0	B	4	25	5	2			LEH
1993 08 13.95	M	9.4	S	10.0	B	4	25	5	2			LEH
1993 08 13.95	M	11.2	HS	10	B		25	3	2			ZNO
1993 08 13.97	S	11.6	AC	20.3	T	10	80	1.6	4			GRA04
1993 08 14.01	S	10.9:	S	25	L		60	4.2				KUB
1993 08 14.05	S	12.0:	GA	31.6	L	5	130					MID01
1993 08 14.10	! V	12.5	YF	19.0	T	4		2.8	6	0.1	145	MIK
1993 08 14.96	M	9.3	S	10.0	B	4	25	4	2			LEH
1993 08 14.97	M	11.3	HS	10	B		25	2.5	2			ZNO
1993 08 15.01	S	10.5	AC	13.0	L	6	36	3.5	4			MEY
1993 08 15.04	S	11.0:	S	25	L		60	4	1			KUB
1993 08 15.97	M	9.3	S	10.0	B	4	25	4	3			LEH
1993 08 17.87	S	11.8	AC	15.2	L	5	76	1.5	1			MOE
1993 08 18.04	S	10.4	AC	13.0	L	6	36	3	4			MEY
1993 08 18.99	S	11.6	AC	20.3	T	10	80	1.4	3/			GRA04
1993 08 19.87	S	11.7	AC	15.2	L	5	44	1.5	1			MOE
1993 08 21.88	C	11.9	HS	30	T	5						RAA01
1993 08 22.09	! V	11.7	YF	20.0	T	2		& 4	7	&0.15	150	MIK
1993 08 23.85	S	11.6	AC	15.2	L	5	76	1.5	2			MOE
1993 08 24.04	S	10.3	AC	13.0	L	6	36	& 3.5	4			MEY
1993 08 24.84	S	11.6	AC	15.2	L	5	76	1.5	2			MOE
1993 08 25.03	S	10.4	AC	13.0	L	6	36	3.5	4			MEY
1993 08 26.86	S	11.5:	AC	15.2	L	5	76	1.5	2			MOE
1993 08 26.99	S	11.3	AC	20.3	T	10	80	1.6	3/			GRA04
1993 08 27.03	S	10.5	AS	13.0	L	6	36	2.5	4			MEY
1993 08 27.86	S	11.5:	AC	15.2	L	5	76	1.5	2			MOE
1993 08 29.05	S	10.4	AS	13.0	L	6	36	3.5	4			MEY
1993 09 04.97	C	10.7	HS	50	L	4		1.4		0.08	317	CAV
1993 09 11.08	S	11.0	AC	20.3	T	10	80	1.6	3			GRA04
1993 09 13.18	S	10.1	AA	20	T	10	64	5	3/			SPR
1993 09 15.21	S	10.0	AA	20	T	10	64	4.5	4			SPR
1993 09 16.21	S	10.4	AA	20	T	10	64	5	3/			SPR
1993 09 17.85	S	10.0	AC	20.3	T	10	100	1.9	4/			GRA04
1993 09 18.21	S	10.2	AA	20	T	10	64	4	4			SPR
1993 09 19.01	C	10.5	HS	18	L	6		3.6		0.1	311	PRA01
1993 09 21.21	S	10.0	AA	20	T	10	125	3	3			SPR

Comet Mueller 1993p

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 08 19.98	! V	14.4	AA	20.0	T	2		0.4	8	&0.03	325	MIK
1993 08 20.93	C	14.6	HS	50	L	4		0.30		0.02	277	CAV
1993 08 21.86	C	14.3	HS	30	T	5						RAA01
1993 08 21.90	C	14.7	HS	18	L	6		< 0.25		0.0	280	PRA01
1993 08 21.94	! V[	15.0	AA	20.0	T	2						MIK
1993 08 26.85	C	14.2	HS	30	T	5						RAA01
1993 09 04.88	C	14.1	HS	50	L	4		0.4		0.01	268	CAV
1993 09 17.98	S	13.4	VB	20.3	T	10	100	0.6	2/			GRA04
1993 09 19.05	C	13.6	HS	18	L	6		0.5				PRA01

Periodic Comet Encke (1961 I = 1980 XI = 1984 VI = 1990 XXI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1961 01 12.74	B	8.0:		10	R		25					ZNO
1961 01 17.71	B	7.0	S	10	R		25	2.5	6	0.1		ZNO
1961 01 18.71	B	7.2	S	10	R		25	2.5	7	0.1		ZNO
1961 01 19.71	B	7.1	S	10	R		25	2	7	0.1		ZNO
1961 01 20.70	B	7.1	S	10	R		25	2				ZNO
1980 10 07.91	S[	11.5:		20.0	R	14	40					SHA02
1980 10 09.90	S[	12.0:		20.0	R	14	40					SHA02
1980 10 23.77	S	10.0:		20.0	R	14	40	5	2			SHA02
1984 01 29.78	S[	11.3	VB	33	L	4	45					SHA02
1984 02 03.78	S[	11.6	VB	33	L	4	45					SHA02
1984 02 13.78	S	10.8	VB	33	L	4	45	2.3	2			SHA02
1993 07 22.42	C	20.6	FA	91.4	L	5						SCO01
1993 07 25.43	C	20.2	FA	91.4	L	5						SCO01

Periodic Comet Grigg-Skjellerup (1982 IV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 05 23.94	S	11.3	VB	20	R	14	40	2.7	1/			SHA02
1982 06 16.98	S[	12.1	VB	33.3	L	4	45					SHA02
1982 06 22.99	S	12.3	VB	20	R	14	40	3	1			SHA02
1982 06 25.99	S	11.8:	VB	20	R	14	40	2	0			SHA02

Periodic Comet Tempel 1 (1983 XI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 02 23.17	S[	12.4	VB	20	R	14	95					SHA02
1983 05 04.11	S[	11.0	M	20	R	14	40					SHA02
1983 05 11.99	S	11.8	VB	20	R	14	40	2.5	4			SHA02
1983 05 13.07	S	9.8	VB	8.0	B		20	4.5	3			SHA02
1983 07 22.08	! S	9.7	VB	33	L	4	45	1.5	3			SHA02

Periodic Comet Tempel 2 (1983 X = 1988 XIV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 08 15.11	S	10.4	VB	20	R	14	40	1.6	3			SHA02
1988 09 10.96	B	9.0	AA	40.0	L	4	120					NAP
1988 10 08.92	S	8.2	AA	6.0	R	15	30	3				LOU
1988 10 15.96	S	8.7	AA	6.0	R	15	30					LOU

Periodic Comet Kohoutek (1987 XXVII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 17.05	S[	12.0:	VB	33	L	4	45					SHA02
1987 10 22.20	S	12.7	VB	33	L	4	83	0.9	2			SHA02
1987 10 29.21	S	12.9	VB	33	L	4	45	1.4	3			SHA02

Periodic Comet Machholz (1986 VIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 05 16.06	S	10.7	VB	20	R	14	40	1.5	2			SHA02
1986 06 11.98	S	12.5	VB	33	L	4	45	2.8	2			SHA02

Periodic Comet d'Arrest (1976 XI = 1982 VII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 06 21.01	S[	11.0:		32	R	18	95					SHA02
1976 06 24.00	S[	11.0:		32	R	18	95					SHA02
1976 06 28.98	S[	11.0:		15	L	8	67					SHA02
1976 06 30.02	S[	11.0:		15	L	8	67					SHA02
1976 07 02.00	S[	11.0:		15	L	8	67					SHA02
1976 07 16.95	S[	10.0:		15	L	8	67					SHA02
1976 07 17.95	S[	11.0:		15	L	8	67					SHA02
1976 07 28.96	S	8.0:		5.0	B		7	10	2			SHA02
1976 07 31.94	S	7.5:		5.0	B		7	8	3			SHA02
1982 07 10.97	S	12.2	VB	32	R	18	95	0.5	1			SHA02
1982 07 26.94	S	11.8	VB	20	R	14	40	3	2			SHA02
1982 07 27.96	S	12.8	VB	32	R	18	95	1.7	1			SHA02
1982 08 13.89	S	12.7	VB	32	R	18	95	1.5	0			SHA02
1982 08 15.91	S	12.7	VB	20	R	14	40	3	0			SHA02
1982 08 18.92	S[	13.2	VB	33.3	L	4	45					SHA02
1982 08 19.93	S[	13.2	VB	32	R	18	95					SHA02
1982 09 07.84	! S	10.3	VB	20	R	14	40	6	0			SHA02
1982 09 21.77	S	10.5	VB	20	R	14	40	0.8	1/			SHA02
1982 09 23.80	S	10.2	VB	20	R	14	40	2.2	1/			SHA02

Periodic Comet Holmes (1993i)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 21.42	C	17.6	FA	91.4	L	5		0.17		&0.02	252	SCO01
1993 07 21.42	c	21.4	FA	91.4	L	5						SCO01
1993 08 22.42	c	21.1	FA	91.4	L	5				0.02	258	SCO01
1993 08 22.43	C	18.1	FA	91.4	L	5						SCO01

Periodic Comet Borrelly (1981 IV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 02 28.88	S	10.5:		20	R	14	40	4	2/			SHA02
1981 03 12.82	S	10.5:		20	R	14	40	2	4/			SHA02
1981 03 17.83	S	11.0:		20	R	14	40	2	2			SHA02
1981 03 28.08	S[	10.5:		20	R	14	40					SHA02
1981 03 28.85	S	12.0	VB	20	R	14	40	1.5	2/			SHA02
1981 04 20.91	S[	11.0	VB	20	R	14	40					SHA02
1981 04 27.91	S[	13.0	VB	20	R	14	40					SHA02

Periodic Comet Kopff (1983 XIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 03 15.20	S[	13.1	VB	20	R	14	120					SHA02
1983 04 07.16	S[	12.2	VB	20	R	14	40					SHA02
1983 04 13.04	S	11.9	VB	20	R	14	95	1.0	1			SHA02
1983 07 12.95	S	11.1	VB	20	R	14	40	1.4	2			SHA02

Periodic Comet Giacobini-Zinner (1959 VIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1959 09 28.83	B	10.4		15	R		80	4				ZNO
1959 09 29.84	B	10.2		15	R		80	5		0.2		ZNO
1959 10 01.82	B	10.1		15	R		80	3.3		0.1		ZNO

Periodic Comet Giacobini-Zinner (1959 VIII = 1985 XIII) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1959 10 02.82		B 10.2		15	R		80	4		0.2		ZNO
1959 10 05.87		B 9.7	S	15	R		80	3		0.2		ZNO
1959 10 06.85		B 9.8	S	15	R		80	3.5		0.2		ZNO
1959 10 07.83		B 9.8	S	15	R		80	3		0.2		ZNO
1985 07 03.00		S[11.5	VB	20	R	14	40					SHA02
1985 07 06.95		S 11.4	VB	20	R	14	40	1.7	3/			SHA02
1985 07 06.96		S 11.4	VB	33	L	4	45	1.7	3/			SHA02
1985 07 12.95		S 10.9	VB	20	R	14	40	1.7	3			SHA02
1985 07 17.01		S 10.4	VB	20	R	14	40	1.7	5/	0.03	210	SHA02
1985 07 21.06		S 9.2	VB	8.0	B		20	5.4	3			SHA02
1985 07 21.06		S 10.0	VB	20	R	14	40	3.0	5/	0.15	250	SHA02
1985 07 21.08		S 10.0	VB	33	L	4	45	3.0	5/	0.15	250	SHA02
1985 07 24.06		S 10.2	VB	20	R	14	40	1.8	6	0.05	270	SHA02
1985 07 24.95		S 9.9	VB	20	R	14	40	2.9	5/			SHA02
1985 07 24.96		S 9.2	VB	8.0	B		20	2.7	3/			SHA02
1985 08 03.93		S 9.2	VB	8.0	B		20	4.1	4			SHA02
1985 08 03.95		S 9.2	VB	20	R	14	40	2.7	5/	0.10	290	SHA02
1985 08 06.03		S 8.9	VB	20	R	14	40	2.3	5/	0.06	290	SHA02
1985 08 07.95		S 8.7	VB	8.0	B		20	4.3	5	0.15	270	SHA02
1985 08 07.97		S 8.9	VB	20	R	14	40	2.3	5	0.12	270	SHA02
1985 08 11.00		S 8.6	VB	8.0	B		20	3.4	5	0.25	285	SHA02
1985 08 11.01		S 8.7	VB	20	R	14	40	2.3	6	0.15	285	SHA02
1985 08 12.00		S 8.6	VB	8.0	B		20	4.2	5	0.15	280	SHA02
1985 08 13.93		S 8.4	VB	8.0	B		20	4.2	4/	0.20	300	SHA02
1985 08 14.92		S 8.4	VB	8.0	B		20	4.5	5	0.20	275	SHA02
1985 08 17.91		S 8.2	VB	8.0	B		20	5.4	4/			SHA02
1985 08 20.92		S 8.6	VB	8.0	B		20	3.6	4			SHA02
1985 08 27.06		S 7.9	VB	8.0	B		20	5.3	4/	0.25	265	SHA02
1985 09 15.13		S 9.1	VB	8.0	B		20	6.1	3	0.53	285	SHA02
1985 10 13.18	!	S 10.5	VB	20	R	14	40	2.8	1			SHA02

Periodic Comet Schwassmann-Wachmann 2 (1981 VI = 1987 XIX)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 03 28.88		S[13.0	VB	32	R	18	95					SHA02
1987 02 20.81		S[12.4	VB	20	R	14	120					SHA02
1993 08 17.08		C 15.9	HS	50	L	4		0.30		0.02	258	CAV
1993 09 18.11		S 13.1	AC	30.5	C	12	120	0.4	2/			GRA04

Periodic Comet Forbes (1993f)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 21.40		C 17.5	FA	91.4	L	5		0.25		0.22	247	SCO01
1993 07 21.40		c 21.6	FA	91.4	L	5						SCO01
1993 07 23.44		C 17.8	FA	91.4	L	5		0.25		>0.28	247	SCO01
1993 07 23.44		c 22.1	FA	91.4	L	5						SCO01
1993 07 29.04	!	V[16.0	YF	20.0	T	2						MIK
1993 08 13.48		C 17.9	FA	91.4	L	5		0.28		0.18	247	SCO01
1993 08 13.48		c 21.3	FA	91.4	L	5						SCO01
1993 08 14.01		C 16.9	HS	18	L	6		< 0.25		0.2	245	PRA01
1993 09 14.49		C 16.5	FA	91.4	L	5		0.22		0.21	245	SCO01
1993 09 14.49		c 17.9	FA	91.4	L	5						SCO01

Periodic Comet Arend-Rigaux (1991 XVII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 22.21		C 21.9	FA	91.4	L	5						SCO01

Periodic Comet Tsuchinshan 1 (1985 I)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 02 11.92	S	[10.9	VB	33	L	4	45					SHA02

Periodic Comet Churyumov-Gerasimenko (1982 VIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 09 22.13	S	[13.1	VB	32	R	18	95					SHA02
1982 09 23.18	S	13.4	VB	32	R	18	240	0.5	7			SHA02
1982 10 17.17	S	12.4	VB	32	R	18	95	0.6	8			SHA02
1982 10 24.10	S	12.5	VB	32	R	18	95	0.6	8			SHA02
1982 11 09.90	S	11.0	VB	32	R	18	240	1.4	8			SHA02
1982 11 10.93	S	10.9	VB	32	R	18	95	1.4	8			SHA02
1982 11 14.15	S	11.2	VB	32	R	18	240	0.9	8			SHA02
1982 11 17.22	S	11 :	VB	32	R	18	240	0.9	8			SHA02
1982 11 19.22	S	10.4	VB	32	R	18	240	0.8	8			SHA02
1982 11 20.14	S	10.6	VB	32	R	18	240	1.0	7			SHA02
1982 11 22.92	S	9.3	VB	33.3	L	4	45	1.3	8			SHA02
1982 11 22.92	S	10.6	VB	32	R	18	240	0.9	7			SHA02
1982 11 26.19	S	10.4	VB	32	R	18	95	1.2	8	0.03	280	SHA02
1982 11 26.20	S	11.0	VB	32	R	18	240	0.8	7			SHA02
1982 11 26.21	S	9.0	VB	8.0	B		20	2.3	5			SHA02
1982 11 27.17	S	10.4	VB	32	R	18	95	1.1	7			SHA02
1982 11 27.20	S	11.0	VB	32	R	18	240	0.8	7	0.01	270	SHA02
1982 11 27.24	S	9.2	VB	8.0	B		20	2.7	5			SHA02
1982 12 05.91	S	10.4	VB	32	R	18	95	0.9	7	0.05	280	SHA02
1982 12 05.91	S	11.0	VB	32	R	18	240	0.9	6			SHA02
1982 12 10.94	S	10.1	VB	32	R	18	95	1.2	7	0.06	275	SHA02
1982 12 10.95	S	9.2	VB	8.0	B		20	1.8	5			SHA02
1982 12 10.95	S	10.7	VB	32	R	18	240	1.0	7			SHA02
1982 12 13.88	S	10.1	VB	32	R	18	95	0.9	7			SHA02
1982 12 13.89	S	9.3	VB	8.0	B		10	1.8	7			SHA02
1982 12 13.89	S	11.1	VB	32	R	18	240	0.8	6			SHA02
1982 12 16.90	S	10.4	VB	32	R	18	95	0.9	7			SHA02
1982 12 16.91	S	10.6	VB	32	R	18	240	0.8	7			SHA02
1982 12 16.92	S	9.3	VB	8.0	B		20	0.8	6			SHA02
1982 12 18.90	S	10.4	VB	32	R	18	95	1.1	6	0.01	270	SHA02
1982 12 18.90	S	11.0	VB	32	R	18	240	1.0	5			SHA02
1982 12 18.91	S	9.5	VB	8.0	B		20	0.9	5			SHA02
1982 12 18.95	S	9.8	VB	33.3	L	4	45	2.4	7		310	SHA02
1982 12 21.27	S	10.1	VB	32	R	18	95	1.8	6/	0.04	255	SHA02
1982 12 23.11	S	10.4	VB	32	R	18	95	1.9	7	0.04	245	SHA02
1982 12 23.12	S	10.1	VB	32	R	18	240	1.3	6			SHA02
1982 12 23.13	S	9.5	VB	8.0	B		20	1.5	6			SHA02
1983 01 01.91	S	11 :	VB	32	R	18	95	1	4/			SHA02
1983 01 06.94	S	10.4	VB	32	R	18	95	2.3	7	0.02	220	SHA02
1983 01 06.94	S	11.0	VB	32	R	18	240	1.2	6/			SHA02
1983 01 06.95	S	9.9	VB	8.0	B		20	1.8	5			SHA02
1983 01 09.90	S	11.0	VB	32	R	18	95	1.2	7			SHA02
1983 01 09.91	S	11.6	VB	32	R	18	240	0.9	5			SHA02
1983 01 09.96	S	10.4	VB	8.0	B		20	1.1	4			SHA02
1983 01 13.82	S	11.5	VB	32	R	18	95	0.7	6			SHA02
1983 01 13.83	S	11.7	VB	32	R	18	240	0.7	6			SHA02
1983 01 18.77	S	11.5	VB	32	R	18	95	1.3	4/			SHA02
1983 01 20.18	S	11.5	VB	32	R	18	95	1.6	5			SHA02
1983 02 01.82	S	12.5	VB	32	R	18	95	0.9	4			SHA02
1983 02 03.85	S	12.2	VB	32	R	18	95	1.4	4			SHA02
1983 02 11.89	S	12.5	VB	32	R	18	95	1.3	2			SHA02
1983 02 18.03	S	12.7:	VB	33.3	L	4	45	0.7	8			SHA02

Periodic Comet West-Kohoutek-Ikemura (1993o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 20.47		C 20.1	FA	91.4	L	5		0.13				SCO01
1993 07 21.47		C 20.1	FA	91.4	L	5						SCO01
1993 08 22.46		C 18.5	FA	91.4	L	5				0.01	256	SCO01

Periodic Comet Wild 2 (1978 XI = 1984 XIV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 03 02.05		S[11.0		32.0	R	18	95					SHA02
1978 03 12.88		S 12.5:		20.0	R	14	40					SHA02
1978 05 09.93		S 12.0:		32.0	R	18	95					SHA02
1984 04 02.91		S[11.0	VB	33	L	4	83					SHA02
1984 04 03.85		S[11.8	VB	33	L	4	120					SHA02

Periodic Comet Howell (1992c)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 22.44		C 15.1	FA	91.4	L	5		2.24		&0.18	249	SCO01
1993 07 22.44		c 21.2	FA	91.4	L	5						SCO01
1993 07 23.45		C 14.4	FA	91.4	L	5				&0.22	248	SCO01
1993 07 23.46		c 20.4	FA	91.4	L	5						SCO01
1993 07 25.08		V 14.5:	AA	20.0	T	2		& 2	3			MIK
1993 07 29.06	!	V 14.9	AA	20.0	T	2		1.5	3			MIK
1993 08 14.03		C 15.2	HS	18	L	6		0.3		0.1	250	PRA01
1993 08 17.42		c 19.6	FA	91.4	L	5						SCO01
1993 08 17.43		C 15.5	FA	91.4	L	5		1.18		&0.24	250	SCO01
1993 09 14.50		C 15.6	FA	91.4	L	5		0.78		0.24	250	SCO01
1993 09 14.50		c 19.6	FA	91.4	L	5						SCO01

Periodic Comet Hartley 2 (1991 XV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 14.08		B 8.3	S	10	B		25	3.5				KUB

Periodic Comet Singer Brewster (1992e)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 20.41		c 22.2	FA	91.4	L	5		0.15		0.02	262	SCO01
1993 07 20.42		C 20.9	FA	91.4	L	5						SCO01
1993 08 16.35		c 22.2	FA	91.4	L	5						SCO01
1993 08 16.37		C 20.3	FA	91.4	L	5		0.17		0.02	262	SCO01
1993 09 16.19		c 22.6	FA	91.4	L	5						SCO01
1993 09 16.22		C 20.6	FA	91.4	L	5		0.17				SCO01

Periodic Comet Hartley 3 (1993m)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 24.45		c 21.6	FA	91.4	L	5		0.18		<0.01	250	SCO01
1993 07 24.47		C 18.6	FA	91.4	L	5						SCO01
1993 08 14.45		c 21.0	FA	91.4	L	5						SCO01
1993 08 14.46		C 17.8	FA	91.4	L	5		0.28		&0.02	252	SCO01

Periodic Comet Faye (1984 XI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 10 26.22		S[11.5	VB	33	L	4	45					SHA02

Periodic Comet Brooks 2 (1987 XXIV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 17.05		S[12.0:	VB	33	L	4	45					SHA02

Periodic Comet Metcalf-Brewington (1991 I)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 10.79		S 9.1	AA	8.0	B		20	2.7	5			SHA02
1991 01 11.77		S 9.2	AA	8.0	B		20	2.7	4			SHA02
1991 01 11.78		S 9.0	AA	20	L	4	37	4	3			PAN
1991 01 13.77		S 8.9	AA	20	L	4	37	4	3			PAN
1991 01 14.80		S 9.1	AA	20	R	14	40	3.2	2			SHA02
1991 01 15.77		S 9.1	AA	8.0	B		20	2.7	3			SHA02
1991 01 15.79		S 9.5	AA	30	R	18	95	2.1	3			SHA02

Periodic Comet Whipple (1993n)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 19.29		C 20.8	FA	91.4	L	5						SCO01

Periodic Comet Ashbrook-Jackson (1992j)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 22.41		C 15.5:	FA	91.4	L	5		0.45		&0.14	245	SCO01
1993 07 22.41		c 20.7:	FA	91.4	L	5						SCO01
1993 07 23.43		C 13.4	FA	91.4	L	5		0.50		&0.32	241	SCO01
1993 07 23.43		c 18.9	FA	91.4	L	5						SCO01
1993 08 13.01		C 12.7	HS	18	L	6		0.5	6	0.1	249	PRA01
1993 08 13.46		C 13.4	FA	91.4	L	5		0.77		&0.37	243	SCO01
1993 08 13.47		c 17.4	FA	91.4	L	5						SCO01
1993 08 14.00	a	S[12.8	AC	20.3	T	10	80	! 1.0				GRA04
1993 08 14.01		S[12.7	GA	31.6	L	5	62	! 1.0				MID01
1993 08 14.41		S 12.3	NP	25.6	L	4	156	1.2	2/			MOR
1993 08 15.40		S 12.5	NP	25.6	L	4	156	1.2	3			MOR
1993 08 21.40		S 12.5	NP	25.6	L	4	111	1.6	2/			MOR
1993 09 14.48		C 13.2	FA	91.4	L	5		1.32		0.46	241	SCO01
1993 09 17.89		S[13.1	AC	20.3	T	10	100	! 1.0				GRA04
1993 09 19.00		C 13.7	HS	18	L	6		0.5		0.2	240	PRA01
1993 09 19.01		S 12.8	VB	20.3	T	10	80	1.6	3			GRA04

Periodic Comet Shajn-Schaldach (1993k)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 22.39		C 18.4	FA	91.4	L	5		0.25		&0.01	248	SCO01
1993 07 22.39		c 21.7	FA	91.4	L	5						SCO01
1993 07 23.42		C 18.5	FA	91.4	L	5		0.25		0.03	253	SCO01
1993 07 23.42		c 22.2	FA	91.4	L	5						SCO01
1993 08 12.29		S[14.0	NP	50.8	L	4	275					MOR
1993 08 14.43		c 21.4	FA	91.4	L	5						SCO01
1993 08 14.44		C 18.2	FA	91.4	L	5		0.27		&0.04	251	SCO01
1993 09 10.45		c 20.9	FA	91.4	L	5						SCO01
1993 09 10.48		C 17.2	FA	91.4	L	5		0.32		&0.02	254	SCO01

Periodic Comet Giclas (1985 XV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 11 12.98		S[12.5	VB	33	L	4	120					SHA02

Periodic Comet Shoemaker 1 (1984 XVI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 12 14.75	S[	12.0	VB	33	L	4	45					SHA02

Periodic Comet Ciffréo (1985 XVI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 12 06.07	S[	10.9	WA	20	R	14	40					SHA02

Periodic Comet Shoemaker-Levy 8 (1992f)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 21.32	c	21.9	FA	91.4	L	5		0.20		<0.01	258	SCO01
1993 07 21.37	C	19.2	FA	91.4	L	5						SCO01
1993 07 25.37	c	20.9	FA	91.4	L	5		0.23		<0.01	250	SCO01
1993 07 25.38	C	18.2	FA	91.4	L	5						SCO01
1993 08 15.31	c	21.4	FA	91.4	L	5						SCO01
1993 08 15.32	C	19.0	FA	91.4	L	5		0.22		0.02	250	SCO01
1993 09 16.15	c	22.0	FA	91.4	L	5						SCO01
1993 09 16.17	C	19.9	FA	91.4	L	5		0.20				SCO01

Periodic Comet Swift-Gehrels (1981 XIX)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 10 25.88	S[	12.8	VB	32	R	18	95					SHA02
1981 10 31.86	S[	12.0:		32	R	18	95					SHA02
1981 11 05.99	S[	12.7	VB	32	R	18	95					SHA02
1981 12 16.92	S	12.8	VB	32	R	18	95	1.6	1			SHA02

Periodic Comet Schaumasse (1992x)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 11 02.70	C	17.3:	EC	60.0	Y	6		0.25				NAK01
1992 11 24.78	C	15.5	EA	60.0	Y	6		0.4				NAK01
1992 11 24.80	S	14.3	AC	60.0	Y	8	253	0.5	3			NAK01
1992 11 30.65	S	14.3	AC	60.0	Y	8	253	0.7	3			NAK01
1992 11 30.66	C	15.4	EA	60.0	Y	6		0.5				NAK01
1992 12 02.66	S	13.8	AC	60.0	Y	8	253	0.7	3/			NAK01
1992 12 17.56	S	13.3	AC	60.0	Y	8	200	1.3	3			NAK01
1992 12 22.13	S	11.0	AC	31.8	L	4	63	4	1			KEE
1992 12 25.58	S	13.0	AC	60.0	Y	8	200	1.2	3/			NAK01
1992 12 26.59	S	12.7	AC	20	L	6	74	2.3	2			NAK01
1992 12 29.90	s	12.5:	AC	40.0	L	5		0.5	2			MER
1993 01 12.44	S	11.1	AC	20	L	6	58	4	1/			NAK01
1993 01 14.54	S	10.9	AC	20	L	6	58	3.5	2			NAK01
1993 01 14.83	s	11.5:	AC	40.0	L	5		0.5	4			MER
1993 01 15.92	S	9.8	AA	25.5	L	4	77	4	0			DIA
1993 01 16.93	S	9.8	AA	25.5	L	4	77	4	0			DIA
1993 01 17.07	M	9.2	S	31.8	L	4	63	8	1			KEE
1993 01 17.50	S	10.9	AC	20	L	6	50	3	2			KAM03
1993 01 18.51	S	10.9	AC	20	L	6	50	3	1			KAM03
1993 01 19.57	S	10.7	AC	20	L	6	50	3	2			KAM03
1993 01 21.58	S	10.5	AC	20	L	6	50	4	2			KAM03
1993 01 22.43	S	9.9	AC	20	L	6	46	5	2			NAK01
1993 01 22.51	S	10.5	AC	20	L	6	50	4	2			KAM03
1993 01 24.27	S	9.5	AA	25.6	L	4	45	5.6	1			MOR
1993 01 26.52	S	10.3	AC	20	L	6	50	4	3			KAM03
1993 01 28.19	S	9.0	AA	25.6	L	4	45	5.2	2			MOR
1993 01 28.21	S	8.8	AA	8.0	B		20	12	2			MOR
1993 02 07.82	S	9.2	AA	25.5	L	4	77	4	0			DIA
1993 02 08.42	S	9.1	AC	20	L	6	46	4.5	3/			NAK01

Periodic Comet Schaumasse (1992x) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 02 10.46	S	9.2	AC	20	L	6	50	5	4			KAM03
1993 02 10.82	S	9.0	AA	25.5	L	4	77	5	0			DIA
1993 02 11.19	S	8.6:	AA	8.0	B		20	10	2			MOR
1993 02 12.81	S	8.8	AA	25.5	L	4	77	5	1			DIA
1993 02 13.46	M	9.2	AC	20	L	6	50	4	4			KAM03
1993 02 14.25	S	8.6:	AA	8.0	B		20	10	2/			MOR
1993 02 14.47	M	9.1	AC	20	L	6	50	5	4			KAM03
1993 02 14.51	S	8.9	AC	20	L	6	46	5	4			NAK01
1993 02 15.90	S	8.6	AA	25.5	L	4	77	5	1			DIA
1993 02 15.92	B	8.4	AA	40.0	L	5	51	5	2			MER
1993 02 18.83	S	8.8	AA	25.5	L	4	77	4				DIA
1993 02 19.50	S	8.7	AC	20	L	6	50	6	4			KAM03
1993 02 20.91	S	8.6	AA	25.5	L	4	77	4	2			DIA
1993 02 21.12	S	8.2	S	15.3	L	3	16	8	2			KEE
1993 02 21.81	S	8.6	AA	25.5	L	4	77	4	2			DIA
1993 02 23.82	S	8.5	AA	25.5	L	4	77	4	2			DIA
1993 02 24.51	M	8.9	AC	20	L	6	50	5	4			KAM03
1993 03 07.93	B	9.0	AA	5.0	B		7					LOU
1993 03 09.97	B	9.0	AA	5.0	B		7					LOU
1993 03 11.18	S	9.0	AA	25.6	L	4	45	5.0	3			MOR
1993 03 11.88	B	8.6	AA	40.0	L	5	51	5	3			MER
1993 03 11.91	S	8.3	AA	25.5	L	4	77	5	1			DIA
1993 03 11.97	B	9.0	AA	5.0	B		7					LOU
1993 03 12.97	B	9.2	AA	5.0	B		7					LOU
1993 03 13.16	S	8.4	S	15.3	L	3	16	10	2			KEE
1993 03 13.20	M	8.5	AA	8.0	B		20	9	2/			MOR
1993 03 13.21	M	8.5	AA	25.6	L	4	45	9	2/	0.67	325	MOR
1993 03 13.49	S	9.1	AC	20	L	6	50	5.5	5			KAM03
1993 03 14.47	S	8.8	S	15	R	5	25	5	4			NAG02
1993 03 14.91	S	8.4	AA	25.5	L	4	77	5	1			DIA
1993 03 15.88	B	8.6	AA	40.0	L	5	51	5	3			MER
1993 03 16.52	S	9.0	AC	20	L	6	50	5	4			KAM03
1993 03 16.90	S	8.4	AA	25.5	L	4	77	4	1			DIA
1993 03 17.50	S	8.9	AC	20	L	6	50	5	4			KAM03
1993 03 18.51	S	8.9	AC	20	L	6	46	5.5	3			NAK01
1993 03 19.58	S	8.8	S	15	R	5	25	6	4			NAG02
1993 03 20.54	M	9.0	AC	20	L	6	50	5	4			KAM03
1993 03 20.62	S	8.9	S	15	R	5	25	5	3			NAG02
1993 03 21.20	M	8.5	AA	8.0	B		20	8	2/			MOR
1993 03 21.49	S	8.9	AC	20	L	6	46	5.5	3			NAK01
1993 03 22.51	S	9.1	AC	20	L	6	50	5	4			KAM03
1993 03 24.92	S	8.6	AA	25.5	L	4	77	4	1			DIA
1993 03 25.91	S	8.6	AA	25.5	L	4	77	4	1			DIA
1993 03 28.88	S	8.9	AA	25.5	L	4	77	4	1			DIA
1993 04 09.49	S	9.8	AC	20	L	6	50	5	3			KAM03
1993 04 10.47	S	10.0	AC	20	L	6	50	5	3			KAM03
1993 04 10.50	S	9.7	AC	20	L	6	46	4	3			NAK01
1993 04 14.48	S	10.3	AC	20	L	6	50	4	2			KAM03
1993 04 14.52	S	10.0	HS	20	L	6	46	4	3/			NAK01
1993 04 15.49	S	10.4	AC	20	L	6	50	4	2			KAM03
1993 04 16.49	S	10.5	AC	20	L	6	50	4	2			KAM03
1993 04 17.22	M	9.5	AA	25.6	L	4	45	4.1	2			MOR
1993 04 17.46	S	9.8	AC	20	L	6	46	4.5	4			NAK01
1993 04 17.50	S	10.4	AC	20	L	6	50	3.5	2			KAM03
1993 04 20.58	S	11.0	AC	20	L	6	50	3	1			KAM03
1993 04 25.49	S	11.0	AC	20	L	6	50	3	2			KAM03
1993 04 25.53	S	10.4	AC	20	L	6	46	4.5	2			NAK01
1993 04 30.04	S	9.9	A	20.0	T	10	78	> 4	1			COM
1993 05 11.94	S	11.0	A	28.0	T	10	160	> 5	0			COM

Periodic Comet Schaumasse (1992x) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 05 15.94	S	10.9	A	28.0	T	10	108	> 4	0			COM
1993 05 16.92	S	12.5	AC	20.3	T	10	80	1.5	1			GAR02
1993 05 16.94	S	11.1:	A	28.0	T	10	108	> 4	0			COM
1993 05 17.93	S	11.2	A	28.0	T	10	108	> 4	0			COM
1993 05 22.22	S	11.3	NP	25.6	L	4	67		2			MOR
1993 05 22.97	S	11.8:	A	28.0	T	10	108	> 3	0			COM
1993 05 23.56	C	15.0	HS	20.3	T	6						NAK07
1993 05 23.56	C	15.2	HS	20.3	T	6						NAK07
1993 05 23.56	C	15.3	HS	20.3	T	6						NAK07
1993 05 23.96	S	11.7:	A	28.0	T	10	108	> 3	0			COM
1993 05 25.59	a C	14.2	GA	60.0	Y	6		0.75			125	NAK01
1993 06 04.49	C	15.1	HS	20.3	T	6						NAK07
1993 06 04.49	C	15.2	HS	20.3	T	6						NAK07
1993 06 04.50	C	14.9	HS	20.3	T	6						NAK07
1993 06 12.27	S	12.8	NP	25.6	L	4	111	1.4	1			MOR
1993 06 13.28	S	13.3	NP	50.8	L	4	120	1.4	0			MOR
1993 07 22.18	c	22.6	FA	91.4	L	5		1.08		&0.03	302	SCO01
1993 07 22.19	C	18.4	FA	91.4	L	5						SCO01
1993 07 24.18	c	22.6	FA	91.4	L	5		0.55				SCO01
1993 07 24.19	C	19.5	FA	91.4	L	5						SCO01

Periodic Comet Smirnova-Chernykh

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 02 19.76	C	16.0	EB	60.0	Y	6		0.35				NAK01
1993 02 25.76	C	16.0	EA	60.0	Y	6		0.3		0.05	293	NAK01
1993 03 22.62	C	15.9	EA	60.0	Y	6		0.35			295	NAK01
1993 04 01.79	C	15.6:	EB	60.0	Y	6		0.3			295	NAK01
1993 04 14.61	C	15.5	HS	60.0	Y	6		0.35			290	NAK01
1993 04 17.59	C	15.7	HS	60.0	Y	6		0.45			295	NAK01
1993 05 15.63	C	15.9	GA	60.0	Y	6		0.35			295	NAK01
1993 05 20.62	C	16.1	HS	60.0	Y	6		0.4			295	NAK01
1993 05 24.63	C	15.9	HS	20.3	T	6						NAK07
1993 05 24.64	C	15.8	HS	20.3	T	6						NAK07
1993 05 24.66	C	15.8	HS	20.3	T	6						NAK07

Periodic Comet Halley (1986 III)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 11 15.24	B	7.3	SP	10.0	R	15	100	8	6/			DES01
1985 11 29.06	B	6.5	SP	10.0	R	15	100	10	6			DES01
1985 12 06.04	B	5.8	SP	10.0	R	15	100	12	6			DES01
1985 12 09.06	B	5.7	SP	10.0	R	15	100	10	6			DES01
1986 03 14.36	B	5.0	SP	6.0	R	11	58	15	5	1.25		DES01
1986 03 23.27	B	4.6	SP	6.0	R	11	58	20	5	1.50		DES01
1986 04 05.27	B	4.0	SP	6.0	R	11	58	25	5	1.40		DES01
1986 04 06.33	B	4.2	SP	6.0	R	11	58	22	5	1.40		DES01
1986 04 10.29	B	4.5	SP	6.0	R	11	58	18	5			DES01
1986 04 12.27	B	4.7	SP	6.0	R	11	58	15	6			DES01
1986 04 16.15	B	4.7	SP	6.0	R	11	58	12	6			DES01
1986 11 12.26	S	12.0:	VB	33	L	4	60	2	2			SHA02
1986 11 14.24	S	12.0:	VB	33	L	4	60	2	2			SHA02
1987 02 21.02	S	12.7	VB	33	L	4	125	1	6			SHA02

Periodic Comet Olbers (1956 IV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1956 04 08.80	B	8.8		10	R		25	& 3		0.2		ZNO
1956 04 20.79	B	8.0:		10	R		25	& 6				ZNO

Periodic Comet Tuttle (1980 XIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 10 07.91		S[11.0:		20.0	R	14	40					SHA02

Periodic Comet Swift-Tuttle (1992t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 10 02.15		S 8.8	AA	15.0	L	4	26	& 5	2			PER01
1992 10 02.82		B 9.0	AA	15.0	B		25	4.4	2			NAG04
1992 10 04.20		S 9.1	AA	15.0	L	4	26	& 4	1/			PER01
1992 10 06.42		S 8.6	AC	15	L	5	38	4	3/			ONO
1992 10 06.76		B 8.9	S	15.0	B		25	3.2	2			NAG04
1992 10 06.78		S 9.1	AC	16	L	6	40	4	2			TOM
1992 10 06.81		M 8.1	AA	3.5	B		7	10				TSU02
1992 10 06.81		M 8.8	S	20	L	6	38	6	2			KAM03
1992 10 06.82		S 9.5	AA	16	L	6	31	3	2			MIT
1992 10 09.81		S 8.0	S	12.5	B		25	5	3			KAN04
1992 10 09.82		M 8.3	S	20	L	6	38	6	4			KAM03
1992 10 10.41		S 9.0	S	12.5	B		25	4	2			KAN04
1992 10 10.42		S 8.5	S	15	L	5	38	5	3			ONO
1992 10 13.82	a	S 8.1	AA	15.0	L	4	26	& 5	3/			PER01
1992 10 13.83	a	S 7.9	AA	3.4	B		9		5			PER01
1992 10 15.41		S 8.1	AA	12.0	B		20	4	3			MIT
1992 10 16.39		S 8.0	S	6.0	B		10	10	5			KAN03
1992 10 16.40		S 7.6	S	40	L	5	56	7	6			KON03
1992 10 17.39		S 8.0	S	6.0	B		10	10	5			KAN03
1992 10 17.40		S 7.4	S	40	L	5	56	8	6			KON03
1992 10 17.42		M 8.0	AC	16	L	6	40	4	3			TOM
1992 10 17.43		M 7.2	AA	3.5	B		7					TSU02
1992 10 17.46		M 8.3	S	20	L	6	38	8	5			KAM03
1992 10 17.81	a	B 7.6	AA	3.4	B		9					PER01
1992 10 17.81	a	M 7.5	AA	15.0	L	4	26					PER01
1992 10 17.81	a	S 7.4	AA	3.4	B		9	& 7	5			PER01
1992 10 17.81	a	S 7.5	AA	15.0	L	4	26	& 6	4			PER01
1992 10 18.79		B 8.2	S	10	B		25	5.6				KUB
1992 10 20.43		S 8.0:	S	15	L	6	36	6	3/			YOS02
1992 10 20.80	a	S 7.2	AA	3.4	B		9	& 7	5			PER01
1992 10 21.39		S 7.0	S	8.0	B		11	6	3			MOM
1992 10 21.39		S 7.5	S	6.0	B		10	8	6			KAN03
1992 10 21.41		S 7.2	S	40	L	5	56	8	6			KON03
1992 10 21.41		S 7.9	S	15	L	5	38	6	3			ONO
1992 10 21.42		I 8.5	S	12.5	B		25	4	4			KAN04
1992 10 21.42		S 7.1	AA	8.0	B		20	4	2			YOS03
1992 10 21.43		B 7.6	S	12.0	B		20	6	3			HAS07
1992 10 21.44		B 7.5	S	15	L	6	36	6	3			YOS02
1992 10 21.45		S 7.6	S	12.0	B		20	4	4			MIT
1992 10 21.46		M 7.6	S	20	L	6	38	6	5			KAM03
1992 10 21.82	a	S 6.9	AA	3.4	B		9	& 8	4/			PER01
1992 10 21.83	a	B 7.3	AA	3.4	B		9					PER01
1992 10 22.39		S 7.5	S	6.0	B		10	10	5			KAN03
1992 10 22.40		S 7.5	S	12.5	B		25	5	4			KAN04
1992 10 22.41		S 7.6	S	12.0	B		20	5	4			MIT
1992 10 22.42		S 6.9	S	8.0	B		11	7	3			MOM
1992 10 22.43		S 7.3	AC	5.0	B		7	6	3			TOM
1992 10 22.48		B 7.5	S	15.0	B		25	& 6	3	0.5		NAG04
1992 10 23.85	a	B 7.1	AA	3.4	B		9					PER01
1992 10 23.85	a	M 6.9	AA	3.4	B		9					PER01
1992 10 23.85	a	S 6.6	AA	3.4	B		9	& 8	4/			PER01
1992 10 24.40		S 6.7	AA	25	L	6	40	12	5			AKI
1992 10 24.78		B 6.9	S	8.0	B		10					HOR02
1992 10 24.81	a	B 6.7	AA	3.4	B		9					PER01

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 10 24.81	a M	6.5	AA	3.4	B		9					PER01
1992 10 24.81	a S	6.4	AA	3.4	B		9	& 9	4/			PER01
1992 10 25.39	S	6.4	S	10.0	B		14	6	5			IWA01
1992 10 25.39	S	7.2	S	6.0	B		10	10	5			KAN03
1992 10 25.40	B	6.5	AA	5.0	B		7			0.67		HAY01
1992 10 25.40	B	7.0	S	12.0	B		20	10	3			HAS07
1992 10 25.40	S	6.4	S	8.0	B		11	10	4			MOM
1992 10 25.42	B	7.1	S	15.0	B		25	5.8	4	0.5		NAG04
1992 10 25.42	S	7.1	AA	8.0	B		20	5	2			YOS03
1992 10 25.42	S	7.2	AA	12.0	B	5	20	15	4			WAS01
1992 10 25.43	E	7.0	AA	12.0	B	5	20	12	4			WAS
1992 10 25.43	S	6.8	S	4.2	B	3	7	8	4			YOS02
1992 10 25.44	S	7.6	S	15	L	5	38	7	4			ONO
1992 10 25.45	S	7.0	AC	5.0	B		7	6	4			TOM
1992 10 25.48	M	7.1	S	20	L	6	38	6	6			KAM03
1992 10 25.51	S	6.5	S	5.0	B		7	7	4			KAK01
1992 10 26.40	M	7.1	AA	12.0	B		20	5	5			MIT
1992 10 26.42	S	6.5	S	5.0	B		7	7	4			KAK01
1992 10 26.42	S	6.5	S	8.0	B		11	12	4	0.5	30	MOM
1992 10 26.44	M	6.5	AA	3.5	B		7	9	5			TSU02
1992 10 26.44	S	6.6	S	12.5	B		25	5	5	0.5		KAN04
1992 10 26.46	M	7.0	S	20	L	6	38	8	6			KAM03
1992 10 26.49	S	7.5	AA	15	L	5	38	7	4			ONO
1992 10 27.39	S	6.8	S	6.0	B		10	10	6			KAN03
1992 10 27.39	S	6.9	S	40	L	5	56	10	7			KON03
1992 10 27.41	M	6.3	AA	3.5	B		7	9	5			TSU02
1992 10 27.41	S	6.8	AA	8.0	B		20	8	2/			YOS03
1992 10 27.42	E	6.8	AC	20.3	T	10	60	8	5			WAS
1992 10 27.42	S	6.4	S	5.0	B		7	8	4			KAK01
1992 10 27.43	B	6.7	AA	12.0	B		20	10	4			HAS07
1992 10 27.43	S	6.3	AA	10.0	B		14	5	4			IWA01
1992 10 27.44	B	7.0	AA	10.0	B		20	7	6			OKA03
1992 10 27.44	S	6.4	S	8.0	B		11	10	3	0.17		MOM
1992 10 27.46	S	6.5	S	12.5	B		25	5	5	0.17		KAN04
1992 10 27.48	M	7.0	AA	20	L	6	38	6	5			KAM03
1992 10 28.39	S	6.7	S	40	L	5	56	10	7			KON03
1992 10 28.39	S	6.8	S	6.0	B		10	10	6			KAN03
1992 10 28.40	S	6.4	S	8.0	B		11	8	3/			MOM
1992 10 28.40	S	7.1	AC	15	L	5	38	10	3	5	60	ONO
1992 10 28.41	S	6.4	AA	10.0	B		14	8	5			IWA01
1992 10 28.44	S	6.4	S	12.5	B		25	7	5			KAN04
1992 10 28.45	B	6.8	AA	12.0	B		20	12	3			HAS07
1992 10 28.45	B	6.9	AA	10.0	B		20	7	6			OKA03
1992 10 28.48	B	6.6	AA	10.0	R	4	20	& 4	4			NAG04
1992 10 29.42	E	6.5	AC	20.3	T	10	60	8	5			WAS
1992 10 29.43	S	6.4	AA	10.0	B		14		5			IWA01
1992 10 30.43	S	6.3	AA	10.0	B		14	6	6			IWA01
1992 10 30.79	S	5.7	AA	3.4	B		9	& 8	4/			PER01
1992 10 31.39	M	6.6	AA	12.0	B		20	6.5	4			MIT
1992 10 31.39	S	6.3	AA	10.0	B		14	6	5			IWA01
1992 10 31.40	S	6.2	AC	5.0	R	6	7	15	3			ONO
1992 10 31.40	S	6.2	S	5.0	B		7	>10	4			KAK01
1992 10 31.41	S	5.9	S	8.0	B		11	10	5			MOM
1992 10 31.42	M	6.2	AA	3.5	B		7	12	5			TSU02
1992 10 31.42	S	6.7	S	7.0	B		14	5	5			KAN04
1992 10 31.45	B	6.7	AA	12.0	B		20	12	4			HAS07
1992 10 31.80	B	6.3	AA	3.4	B		9					PER01
1992 10 31.80	S	5.8	AA	3.4	B		9	& 9	6			PER01
1992 11 01.38	S	6.2	S	40	L	5		10	7			KON03

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 11 01.39	M	6.3	AA	12.0	B		20	7	6			MIT
1992 11 01.40	B	6.5	AA	12.0	B		20	12	5			HAS07
1992 11 01.40	S	6.4	AA	8.0	B		20	8	4			YOS03
1992 11 01.40	S	6.5	AA	7.0	B		10	7	4			MIY
1992 11 01.42	B	7.2	S	12.0	B		20	10	3			HIS
1992 11 01.78	S	5.8	AA	5.0	B		7	5.4	2			SHA02
1992 11 01.80	B	5.9	AA	3.4	B		9					PER01
1992 11 01.80	S	5.7	AA	3.4	B		9	& 8	5			PER01
1992 11 02.37	S	6.1	AA	15	L	5	38	12	4			ONO
1992 11 02.38	S	6.3	AA	25	L	6	40	11	5			AKI
1992 11 02.39	S	6.5	S	7.0	B		10	7	4			MIY
1992 11 02.40	S	6.0	S	40	L	5		12	7	0.33	40	KON03
1992 11 02.41	B	6.1	S	4.2	B	3	7	10	5			YOS02
1992 11 02.43	B	6.1	AA	5.0	B		7			0.17		HAY01
1992 11 02.43	B	6.3	AA	5.0	B		7	15	5			TOM
1992 11 02.44	M	6.4	S	20	L	6	38	9	5			KAM03
1992 11 02.44	S	6.5	S	7.0	B		14	6	5			KAN04
1992 11 02.45	B	6.5	S	10.0	B		20	10	6			OKA03
1992 11 02.46	E	6.3	AA	6.0	R	7	17	10	6			KAM03
1992 11 02.76	S	5.8	AA	5.0	B		7	10	3			SHA02
1992 11 03.38	B	6.3	S	6.0	B		10	8	7			KAN03
1992 11 03.38	S	5.9	AA	5.6	B		8	15	4			ONO
1992 11 04.39	S	5.8	S	40	L	5		12	7	0.33	40	KON03
1992 11 04.40	S	5.9	AA	5.6	B		8	12	4			ONO
1992 11 04.40	S	6.5	S	10.0	R		29	12	5			KAN04
1992 11 04.41	B	6.4	S	12.0	B		20	12	5			HAS07
1992 11 04.42	S	6.1	AA	8.0	B		20	7	4/			YOS03
1992 11 04.43	S	6.2	S	5.0	B		7	15	4			KAK01
1992 11 04.44	M	6.2	S	20	L	6	38	8	6			KAM03
1992 11 04.46	E	6.3	S	6.0	R	7	17		5			KAM03
1992 11 05.38	B	6.1	S	6.0	B		10	8	5			KAN03
1992 11 05.38	E	6.0	AC	20.3	T	10	60	8	6			WAS
1992 11 05.75	S	5.6	AA	8.0	B		10	6	3			SHA02
1992 11 06.79	B	5.7	AA	3.4	B		9					PER01
1992 11 06.79	M	5.5	AA	3.4	B		9					PER01
1992 11 06.79	S	5.4	AA	3.4	B		9	& 7	5			PER01
1992 11 06.86	S	5.6	AA	8.0	B		10	6	4			SHA02
1992 11 07.73	B	5.7	S	8.0	B		10					DVO
1992 11 07.76	B	5.8	S	8.0	B		10					HOR02
1992 11 07.79	B	5.6	AA	3.4	B		9					PER01
1992 11 07.79	M	5.2	AA	3.4	B		9					PER01
1992 11 07.79	S	4.9	AA	3.4	B		9	> 7	6			PER01
1992 11 08.38	S	5.7	S	8.0	B		11	7	6			MOM
1992 11 08.89	S	5.5	AA	8.0	B		10	6	3			SHA02
1992 11 10.39	S	6.2	AA	7.0	B		10	8	4			MIY
1992 11 10.41	E	5.8	AA	20.3	T	10	60	8	6			WAS
1992 11 10.42	S	5.8	AA	8.0	B		20	8	4/			YOS03
1992 11 10.42	S	6.0	S	20.3	T	10	60	6	5			WAS01
1992 11 10.43	B	6.4	S	12.0	B		20	8	3			HIS
1992 11 10.44	S	5.9	S	7.0	B		14	8	5			KAN04
1992 11 11.38	B	5.6	S	6.0	B		10	8	4	1.0		KAN03
1992 11 11.38	M	6.1	AA	12.0	B		20	6	5			MIT
1992 11 11.38	S	6.7	S	7.0	B		10	5	4			MIY
1992 11 11.39	S	5.4	S	8.0	B		11	7	6			MOM
1992 11 11.42	S	6.0	S	7.0	B		14	7	5			KAN04
1992 11 11.44	S	5.6	S	5.0	B		7		5			KAK01
1992 11 11.45	S	6.4	S	6.0	R	7	17		5			KAM03
1992 11 11.45	S	6.5	S	20	L	6	38	6	5			KAM03
1992 11 12.36	B	5.4	S	6.0	B		10	8	5	2.0		KAN03

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 11 12.38	S	5.4	S	8.0	B		11	7	6/	0.33		MOM
1992 11 12.38	S	6.4	S	10.0	R		22	6	5			KAN04
1992 11 12.44	B	5.8	S	12.0	B		20	12	6			HAS07
1992 11 12.44	M	6.0	S	20	L	6	38	7	7			KAM03
1992 11 12.79	B	5.5	AA	3.4	B		9					PER01
1992 11 12.79	S	4.8	AA	3.4	B		9	& 6	6			PER01
1992 11 13.40	B	5.6	S	6.0	B		10	10	6	2.0		KAN03
1992 11 13.42	S	5.3	S	8.0	B		11	12	6	0.33		MOM
1992 11 13.44		5.0	S	20.3	L	8	38		8			BOE
1992 11 14.37	S	5.8	AA	15	L	5	38	9	6			ONO
1992 11 14.38	S	5.5	S	5.0	B		7	10	6			KAK01
1992 11 14.40	M	6.1	AA	10	L	6	24		4			YAM01
1992 11 14.40	S	5.7	AA	8.0	B		20	6	5			YOS03
1992 11 14.40	S	5.8	S	7.0	B		14	6	5	0.17		KAN04
1992 11 14.40	S	5.9	AA	10.0	B		14	8	4			IWA01
1992 11 14.41	E	5.5	AC	12.0	B	5	20	8	6			WAS
1992 11 14.41	S	5.6	AA	4.2	B	3	7	10	5	0.75	40	YOS02
1992 11 14.42	B	5.4	AA	10.0	B		20	10	6			OKA03
1992 11 14.42	S	5.3	S	8.0	B		11	11	5/			MOM
1992 11 14.47	B	5.4	AA	10.0	R	4	20					NAG04
1992 11 14.99		5.3	AA	0.0	E		1					STE01
1992 11 15.40	B	5.5	S	6.0	B		10	8	6	2.0		KAN03
1992 11 15.42	B	5.5	AA	5.0	B		7	>10	6			TOM
1992 11 16.42	S	5.2	S	8.0	B		11	7	6			MOM
1992 11 16.44	S	6.2	S	7.0	B		14	5	5			KAN04
1992 11 16.45	S	5.3	S	20	L	6	38	9	8			KAM03
1992 11 16.46	S	5.7	S	4.2	B	3	7	10	6			YOS02
1992 11 16.79	B	5.4	AA	3.4	B		9					PER01
1992 11 16.79	M	5.1	AA	3.4	B		9					PER01
1992 11 16.79	S	4.9	AA	3.4	B		9	> 9	7			PER01
1992 11 17.35	M	4.9	AA	3.5	B		7	13	5			TSU02
1992 11 17.39	B	5.3	S	16.0	H	3	35	5	7			NAG04
1992 11 17.39	B	5.5	S	6.0	B		10	8	7	2.0		KAN03
1992 11 17.41	S	5.2	S	8.0	B		11	10	6			MOM
1992 11 17.42	B	5.3	AA	10.0	B		20	10	6			OKA03
1992 11 17.43	B	5.5	AA	5.0	B		7	12	6	0.5	40	TOM
1992 11 17.43	S	5.7	AA	8.0	B		20	6	6			YOS03
1992 11 17.44	B	5.5	S	12.0	B		20	15	6			HAS07
1992 11 17.80	B	5.4	AA	3.4	B		9					PER01
1992 11 17.80	M	5.0	AA	3.4	B		9					PER01
1992 11 17.80	S	4.9	AA	3.4	B		9	> 9	6/			PER01
1992 11 18.40	B	5.3	S	12.0	B		20	15	6			HAS07
1992 11 18.40	M	5.4	AA	12.0	B		20	7	6	1.0		MIT
1992 11 18.41	M	5.6	AA	10	L	6	24	6	5			YAM01
1992 11 18.42	S	5.0	S	8.0	B		11	7	7/			MOM
1992 11 18.79	B	5.2	AA	3.4	B		9					PER01
1992 11 18.79	M	4.7	AA	3.4	B		9					PER01
1992 11 18.79	S	4.7	AA	3.4	B		9	> 7	6/			PER01
1992 11 19.37	B	5.3	AA	5.0	B		7	10	6	1.0	40	TOM
1992 11 19.42	S	5.4	AA	5.0	B		7	10	6			KAK01
1992 11 19.44	M	5.3	S	20	L	6	38	11	8			KAM03
1992 11 20.79	B	5.2	AA	3.4	B		9					PER01
1992 11 20.79	I	5.0	AA	0.0	E		1		7			PER01
1992 11 20.79	M	5.2	AA	3.4	B		9					PER01
1992 11 20.79	S	4.8	AA	3.4	B		9	& 4	7	>1.0	40	PER01
1992 11 21.39	M	5.4	AA	12.0	B		20	6	7	1.0		MIT
1992 11 21.39	S	5.5	AA	8.0	B		11	8	6	2.0		AKI
1992 11 21.40	M	5.2	AA	8.0	B		11	6	7			MIT
1992 11 21.41	S	5.1	AA	5.6	B		8	12	6			ONO

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 11 21.42	B	5.2	AA	5.0	B		7	8	7	>0.75	45	TOM
1992 11 21.42	S	5.8	AA	8.0	B		20	5	6			YOS03
1992 11 21.43	S	5.7	AA	12	L		40	10	5			HAY01
1992 11 21.78	B	5.0	AA	3.4	B		9					PER01
1992 11 21.78	I	4.8	AA	0.0	E		1		7			PER01
1992 11 21.78	M	4.8	AA	3.4	B		9					PER01
1992 11 21.78	S	4.5	AA	3.4	B		9	& 7	7	>1.5	50	PER01
1992 11 21.79	B	5.5	SC	8.0	B		20					CHU03
1992 11 22.35	S	5.5	S	12.5	B		25	7	6	1.0		KAN04
1992 11 22.36	B	5.4	AA	5.0	B		7			1.0		HAY01
1992 11 22.36	B	5.8	AA	12.0	B		20	10	6			HIS
1992 11 22.37	S	5.5	AA	7.0	B		10	5	6			MIY
1992 11 22.39	S	5.6	AA	10.0	B		14	10	6	0.17		IWA01
1992 11 22.40	B	5.2	AA	5.0	B		7	7	7	0.67	45	TOM
1992 11 22.40	M	4.9	AA	3.5	B		7	12	5			TSU02
1992 11 22.40	M	5.0	AA	20	L	6	38	12	8	0.67	45	KAM03
1992 11 22.40	S	5.2	AA	5.6	B		8	10	6			ONO
1992 11 22.41	M	6.4	AA	8.0	B		11	10	6			HIR01
1992 11 22.41	S	5.3	S	7.0	B		10	12	6	1.0		KAK01
1992 11 22.42	S	5.2	AA	4.2	B	3	7	8	6			YOS02
1992 11 22.43	B	5.2	AA	12.0	B		20	15	6	0.5		HAS07
1992 11 22.44	B	5.1	AA	20.3	T	6	43	4	8	1.3	35	NAG04
1992 11 22.45	M	6.5	AA	8.0	B		11	10	6			HIR01
1992 11 22.78	I	4.8	AA	0.0	E		1		8			PER01
1992 11 22.79	B	5.2	AA	3.4	B		9					PER01
1992 11 22.79	M	4.9	AA	3.4	B		9					PER01
1992 11 22.79	S	4.8	AA	3.4	B		9	& 6	6	1.5	40	PER01
1992 11 23.36	B	5.7	AA	12.0	B		20	10	6			HIS
1992 11 23.37	M	5.5	AA	10	L	6	24	5	6			YAM01
1992 11 23.37	S	5.2	AA	5.6	B		8	10	6			ONO
1992 11 23.37	S	5.4	AA	7.0	B		10	5	7			MIY
1992 11 23.38	B	5.0	AA	12.0	B		20	15	6	2.0		HAS07
1992 11 23.38	M	5.3	AA	12.0	B		20	6	7	0.83		MIT
1992 11 23.39	M	5.2	AA	8.0	B		11	6	7			MIT
1992 11 23.40	S	5.1	S	8.0	B		11	9	7	0.67	30	MOM
1992 11 23.41	S	5.2	AA	4.2	B	3	7	8	6	1.0	45	YOS02
1992 11 24.40	B	5.0	AA	10.0	B		20	10	6	0.5		OKA03
1992 11 24.40	M	6.0	AA	8.0	B		11	8	6			HIR01
1992 11 24.44		5.0	S	20.3	L	8	38	14	8			BOE
1992 11 24.44	M	5.1	AA	20	L	6	38	9	7	0.25	50	KAM03
1992 11 25.37	S	5.4	AA	7.0	B		10	5	6			MIY
1992 11 25.38	M	5.7	AA	10	L	6	24	5	6			YAM01
1992 11 25.39	S	5.5	S	7.0	B		14	6	6	0.75		KAN04
1992 11 25.40	E	5.3	AC	6.5	R		36	5	6			WAS
1992 11 25.41	S	5.1	AA	5.6	B		8	10	6			ONO
1992 11 25.42	S	5.1	S	8.0	B		11	11	6/	1.5	40	MOM
1992 11 25.43	B	5.2	AA	12.0	B		20	12	7			HAS07
1992 11 25.44		5.0	S	20.3	L	8	38	14				BOE
1992 11 25.44	M	5.2	AA	20	L	6	38	10	7	0.67	50	KAM03
1992 11 26.37	B	5.4	AA	5.0	B		7			0.5		HAY01
1992 11 26.39	E	5.3	AC	6.5	R		36	6	7			WAS
1992 11 26.41	B	5.3	AA	5.0	B		7	5	7	1.0	55	TOM
1992 11 26.42	B	5.2	AA	12.0	B		20	18	7	2.0		HAS07
1992 11 27.37	M	5.2	AA	12.0	B		20	6	7	2.0		MIT
1992 11 27.37	M	5.5	AA	10	L	6	24	4.7	7			YAM01
1992 11 27.38	M	5.1	AA	8.0	B		11	6	7	2.5		MIT
1992 11 27.40	I	5.7	AA	8.0	B		20	6	6/			YOS03
1992 11 27.41	B	5.0	AA	12.0	B		20	15	7	2.5		HAS07
1992 11 27.75	B	5.3	S	8.0	B		10	15				HOR02

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 11 27.80	B	4.7	AA	3.4	B		9					PER01
1992 11 27.80	I	4.6	AA	0.0	E		1					PER01
1992 11 27.80	M	4.7	AA	3.4	B		9					PER01
1992 11 27.80	S	5.1	AA	3.4	B		9	& 7	5/	&0.8	35	PER01
1992 11 28.38	E	5.2	AC	8.0	B		11	6	7			WAS
1992 11 29.36	S	5.5	S	7.0	B		14	6	5	1.0		KAN04
1992 11 29.37	B	5.0	AA	12.0	B		20	18	7	2.0		HAS07
1992 11 29.37	M	5.1	AA	8.0	B		11	4	7			MIT
1992 11 29.37	S	5.1	AA	8.0	B		11	7	5	1.5		AKI
1992 11 29.37	S	5.4	AA	5.6	B		8	8	6			ONO
1992 11 29.38	M	5.2	AA	12.0	B		20	4	7	1.0		MIT
1992 11 29.38	S	4.8	S	8.0	B		11	9	7	1.5	40	MOM
1992 11 29.38	S	5.5	AA	7.0	B		10	5	6			MIY
1992 11 29.40	B	5.2	AA	10.0	B		20	10	6			OKA03
1992 11 29.40	M	4.9	S	20	L	6	38	8	8	0.42	50	KAM03
1992 11 29.41	E	5.0	AC	8.0	B		11	7	7			WAS
1992 11 29.42	M	5.2	AA	3.5	B		7	12				TSU02
1992 11 29.79	I	5.0	AA	0.0	E		1					PER01
1992 11 29.80	B	5.1	AA	3.4	B		9					PER01
1992 11 29.80	M	5.1	AA	3.4	B		9					PER01
1992 11 29.80	S	4.7:	AA	3.4	B		9	> 6	6	&1	40	PER01
1992 11 30.40	B	5.3	AA	5.0	B		7	5	7	1.0	55	TOM
1992 11 30.41	M	5.6	AA	8.0	B		11	5	6			HIR01
1992 11 30.44		4.9	S	20.3	L	8	38			1.5		BOE
1992 12 01.44		4.9	S	20.3	L	8	38	13		>1.5		BOE
1992 12 02.37	B	5.8	AA	8.0	B		20	6	6			YOS03
1992 12 02.39	B	4.9	AA	12.0	B		20	15	7	2.0		HAS07
1992 12 03.39	M	5.4	AA	8.0	B		11	4	6			HIR01
1992 12 04.36	B	5.0	AA	5.0	B		7			0.5		HAY01
1992 12 04.36	S	5.3	AA	7.0	B		10	5	7			MIY
1992 12 04.36	S	5.6	AA	8.0	B		20	6	6/			YOS03
1992 12 04.37	S	6.0	AA	5.6	B		8	8	6	0.33		ONO
1992 12 04.38	M	5.1	AA	8.0	B		11	4	7/	1.2	50	MIT
1992 12 04.38	M	5.2	AA	8.0	B		11	5	5			HIR01
1992 12 04.41	S	5.2	AA	7.0	B		10	15	6	>0.5		KAK01
1992 12 05.37	B	4.9	AA	12.0	B		20	12	7	1.0		HAS07
1992 12 05.37	M	5.1	AA	8.0	B		11	4	7/			MIT
1992 12 05.79	a B	4.7	AA	3.4	B		9					PER01
1992 12 05.79	a M	4.8	AA	3.4	B		9	& 5	6	&2	50	PER01
1992 12 06.37	B	5.2	AA	12.0	B		20	8	7	0.5		HAS07
1992 12 07.78	a B	5.1	AA	3.4	B		9					PER01
1992 12 07.78	a M	4.8	AA	3.4	B		9					PER01
1992 12 07.78	a S	4.8	AA	3.4	B		9	& 6	7			PER01
1992 12 08.38	B	5.0	AA	12.0	B		20	8	7	0.5		HAS07
1992 12 08.38	B	5.5	AA	5.0	B		7		7			TOM
1992 12 08.38	S	5.3	AA	7.0	B		10	4	6			MIY
1992 12 08.78	a B	5.0	AA	3.4	B		9					PER01
1992 12 08.78	a M	4.8	AA	3.4	B		9	> 4	6/			PER01
1992 12 10.36	S	6.2	AA	5.6	B		8	8	6			ONO
1992 12 10.78	a B	5.1	AA	3.4	B		9					PER01
1992 12 10.78	a M	5.0	AA	3.4	B		9					PER01
1992 12 10.78	a S	4.9	AA	3.4	B		9	& 5	7			PER01
1992 12 11.35	S	5.5	AA	7.0	B		10	3	6			MIY
1992 12 11.36	B	5.2	AA	5.0	B		7			1.0		HAY01
1992 12 11.40	M	5.1	AA	8.0	B		11	6	6			HIR01
1992 12 11.40	S	5.0	AA	7.0	B		10	15	7	>1.0		KAK01
1992 12 11.78	a B	4.9	AA	3.4	B		9					PER01
1992 12 11.78	a I	4.9	AA	0.0	E		1					PER01
1992 12 11.78	a M	4.9	AA	3.4	B		9	& 5	5	&3	50	PER01

Periodic Comet Swift-Tuttle (1992t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 12 12.35	B	5.1	AA	12.0	B		20	7	7	2.0		HAS07
1992 12 12.35	S	5.5	AA	7.0	B		10	3	6			MIY
1992 12 12.37	S	4.9	S	8.0	B		11	8	7	2	50	MOM
1992 12 12.38	M	4.9	S	20	L	6	38	8	7	0.25		KAM03
1992 12 12.38	M	5.5	AA	8.0	B		11					MIT
1992 12 12.75	B	5.1	SC	8.0	B		20					CHU03
1992 12 12.76	B	5.1	SC	3.0	B		8					CHU03
1992 12 12.78	a B	5.0	AA	3.4	B		9					PER01
1992 12 12.78	a I	5.0	AA	0.0	E		1					PER01
1992 12 12.78	a M	5.0	AA	3.4	B		9	& 6	6	&3	50	PER01
1992 12 13.36	S	5.1	S	7.0	B		14	5	5	0.75		KAN04
1992 12 13.37	B	5.3	AA	5.0	B		7			0.5		HAY01
1992 12 13.37	S	5.7	AA	15	L	5	38	7	6	0.33		ONO
1992 12 13.78	a B	5.1	AA	3.4	B		9					PER01
1992 12 13.78	a I	5.0	AA	0.0	E		1					PER01
1992 12 13.78	a M	5.1	AA	3.4	B		9	& 6	5	>2	50	PER01
1992 12 14.38	B	5.1	AA	5.0	B		7		7	0.5		HAS07
1992 12 14.38	S	5.0	S	10.0	R		28	8	7	>1.0		KAK01
1992 12 14.39	M	5.0	AA	3.5	B		7	6	6			TSU02
1992 12 15.36	B	5.2	S	5.0	B		7		6	1.0		HAS07
1992 12 15.36	S	5.4	S	7.0	B		10	3	5			MIY
1992 12 15.37	S	4.9	S	10.0	R		28	8	7	2.0		KAK01
1992 12 15.37	S	5.0	S	8.0	B		11	8	7	1	50	MOM
1992 12 15.40	M	5.2	AA	8.0	B		11	4	7	1.5		MIT
1992 12 16.38	E	5.3	AC	8.0	B		11	6				WAS
1992 12 17.37	E	5.3	AC	8.0	B		11	6				WAS
1992 12 18.36	B	5.0	S	5.0	B		7		7			HAS07
1992 12 18.36	S	5.5	S	7.0	B		10	3	5			MIY
1992 12 18.38	E	5.4	AC	8.0	B		11	6				WAS
1992 12 18.41	S	5.1	AA	4.2	B	3	7	5	6/	<1	70	YOS02
1992 12 19.36	B	5.0	S	12.0	B		20	6	7	1.0		HAS07
1992 12 19.36	B	5.7	AA	12	L		40	8	5			HAY01
1992 12 19.36	M	5.2	AA	8.0	B		11	4	7/	1.0		MIT
1992 12 19.36	S	5.5	AA	25	L	6	40	5	5			AKI
1992 12 19.38	M	5.3	S	3.5	B		7	7	7			TSU02
1992 12 19.39	S	5.1	AA	4.2	B	3	7	4	7	0.67	65	YOS02
1992 12 20.05	M	5.0	AA	4.0	B		8	5	5	1	45	KEE
1992 12 22.04	! M	5.5	SP	4.0	B		8	6	3	2	50	KEE
1992 12 23.04	! M	5.4	SP	4.0	B		8	6	3	1	50	KEE
1992 12 23.36	B	5.3	AA	8.0	B		11	5	7			MIT
1992 12 23.37	B	5.3	AA	12.0	B		20	5	5			HAS07
1992 12 24.04	! M	5.4	SP	4.0	B		8	6	3			KEE
1992 12 24.37	E	5.8	AC	8.0	B		11	5				WAS
1992 12 24.46		5.3	S	20.3	L	8	38			>0.5		BOE
1992 12 25.04	! M	5.5	SP	4.0	B		8					KEE
1992 12 25.36	B	5.4	AA	12.0	B		20	5	5			HAS07
1992 12 25.38	S	5.6	AA	20.3	T	6	43		5	1.1		NAG04
1992 12 26.36	M	5.5	AA	12.0	B		20	4	7	0.5		MIT
1993 04 01.79	S	11.1	SM	20.3	L		56	2	0			CAM03

Periodic Comet Boethin (1986 I)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 01 03.75	S	8.5	AA	8.0	B		20	6	3			SHA02
1986 01 06.76	S	8.5	AA	20	R	14	40	3.7	3			SHA02
1986 01 06.77	S	8.3	AA	8.0	B		20	1.1	3			SHA02
1986 01 10.75	S	9.3	AA	8.0	B		20	6	4			SHA02
1986 01 24.80	S	9.0	AA	20	R	14	40	3.0	3			SHA02

Periodic Comet Schwassmann-Wachmann 1 (1989 XV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 03 21.15		S[13.0	NP	25.6	L	4	156					MOR
1993 04 10.16		S[13.0	NP	25.6	L	4	111					MOR
1993 04 17.17		S 12.7	NP	25.6	L	4	111		2			MOR
1993 08 22.11	!	V[14.0	YF	20.0	T	2						MIK

Periodic Comet Crommelin (1984 IV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 01 20.75		S[10.5	VB	33	L	4	45					SHA02
1984 01 29.77		S 10.9	VB	33	L	4	45	1.2	4			SHA02
1984 02 03.77		S 10.6	VB	33	L	4	45	2.8	5			SHA02
1984 02 12.80		S 10.4	VB	33	L	4	45	2.7	3			SHA02
1984 02 13.77		S 9.7	VB	33	L	4	45	2.3	4			SHA02
1984 03 07.81		S 9.4	AA	33	L	4	45	2.6	4/			SHA02

Periodic Comet Neujmin 3 (1993j)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 21.21		c 21.5:	FA	91.4	L	5			9			SCO01
1993 07 24.20		c 22.3	FA	91.4	L	5		0.23				SCO01
1993 07 24.22		C 20.9	FA	91.4	L	5						SCO01
1993 07 25.18		C 20.9	FA	91.4	L	5						SCO01
1993 08 16.15		C 20.3	FA	91.4	L	5						SCO01
1993 08 16.16		c 23.0	FA	91.4	L	5		0.15		<0.01	90	SCO01

Periodic Comet Väisälä 1 (1992u)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 03 13.31		S 12.5	NP	25.6	L	4	156	0.8	3/			MOR
1993 03 21.27		S[13.0	NP	25.6	L	4	156					MOR
1993 04 17.28		S 13.2	NP	25.6	L	4	156	1.4	2			MOR
1993 05 16.86		C 14.9	HS	50	L	6		0.35		0.04	119	CAV
1993 05 23.55		C 14.1	HS	20.3	T	6						NAK07
1993 05 23.55		C 14.6	HS	20.3	T	6						NAK07
1993 05 23.55		C 14.8	HS	20.3	T	6						NAK07
1993 05 23.86		C 14.9	HS	50	L	6						CAV
1993 05 25.56		C 14.9	HS	20.3	T	6						NAK07
1993 05 25.58		C 15.1	HS	20.3	T	6						NAK07
1993 06 04.50		C 14.5	HS	20.3	T	6						NAK07
1993 06 04.50		C 14.6	HS	20.3	T	6						NAK07
1993 06 13.26		S[14.0	NP	50.8	L	4	275					MOR
1993 07 22.17		C 16.5	FA	91.4	L	5		0.52		&0.03	113	SCO01
1993 07 22.17		c 21.5	FA	91.4	L	5						SCO01
1993 07 24.18		C 16.3	FA	91.4	L	5		0.35		&0.03	113	SCO01
1993 07 24.18		c 21.3	FA	91.4	L	5						SCO01

Periodic Comet Stephan-Oterma (1980 X)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 10 30.02		S 10.4	S	20.0	R	14	40	3	4			SHA02
1980 10 31.07		S 10.6	S	20	R	14	40	2	4			SHA02
1980 11 30.86		S 9.3	S	20.0	R	14	95	2	7			SHA02
1980 12 06.89		S 8.8	S	32.0	R	18	95	1.5	8	0.17	185	SHA02
1981 01 17.22		S 11.0	VB	20.0	R	14	40	2	3			SHA02
1981 02 04.81		S 13.6	VB	32.0	R	18	240	0.6	4			SHA02
1981 02 11.83		S[12.8	VB	32.0	R	18	240					SHA02

Periodic Comet Slaughter-Burnham (1992w)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 07 22.45		c 21.8	FA	91.4	L	5		0.27		0.03	258	SCO01
1993 07 22.46		C 16.6	FA	91.4	L	5						SCO01
1993 07 25.46		C 16.9	FA	91.4	L	5		0.28		0.03	259	SCO01
1993 07 25.46		c 20.4	FA	91.4	L	5						SCO01
1993 08 14.48		C 16.9	FA	91.4	L	5		0.30		0.05	260	SCO01
1993 08 14.48		c 19.8	FA	91.4	L	5						SCO01

Periodic Comet IRAS (1983 XIV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 09 04.97		S[12.8	VB	32	R	18	240					SHA02
1983 10 07.95		S[12.4	VB	33	L	4	45					SHA02
1983 10 11.86		S 12.9	VB	33	L	4	45	0.8	5			SHA02
1983 10 29.84		S[12.4	VB	32	R	18	240					SHA02

Periodic Comet Hartley-IRAS (1984 III)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 03 26.96		S 11.0:		20	R	14	40	2	2			SHA02
1984 05 19.04		S[11.5	VB	33	L	4	45					SHA02
1984 05 30.96		S[12.0	VB	33	L	4	45					SHA02

Periodic Comet Shoemaker 3 (1985 XVIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 01 20.16		S[12.2	VB	20	R	14	120					SHA02

Periodic Comet Shoemaker-Levy 9 (1993e)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 04 10.20		S 12.9	NP	25.6	L	4	111	1.7	2			MOR
1993 04 17.26		S 13.3	NP	25.6	L	4	156	1.8	1/			MOR
1993 04 21.31		S 13.2	AC	31.8	L	4	63	1.2	1	?		KEE
1993 04 23.92		S 13.5:	AC	20.3	T	10	167	0.4	2			GAR02
1993 05 16.93		S[13.0	AC	20.3	T	10	167	! 0.5				GAR02
1993 06 13.24		S 13.7	NP	50.8	L	4	120	0.9	2			MOR
1993 07 12.90		S[12.5	AC	20.3	T	10	167	! 0.5				GAR02
1993 07 17.20	a	S 14.0	NP	50.8	L	4	169	1.2	2			MOR

Periodic Comet Helin-Lawrence (19931)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1993 06 27.00		C 16.7	HS	50	L	6						CAV
1993 07 11.90		S[13.0	AC	20.3	T	10	167	! 0.5				GAR02
1993 07 12.93		S[13.0	AC	20.3	T	10	167	! 0.5				GAR02

****
****

Corrigendum. In the October 1992 issue, page 93, the title for Alan Hale's article should, of course, read "Periodic Comets for the Visual Observer in 1993"

The Brightness of P/Swift-Tuttle in 1992-1993

Daniel W. E. Green

P/Swift-Tuttle (1992t) was recovered in late September 1992 when it was already quite bright (about ninth magnitude). It was extremely well observed from then until it was lost in the glare of the sun in late December: including the data in this issue of the *ICQ*, we have published in the past year a total of 2268 magnitude estimates from 195 different observers, covering every UT date from September 27 to December 27. It is really unfortunate that the comet was not recovered at the beginning of 1992 (when pre-recovery observations were made at two European observatories), for an extension of the light curve. Furthermore, the comet has been so poorly observed after conjunction with the sun — both astrometrically and photometrically — that many people will wonder upon its next return in 2126 as to why the southern-hemisphere observers so neglected obtaining useful data of P/Swift-Tuttle in 1993. Post-conjunction magnitude observations were only made by visual observers from 1993 February 17 to April 1 (total of only 24 estimates); no astrometric observers have yet made total magnitude estimates in 1993.

The comet followed the same power-law formula quite closely during pre-perihelion both in 1862 (cf. Green 1992, *ICQ* **14**, 95) and in 1992: $m_1 = 4.5 + 5 \log \Delta + 15 \log r$, where m_1 is the total visual magnitude, and Δ and r are the comet's geocentric and heliocentric distances in AU, respectively. This formula even satisfies the pre-discovery observations from 1992 Jan. 3 and 7, where total photographic magnitudes were given as 17.5-18 (*MPC* 21160), so the above equation seems good for 4.5 AU $> r > q$. Perihelion occurred on 1992 Dec. 12.32 TT (cf. Marsden 1992, *MPC* 21235), so observations did occur for nearly 3 weeks post-perihelion prior to conjunction. Twelve post-conjunction observers made by three southern-hemisphere observers (Albert Jones, David Seargent, and Paul Camilleri) were chosen from the *ICQ* archive. The limited available data confirm my remarks one year ago (*ICQ* **14**, 95) that the post-perihelion brightness of P/Swift-Tuttle appears to be fairly symmetrical with its pre-perihelion light curve (with a possible tendency from an r^{-6} toward an r^{-8} fall-off in brightness); with so little data available, further remarks are not really possible. It is hoped that decent CCD estimates of m_1 will be made during the next year as the comet fades further.

The plot of magnitude data below was made from the above-mentioned post-conjunction data, combined with pre-conjunction data from nine observers published in the *ICQ* (whose *ICQ* codes are BOR, BUS01, COM, GRA04, GRE, KEE, MOR, TOM01, and WAT01). The pre-conjunction data were chosen carefully, based on observer experience and on observational coverage of P/Swift-Tuttle. Data were chosen such only one observation per night per observer was used; when an observer made more than one magnitude estimate per observing session, the tendency was to choose estimates made through instruments with smaller apertures (and when the comet was larger — before December — to choose Sidgwick-method estimates over Bobrovnikoff-method estimates). A total of 226 pre-conjunction observations were thus chosen for the plot below, making a total of 238 m_1 estimates from 1992 Sept. 27 to 1993 Apr. 1 UT.