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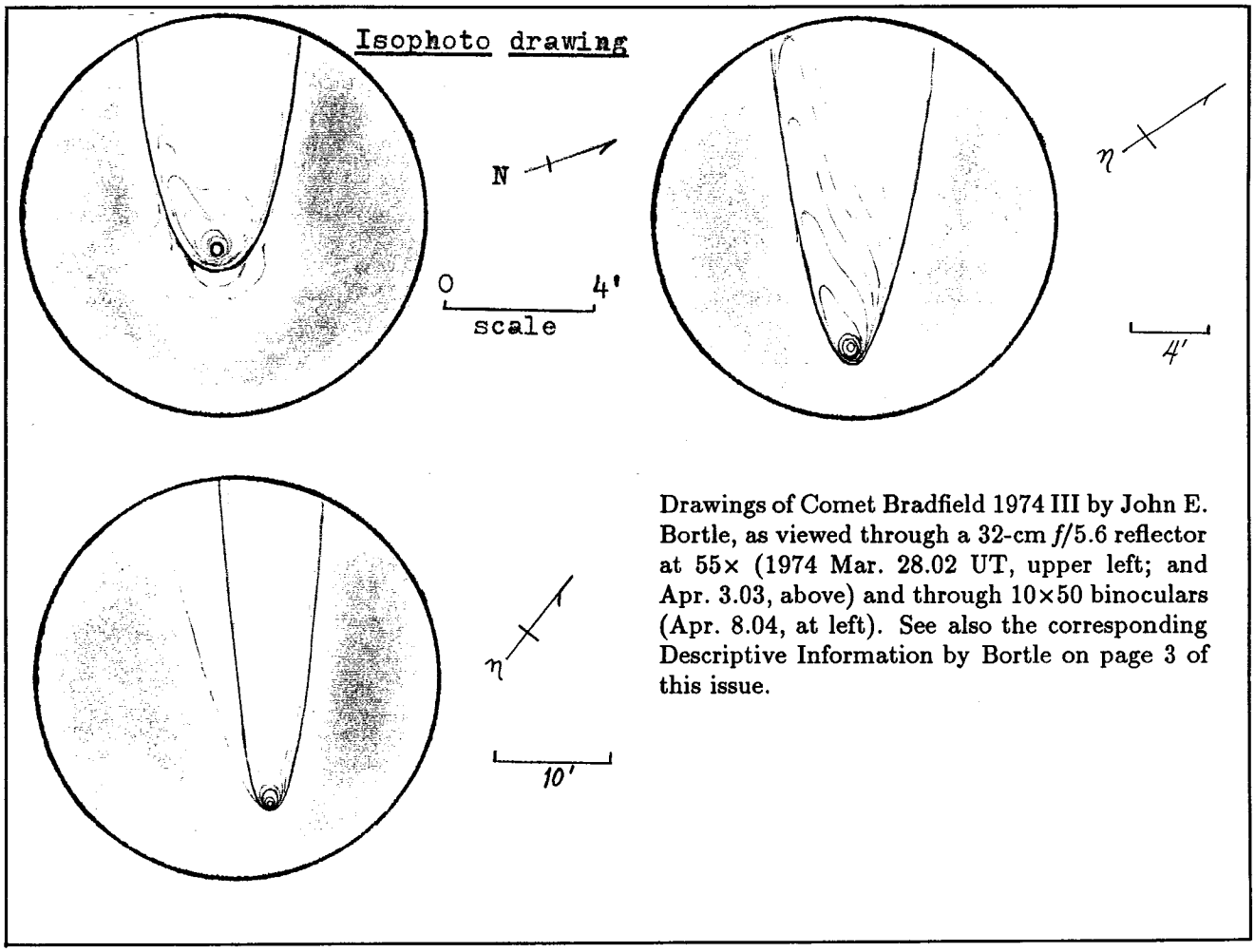

Drawings of Comet Bradfield 1974 III by John E. Bortle, as viewed through a 32-cm $f/5.6$ reflector at 55× (1974 Mar. 28.02 UT, upper left; and Apr. 3.03, above) and through 10×50 binoculars (Apr. 8.04, at left). See also the corresponding Descriptive Information by Bortle on page 3 of this issue.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY
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The International Comet Quarterly (*ICQ*) is a journal devoted to news and observation of comets, published by the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts. Regular issues are published 4 times per year (January, April, July, and October), with an annual *Comet Handbook* of ephemerides published normally in the first half of the year as a special fifth issue. An index to each volume normally is published in every other 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$24.00 per year (price includes the annual *Comet Handbook*; the price without the *Handbook* is US$16.00 per year). Subscribers who do not wish to be billed may subscribe at the special rate of US$20.00 per year (rate is $12.00 without *Handbook*). [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 $10.00 ($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.

Manuscripts will be reviewed for possible publication (if possible, send via computer networks; or, send typed, double-spaced copy to the Editor at the Cambridge address above); authors should first obtain a copy of "Information and Guidelines for Authors" from the Editor. 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 manuscripts and observational data in machine-readable form are encouraged to do so [especially through e-mail via the computer networks *BITNET* (GREEN@CFA) or *SPAN* (CFAPS2::GREEN), or via floppy disks that can be read on an IBM PC], and should contact the Editor for further information.

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— CORRIGENDA —

• In the October 1991 issue, p. 148, third paragraph, last line, change the last sentence to read "There are 26,700 magnitude estimates of long-period comets and 17,432 of short-period comets."

• In the January 1991 issue, p. 6, Comet Levy 1990c, the photographs attributed to Robert Price [PRI] on Sept. 7.42, 8.44, 10.50, 15.54, and 16.50 were actually taken by Paul Camilleri [CAM03].

Φ Φ Φ

CATALOGUE OF COMETARY ORBITS

The seventh edition of the *Catalogue of Cometary Orbits*, compiled by Brian G. Marsden, has been completed. This new 99-page edition contains orbits for 1353 cometary apparitions up through the end of 1991, and the angular elements are given for equinox J2000.0. (The previous sixth edition, published in 1989, contained B1950.0 elements.) The *Catalogue* contains orbitsl elements with references, comet names (and also preliminary and permanent designations of comets) as recognized by the International Astronomical Union, date spans that comets were observed, and various statistical tables.

The new *Catalogue* can be purchased for $20.00; check should be made payable to 'Minor Planet Center' and sent to: Mail Stop 18; Smithsonian Astrophysical Observatory; 60 Garden St.; Cambridge, MA 02138; U.S.A.

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This index follows the style used in the previous index for Volumes 10-11 (see *ICQ* April 1990 issue, p. I-1). Indices are now generally published every other year in the January issue. References listed below indicate page number. For example, (12:113) indicates page 113 of Volume 12, which was in the October 1990 issue (ascertained from the listing at the top of this page). Note that a single page reference to a specific comet sometimes refers to several different locations on one page. —D.W.E.G.

LIST OF ARTICLES, COLUMNS, NOTES, ETC., BY TITLE:

TABULATED OBSERVATIONS, NEWS, ETC., OF INDIVIDUAL COMETS

Long-period comets are listed first (alphabetically), short-period objects are listed afterwards. The contents of the tables of provisional and Roman-numeral designations (**12**:2, **12**:106, **13**:64, **13**:142, **13**:184) *are not included below, neither are the contents of Table I of Bortle* (**13**:89).

TABULATION OF COMET OBSERVATIONS

In this issue we include most of the observations of comet Bradfield 1974 III (1974b) from the files of the Comets Section of the Association of Lunar and Planetary Observers (A.L.P.O.), thus concluding a decade-long project of tabulating the data from this organization. A summary article concerning the *ICQ* tabulation of these A.L.P.O. comet data has just been published by D. W. E. Green, D. D. Meisel, and D. Milon in the *Journal of the A.L.P.O.* **35**, 145 (December 1991 issue).

New additions to the 'Magnitude Method Key': b = Bobrovnikoff method using RCA #4549 image intensifier (see method 'e', below); e = Beyer method using RCA #4549 image intensifier (cf. D. A. Sutherland 1974, *J.A.L.P.O.* **24**, 218); o = visual extrafocal comparison using RCA #4549 image intensifier (see method 'e', above); s = Sidgwick method using RCA #4549 image intensifier (see method 'e', above); w = 1P21 photometer + Kodak W64 filter [R. B. Minton writes (1974) that "this surface-filter combination closely matches the spectral response of the dark-adapted eye"].

Descriptive Information (to complement the Tabulated Data):

◇ *Comet Bradfield 1974 III (all observations of this comet in this issue are from the files of the A.L.P.O. Comets Section)* ⟹ 1974 Mar. 15.00: "an apparently stellar nucleus at the coma's center estimated as mag 5.8:" [BOR]. Mar. 19.00: "narrow, faint, straight tail w/ width no more than perhaps one-half of the coma's dia."; coma appears "like a slightly diffuse star" [BOR]. Mar. 20.38: comet alt. ~ 6°; w/ 30-cm L (132×), "bright, planetary" nuclear disk ~ 0′.2 in dia., tail 4′ long and 2′ wide in p.a. 110°, "consisting of a series of faint streaks, barely visible"; at 66×, the main tail was 15′ long and 4′ wide in p.a. 90°, and was "generally about same brightness as coma, but the sharp edges looked brighter than the central part" [THO]. Mar. 21.01: "tail is straight and evenly illuminated, more sharply defined on its N side; it is rather narrow but widens slightly as it advances; a stellar nucleus of mag 6.1 is centrally located in coma; comet's overall appearance rather similar to that of comet Heck-Sause 1973a, though the latter was much fainter" [BOR]. Mar. 22.01: "tail is long, narrow, and straight, widening slightly as it advances"; in 15×80 B, apparently stellar nucleus, m_2 = 6.3 (!AT) [BOR]. Mar. 23.01: in 32-cm *f*/5.6 L (55×, 88×, 146×), coma dia. 1′.4, stellar (or very nearly stellar) nucleus of m_2 = 8.2 (ref: S), DC = 8, "rather evenly illuminated tail is more sharply defined on its N side and is slightly convex in shape (S edge slightly diffuse and appears to extend straight away from coma" — tail can be traced twice as far through a Wratten #82A filter than a #8 filter (slightly shorter yet through a #15G) — visual spectroscope shows 3 emission bands, one each in the blue, green, and yellow (relative intensities 1:6:3), all superimposed on a very strong continuum that is brightest in the red-yellow region — bands are strongest in the coma, while continuum seems strongest in tail; in 15×80 B, m_2 = 6.8 (ref: S), coma dia. 1′ [BOR]. Mar. 24.02: in 32-cm *f*/5.6 L (55×, 88×), DC = 7, coma dia. = 1′.9, "nucleus probably not quite stellar (seeing was quite poor); area of greatest cond. and the nucleus are offset sunward to a very obvious degree" [BOR]. Mar. 25.02: in 10×50 B, "for first degree or so behind the head, the N edge of the long, slender tail is more sharply defined than the S edge — tail easily traced out to 2°.5 in length"; comet visible to naked eye; in 32-cm *f*/5.6 L (55×, 88×), DC = 8, coma dia. 2′.0, nuclear region larger than previously and slightly diffuse — "clearly nonstellar but very intense" — area of greatest cond. is offset sunward [BOR]. Mar. 25.05: "width of tail increased from ~ 2′ at the head to ~ 6′-8′ some 2° from the head; tail had very sharp boundaries" [MOR]. Mar. 26.02: In 32-cm *f*/5.6 L (55×, 88×, 146×), nucleus completely stellar in appearance, coma dia. 1′.7, DC = 6?, coma and tail were equally well seen through Wratten W82A and W8 filters; in 15×80 B, m_2 = 7.9 (ref: S), coma dia. 1′.4; "spectroscope shows banded spectrum, w/ b-g-y bands having relative intensities 2:12:3 — bands probably more sharply defined on red sides, continuum remains strong and seems to start in blue-green region of the spectrum, reaching maximum intensity in the yellow-red region — emission bands seem slightly weaker than before but continuum is unchanged — banded spectrum confined to coma, strong continuum visible in tail region [BOR]. Mar. 26.05: the main (2°) tail was white and straight; the second (30′) tail was faint and poorly defined [MOR]. Mar. 27.06: "the length of the tail was no doubt decreased by the moon, which was ~ 7°-8° away" [MOR]. Mar. 28.02: in 15×80 B, m_2 = 7.9 (ref: S), coma dia. = 1′.9; in 32-cm *f*/5.6 L (55×, 88×), DC = 6, brilliant stellar nucleus of m_2 ~ 9.5 located near the leading edge of the coma, whose outline is parabolic, coma dia. = 1′.9; "beyond sunward edge of the primary envelope is a faint, circular glow centered on the nucleus; a poorly defined, broad ray (slightly brighter than the general background of the tail) is noted near the tail's S edge; tail seems evenly illuminated across its width" [BOR]. Mar. 29.03: "tail is long and slender, apparently straight over its entire length — in 10×50 B, N edge of tail is the more sharply defined for the first degree; in 32-cm L, DC = 6, coma dia. = 1′.8; "coma is essentially parabolic in outline; a very faint, circular, diffuse cloud seems to extend sunward and is centered on the nucleus (total diameter perhaps several arcmin); a slight brightening is noted in the coma where the ray was seen last night; nucleus is sharp and stellar" [BOR].

Apr. 1.04: in 20.3-cm L, "tail quite wide just behind coma (6′-8′) but then thins out to ~ 3′ or so at end"; there was a bright, disklike nucleus ~ 1′-2′ across [GRE]. Apr. 3.03: "tail is straight and quite broad (as compared w/ previous obs.), being ~ 30′ wide at its terminus — overall, tail is rather faint"; in 32-cm *f*/5.6 L (55×, 88×), S third of tail is brighter than the rest of tail, coma dia. 1′.9; in 15×80 B, "there is a stellar nucleus of perhaps mag 8.5 at the coma's center", coma dia. 3′.1 [BOR]. Apr. 3.04: in 20.3-cm *f*/6 L (43×), coma dia. ~ 5′, with a disklike nuclear region ~ 1′-2′ across [GRE]. Apr. 7.06: in 20.3-cm *f*/6 L (67×), 55′ tail, "coma was more diffuse than previously" (dia. 4′-5′), with nuclear disk [GRE]. Apr. 8.04: brighter part of tail has a rather clear N edge (p.a. 35°) and a more diffuse S edge (p.a. 45°); "the coma is strongly condensed w/ a rather faint, probably-not-quite-stellar nucleus — both the area of greatest

(Continued on next page...)

(Continued from previous page) cond. and the nucleus are slightly offset sunward of the probable center of the coma; comet is faintly visible to naked eye as a 5th-mag star [BOR]. Apr. 9.07: width of the fan-shaped tail at 30′ from the coma was 8′ [MOR]. Apr. 11.05: tail spans p.a. 25°-77° — in binoculars the N edge is sharper and slightly brighter than the rest, apparently moving straight away from the coma; in 32-cm *f*/5.6 L (55×, 88×, 146×), DC = 6, coma dia. = 2′.3-3′.0, N edge region of tail is brightest through a Wratten W82A filter and central region is brightest w/ a W8 filter; coma is strongly condensed w/ a very small, non-stellar nucleus centrally located; a short, very narrow ray points toward the bright N portion of the tail and seems to originate almost exactly at the nucleus" [BOR]. Apr. 11.06: "brightest part of tail stretched out ~ 20′ in length, but w/ averted vision the tail appeared to be close to 54′ long; nucleus not as starlike as it was one week ago" [GRE]. Apr. 16.11: fan-shaped tail in p.a. 9°-55°; tail was 20′, 50′, and 45′ long in p.a. 9°, 32°, and 55°, respectively [MOR]. Apr. 17.04: "nucleus was more diffuse than on Apr. 11" [GRE]. Apr. 17.10: tail was fanned from p.a. 20° to 53°, "but at distances greater than 30′ from the coma, the tail appeared to be straight and narrow (p.a. 41°)"; in 15-cm *f*/4 L, DC = 7, coma dia. 2′.9, "coma appeared to be slightly elongated w/ an elongated central cond. in its center" [MOR]. Apr. 17.30: "tail is extremely faint and vague, boundaries almost non-existent (especially on the S side); in 32-cm *f*/5.6 L (55×, 88×), DC = 4-5, coma dia. 1′.8, "fairly broad tail, brighter at the center (p.a. 35°) than the edges, which are reasonably well defined near the beginnings of the tail", stellar or almost stellar nucleus of perhaps mag 11.5 is centrally located in the coma; in binoculars, tail spans p.a. 26°-65° [BOR]. Apr. 18.06: "tail's appearance is somewhat uncertain; the 32-cm L and 20×120 B show the tail as sharply curved to the S w/ only a small amount of material extending straight away to the NNE (this latter portion of the tail is rather sharply defined at its N edge) — w/ the latter instrument, tail spans p.a. 36°-83° and coma dia. 2′.6; 10×50 B suggest the tail's edges to be more or less straight instead of curved, but in these the tail is so faint and diffuse that no real conclusions can be drawn"; in 32-cm L, DC = 5, coma dia. 2′.5, coma has "a very small, fairly strong nuclear cond. at its center, and a faint, very diffuse halo only a little larger than the brighter part of the comet's head seems to surround the coma" [BOR]. Apr. 18.10: fan-shaped tail spanning p.a. 34°-53°, the length ranging from 30′ to 20′ at 34° and 53°; in 15-cm *f*/4 L, there was a central cond. at 24×, though "at 48× the central cond. disappeared and what appeared to be a stellar (?) nucleus was visible" [MOR].

Apr. 20.06: "faint tail possibly as long as 38′-42′; brightest part of tail (near coma) ~ 5′ long; *definite* length out to ~ 15′; tail was flared or fanned after ~ 8′-10′ from the coma, to maybe as much as 6′-8′ in width" [GRE]. Apr. 20.09: fan-shaped tail spanning p.a. 22°-45°; in 15-cm *f*/4 L, same description about nuclear region as on Apr. 18.10 [MOR]. Apr. 20.15: in 32-cm L, DC = 4, coma dia. = 2′.0-2′.3, "there is a stellar or almost stellar nucleus of perhaps mag 11.5-12 at the coma's center, tail is quite broad w/ its brightest portion located N of the tail's center"; in 20×120 B, there is a curving tail (about twice as long as in 10×50 B) spanning p.a. 20°-62° that is very faint and rather diffuse [BOR]. Apr. 21.07: in 20×120 B, the tail extends 50′ in p.a. 25°-57°, "the brightest portion (in cross section) of which is fairly near the N edge (p.a. perhaps 30°) — the S edge is extremely diffuse and the outer part of the tail simply fades into the Milky Way background"; in 32-cm L, DC = 4, coma dia. = 1′.3-1′.4, "small, poorly defined, central cond. surrounding a stellar or almost stellar nucleus of mag ~ 11.5, w/ a narrow tail spine extending from the central cond. into the brightest part of the tail for a short distance (tail is brighter and longer, particularly the N portion, through a Wratten W82A filter, compared to a W8)" [BOR]. Apr. 21.08: "brightest part of tail ~ 8′ long; nucleus like star" [GRE]. Apr. 23.09: fan-shaped tail spanning p.a. 27°-45°; in 15-cm *f*/4 L (24×), "coma was elongated and there was a hint of a stellar (?) nucleus" [MOR]. Apr. 24.10: "tail more diffuse", still visible in 8×50 finder; "nucleus is starlike" [GRE]. Apr. 25.10: "tail was still somewhat fan-shaped, but only subtended ~ 10° in p.a."; round coma had a central cond. of mag 9.5-10.0 [MOR]. Apr. 26.07: fairly broad tail subtends ~ 20° in p.a.; "there is a very small, intense cond. surrounding a faint stellar nucleus (this cond. is rather well defined and is, in turn, surrounded by a larger, more diffuse cond.), this intense cond. being strikingly apparent through the 20×120 B"; in 32-cm L (55×), DC = 5, coma dia. 1′.5, "very narrow jet extending several arcmin into the tail at a point ~ 1/3 of the way from the N to the S side of the tail — tail is obviously brighter at the center than at the edges"; in 20×120 B, coma dia. 2′.6 [BOR]. Apr. 27.12: tail *possibly* as long as 18′ or 20′; "nucleus still evident but faint"; "comet still faintly visible in 8×50 finder" [GRE]. Apr. 27.30: tail has rather low surface brightness and spans p.a. 32°-48°; at coma's center there is a small, sharp, intense cond. surrounding a faint stellar nucleus; in 32-cm *f*/5.6 L (55×), DC = 4, coma dia. 1′.8; in 20×120 B, coma dia. 2′.2 [BOR]. Apr. 28.06: w/ averted vision, tail *may* have gone to 15′ in length [GRE]. Apr. 28.34: in 10×50 B, tail is of low surface brightness and spans p.a. 35°-65°; in 32-cm L, DC = 4-5, a vague tail spine or jet is detected at 88×, and this along with the brightest part of the tail points toward p.a. 50°; "a very sharp, intense, small cond. occupies the coma's center and is surrounded by a fainter but rather condensed region" [BOR]. Apr. 30.31: in 32-cm *f*/5.6 L (55×, 88×), "there is a fairly bright, straight, not particularly broad 20′ tail or ray (brighter at the middle) in p.a. 40° that is superimposed on the N edge of a very broad, much fainter swath of light 35′ long spanning p.a. 35°-75° whose S edge curves slightly to the S"; DC = 5, coma dia. 1′.8, "the coma's outline is parabolic w/ an intense small cond. at its center, within which (slightly offset sunward) is an almost stellar nucleus of mag 12.5; comet in close proximity to an 8th-mag star, making mag estimates difficult" [BOR].

May 1.11: tail was straight, narrow; coma had a central cond. [MOR]. May 2.33: in 32-cm *f*/5.6 L (55×, 88×), "tail is quite broad w/ a brighter, quite distinct section in p.a. 38° forming the N edge (the part of the tail S of the brighter section is of low surface brightness) — tail can be traced 35′ in p.a. 34°-70°; coma circular and clearly distinguishable from beginnings of tail, and is very suddenly sharply condensed at the center w/ an almost stellar nucleus of mag 12 (ref: NP)", DC = 5, coma dia. = 2′.0 [BOR]. May 8.08: in 20×120 B, tail is extremely faint and quite diffuse, apparently fairly narrow and straight, visible out to perhaps 30′ in p.a. 46°, coma dia. 2′.1 — circular coma is strongly, sharply, and suddenly condensed at the center w/ a very faint, apparently stellar nucleus; condensed region is very small (perhaps 0′.3-0′.4 in dia.) [BOR]. *(Continued...)*

(Continued from previous page) May 9.09: tail is visible only in 32-cm *f*/5.6 L (55×, 88×) [correction to *ICQ* 44] — tail is fairly broad, extremely faint and diffuse, and apparently straight; also in 32-cm L, DC = 3 (neglecting nuclear cond.), coma dia. 2′.8, circular coma contains at its center "a very small, extremely intense nuclear cond. of mag 11 and diameter not > 0′.2-0′.3 that comes almost to a point at the center" [BOR]. May 11.16: hint of a short tail; coma was round w/ a hint of a nucleus [MOR]. May 12.08: "straight, fairly narrow tail, as wide as the coma at its beginnings and widening slightly as it advances"; in 32-cm *f*/5.6 L (55×), DC = 4, "at center of the diffuse coma is a small, sharply condensed region (mag 11-11.5, ref: NP) whose exact boundaries are not clearly marked, coming almost to a point" [BOR]. May 14.08: tail was 4′-8′ long and faint [GRE]. May 14.08: tail is more apparent in 20×120 B (in which it is perhaps as wide as the coma — 4′-5′ — curving slightly to the S) than in 32-cm *f*/5.6 L (44×, 55×, 88×) or in 10×50 B; small cond. appears to be offset sunward; in 32-cm L, DC = 5, coma dia. 2′-2′.5, stellar nucleus (mag 13-13.5, ref: NP) located at center of the rather strong cond. [BOR]. May 14.11: coma had a sharp central cond. [MOR]. May 15.08: extremely diffuse, faint, fairly narrow tail is not wider than the coma and is either straight or slightly curved to the S; in 32-cm *f*/5.6 L (44×, 55×, 110×), a strong cond. occupies a fairly large portion of the coma, at the center of which is an apparently stellar nucleus of mag 13.2 [BOR]. May 16.13: very faint straight tail had width ~ 3′-4′; diffuse, round coma had a sharp central cond. [MOR]. May 19.09: tail is very faint and fairly broad, curving from p.a. 190° at the head to 213° at its end; in 32-cm *f*/5.6 L (110×), slightly nonstellar nucleus of mag 13.5 (ref: NP), surrounded by a fairly condensed region, at coma's center [BOR]. May 20.10: in 20×120 B, tail is apparently straight, fairly narrow, and diffuse; 10×50 B show a large, very diffuse cloud ~ 9′ in dia. w/ a fairly strong cond. 5′.2 in dia. somewhat sunward of the center of the cloud; in 32-cm L (88×), at the coma's center there is a strongly elongated cond. (p.a. 0°-180°) containing an apparently stellar nucleus of mag 13.5 strongly offset toward p.a. 0° in the cond. [BOR]. May 21.11: tail is seen better in 20×120 B than in 32-cm L or 10×50 B; in 20×120 B, coma dia. 3′.3, diffuse, apparently straight tail spans p.a. 180°-213°; coma is diffuse but rather suddenly condensed at the center; in 32-cm L, area of greatest cond. is probably somewhat elongated in p.a. 0°-180°, w/ an almost stellar nucleus strongly offset toward p.a. 0°; during observations, comet in almost central transit of a mag 13 star [BOR]. May 21.18: round coma w/ a small central cond. [MOR]. May 23.17: very faint tail was quite broad; round coma had a small central cond. at 24×, though "at 48× the central cond. was no longer visible" [MOR]. May 24.09: in 32-cm L, tail is very faint, broad, and diffuse; at 88×, a stellar (or almost stellar) nucleus is centrally located — the area of greatest cond. is perhaps slightly elongated away from the nucleus toward p.a. 180° [BOR]. May 25.13: tail was very faint; round "coma consisted of a small central cond. surrounded by a diffuse haze" [MOR]. May 27.11: no tail apparent; diffuse coma is somewhat condensed toward the center, at which is located a stellar nucleus of mag 13 (ref: NP) [BOR].

June 12.15: very faint, broad, and apparently fan-shaped tail whose boundaries are very ill-defined; at center of circular coma is a nonstellar nucleus of mag 13-13.5 (ref: NP) [BOR]. June 13.10: comet was involved w/ several faint stars in p.a. 200°, so the tail's reality is somewhat questionable; coma is somewhat centrally condensed, w/ a faint, not-quite-stellar nucleus centrally located [BOR]. June 13.22: faint fan-shaped tail; round coma had some central cond. [MOR]. June 14.11: tail is extremely faint and difficult, apparently straight and w/ ill-defined boundaries, perhaps as wide as the coma; coma is circular w/ extremely vague and diffuse boundaries and has a possibly-stellar nucleus of mag 13.5 centrally located [BOR]. June 19.11: "apparently circular coma slight condensed toward the center w/ a strong suggestion of a stellar (or almost stellar), centrally-located nucleus of perhaps mag 13.5" [BOR]. July 9.10: coma is w/o central cond. or nucleus [BOR]. July 11.11: circular, very diffuse coma only slightly condensed toward the center; there is no central cond. or nucleus apparent [BOR].

◇ *Comet Liller 1988 V* ⟹ 1988 May 16.86: central cond. of mag 8.5 [OST].

◇ *Comet Okazaki-Levy-Rudenko 1989 XIX* ⟹ On 1989 Sept. 26.50, Oct. 3.59, and Oct. 4.53, the following respective tail lengths and were measured from ORWO ZU-21 plates taken w/ a 50-cm *f*/2.4 Maksutov camera at Camenskoye Plato Observatory, Alma-Ata, U.S.S.R.: 0°.1, 0°.09, and 0°.11 in p.a. 40°, 41°, and 43° [OST].

◇ *Comet Austin 1990 V* ⟹ 1990 Apr. 7.69: in 7×35 B, m_1 ~ 6 (MM: B), 30′ coma, DC = 7 [KUS]. Apr. 8.69: in 11-cm L (32×), m_1 = 6.0 (MM: B), 30′ coma, DC = 7 [KUS]. May 4.17 and 7.14: starlike nucleus seen [BRU]. May 5.16: m_2 = 10 [BRU].

◇ *Comet Levy 1990 XX* ⟹ 1990 Aug. 3, 10, 12, 13, 18, 27: starlike nucleus [KOS]. Aug. 18.76: in 15.3-cm R, m_2 = 8.9 (ref: PI) [MAM]. Aug. 19.86: nucleus has dia. 10″, m_2 = 8 [NAK09]. Aug. 19.92: also 0°.25 tail in p.a. 50° [REN]. Aug. 21.75: in 15.3-cm R, m_2 = 8.5 (ref: PI) [MAM]. Aug. 24.78: in 15.3-cm R, m_2 = 8.8 (ref: PI) [MAM]. Sept. 11.42: in 25-cm *f*/4.1 L (80×), coma dia. 8′, DC = 8 [GAR01]. Sept. 16.40: in 10×50 B, 3° tail [GAR01]. Oct. 13.41: in 25-cm *f*/4 L (80×), coma dia. 2′.5, DC = 8 [GAR01]. Nov. 25.72: in 25-cm *f*/4 L (80×), coma dia. 3′.0, DC = 6, 0°.3 tail [GAR01]. 1991 Jan. 10.64: 15-min exp. on 2415 film w/ 200-mm *f*/4 telephoto lens shows a very strongly condensed coma of mag 7, w/ main tail 0°.5 long in p.a. 315° and anti-tail 0°.75 long in p.a. 225° [CAM03]. Jan. 12.64: exp. taken as on Jan. 10.64, the comet being similar except main tail 0°.5 long in p.a. 280° and anti-tail 1°.0 long in p.a. 210° [CAM03]. Mar. 3.82 and 4.81: in 12.8-cm *f*/4 L (38×), m_1 [9.9 (MM: B, Ref: A; assuming coma dia. = 2′); obs. from Moscow, moderate city light [ZHU]. Mar. 5.76: in 20×110 B, m_1 = 9.0 (MM: B), coma dia. 6′, DC = 3 [SHU]. Mar. 7.81: in 20-cm *f*/15 R (100×), m_1 ~ 10 (ref: UM — galaxies M65, M66), coma dia. ~ 1′, DC = 2 [ZHU]. Mar. 11.77: in 20-cm *f*/15 R (214×), m_1 ~ 10 (ref: UM — galaxies M65, M66), coma dia. ~ 1′, DC = 2 [ZHU]. Mar. 11.83: coma extended towards SW [ZHU]. Mar. 17.45: in 20.3-cm *f*/7.2 L (56×), m_1 ~ 10, coma dia. 1′.5 [CAM03]. Mar. 18.57: photograph taken by V. Korneev and S. Zhuiko w/ Sternberg Astronomical Institute's wide-angle 23-cm *f*/10 astrograph at Majdanak Mountain Station shows mag ~ 10.5 (ref: A), coma dia. 1′, DC = 3 [ZHU].

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◇ *Comet Arai 1990 XXVI* ⟹ 1991 Jan. 10.60: 15-min exp. on 2415 film w/ 200-mm *f*/4 telephoto lens shows the comet as a starlike object of mag 11 at the center of a faint, vague coma [CAM03].

◇ *Comet Shoemaker-Levy 1991d* ⟹ 1991 Nov. 16.56: "possible stellar cond." [MOR]. Dec. 4.18: "highly condensed coma" [MIK]. Dec. 10.20: central cond. of mag ~ 13 [JAH]. Dec. 16.149: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows a dense coma of dia. ~ 5′ and a slightly curved tail 0°.3 long in p.a. ~ 290° [MIK]. Dec. 16.52: "stellar cond. surrounded by diffuse coma" [MOR]. Dec. 19.44: circular coma w/ vague, diffuse boundaries, well condensed near the center; small central knot ~ 0′.5 in size [BOR]. 1992 Jan. 1.44: at 110×, centermost area of coma contains a bright but ill-defined knot of material not clearly separated from its surroundings [BOR]. Jan. 7.207: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows a total coma dia. of ~ 6′; straight tail ~ 0°.24 long in p.a. 300°; broad, slightly curved fan (probably dust) ~ 0°.1 long spanning p.a. 300°-340° [MIK].

◇ *Comet Shoemaker-Levy 1991a*$_1$ ⟹ 1991 Dec. 30.763 and 31.720: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows starlike object of dia. 12″ and mag ~ 15; there is also a fan-shaped tail present on both frames, extending ~ 2′ in p.a. 90°; the comet was not seen on Dec. 30 in 36-cm T at 80× under very good seeing conditions [MIK].

◇ *Comet Zanotta-Brewington 1991g*$_1$ ⟹ 1991 Dec. 24.74 and 28.73: "dense, central cond." of dia. ~ 2′ [MIK]. Dec. 25.12: "no stellar central cond.; Lumicon Comet Filter enhanced comet" [MOR]. Dec. 27.76: "dense central cond." [MIK]. Dec. 27.766: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows total coma dia. ~ 4′.5, dense central cond. of dia. ~ 1′; faint tail ~ 0°.17 long in p.a. 35° [MIK]. Dec. 27.97: "Lumicon comet filter noticeably enhances comet" [BOR]. Dec. 27.97-1992 Jan. 5.97: "extinction correction (never more than 0.1 mag) was necessary between comparison-star fields and comet on several occasions" [BOR]. Dec. 30.753: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows total coma dia. 4′.6, straight narrow tail 0°.22 long in p.a. 40° [MIK]. Dec. 30.80: "comet quite diffuse, edges ill defined; faint star-like nucleus of mag ~ 10.5" [PER01]. Dec. 30.98: "Lumicon comet filter enhances comet (but also darkens the sky background dramatically)"; at 110×, the dense central region of the coma may contain a minute, stellar (or near-stellar) nucleus of mag ~ 13 [BOR]. Jan. 8.05, 9.06: in good seeing, the nucleus was very well defined; on the 8th, there was an interesting appulse to a 12th-mag star: the star was only ~ 20″ (almost due) south of the nucleus — star and the nucleus were almost identical in brightness (roughly mag 10.5-11.0) [GAS].

◇ *Periodic Comet Faye (1991n)* ⟹ 1991 Aug. 7.34: stellar central cond. of mag 14.3 ± 0.1; comet ~ 2′ from a star of mag 7.4 [MOD]. Aug. 8.29: stellar central cond. of mag 14.8 ± 0.2 [MOD]. Sept. 6.15 and Oct. 13.14: instrument is a 25-cm "Buchroeder Tri-Schiefspiegler" [NOW]. Sept. 7.19-1992 Jan. 5.99: AAVSO chart for R Ari was used for all of the magnitude estimates in this period [BOR]. Sept. 7.19: bright, obvious, stellar (or nearly stellar) nucleus of mag ~ 12.5-13; occasional vague suggestions of extensions toward the SW; coma strongly condensed [BOR]. Sept. 7.22: in 35.9-cm L (214×), stellar central cond. of mag 13.1 ± 0.1 [MOD]. Sept. 12.36: sharply condensed coma (shape uncertain), possibly fan-shaped opening to the SW; cond. offset NW in coma; obvious nucleus of mag 12.5; occasional suggestions of a narrow tail 2′-3′ long in p.a. 250° [BOR]. Sept. 12.97: fairly round coma w/ slight central cond. [ZHU]. Sept. 13.36: occasional suggestions that the coma (which seems noticeably smaller than yesterday) is elongated toward the SW; nucleus is also less obvious this morning [BOR]. Sept. 21.37: elongated, sharply condensed coma, possibly fan-shaped w/ the axis along p.a. 60°-240°; cond. offset toward p.a. 60°; at 110×, nucleus is not quite stellar (mag 12.5); very faint, narrow tail glimpsed, 2′ long in p.a. 240° [BOR]. Oct. 3.22: bright central cond. of dia. ~ 0′.5 [HER02]. Oct. 5.23 and 10.22: elongated coma [PRY]. Oct. 5.86: coma a little extended E-W (3′ × 5′) [ZHU]. Oct. 6.82: at 214×, stellar central cond. of $m_2 \simeq 13.0$: (ref: NN) [ZHU]. Oct. 8.14: coma suggested as being teardrop-shaped w/ narrow end toward p.a. 260°; possible faint outer halo to coma; coma sharply condensed at center w/ a nucleus of mag 12.5 (ref: AC) [BOR]. Oct. 8.99: distinct stellar central cond. was seen [ZHU]. Oct. 9.11: telescope shows highly condensed coma probably elongated along p.a. 60°-240°; cond. offset to p.a. 60°; not-quite-stellar nucleus of mag 12.5 (ref: AC); at 110×, nucleus is somewhat less than 0′.1 in dia. [BOR]. Oct. 10.11: very vague, diffuse coma boundaries, but center sharply condensed; possible tenuous outer halo to 2′.4; centrally-located nucleus is mag 12.3 (ref: AC); coma seems circular [BOR]. Oct. 13.33: spike tail [PRY]. Oct. 14.29: faint tail [HER02]. Oct. 19.43: bright central cond. gone (not sure if due to comet's low altitude [HER02]. Oct. 30.10: "cond. region occupies only 30% of coma's dia., the rest being very diffuse"; possible outer halo to 2′.6 [BOR]. Oct. 30.17: darker sky than on Oct. 19; bright central cond. of Oct. 3-16 is gone [HER02]. Nov. 6.05: coma suddenly, sharply condensed at center; very faint outer halo suspected; coma appears to be circular; at 110×, nucleus is mag 12.5 (ref: AC) and heavily involved w/ coma [BOR]. Nov. 6.05-1992 Jan. 5.99: minor extinction corrections (–0.1 mag) were applied to the observations in this time period to allow for the comet's lower altitude [BOR]. Nov. 9.84: "central cond. of mag ~ 11, (ref: AC, TT Psc chart), stellar nucleus" [JAH]. Nov. 14.83: central cond. of mag ~ 12, nucleus not at coma's center, but offset in p.a. 340° [JAH]. Nov. 15.20: very sharply condensed center surrounded by extensive diffuse region; beyond this, occasional suggestions of a tenuous outer halo to > 2′ [BOR]. Nov. 27.05: "cond. area of coma occupies 35% of total dia.; at 110×, the nucleus is estimated at mag 13.0 (ref: AC), appearing starlike" [BOR]. Dec. 3.95: "weak nucleus; coma edges ill defined" [PER01]. Dec. 11.900: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows coma dia. ~ 4′; broad, fan-like tail extending ~ 0°.15 between p.a. ~ 310° and 90° [MIK]. Dec. 25.01: at 110×, a nucleus of 13th mag is visible (ref: AC) [BOR]. Dec. 30.99: at 68×, "Lumicon comet filter just about extinguishes comet" [BOR]. Dec. 31.99: center of coma still sharply condensed [BOR].

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◇ *Periodic Comet Hartley 2 (1991t)* ⟹ 1991 July 9.92: approx. mag est. based on 'assumed' image of faint galaxy [KOR01]. July 9.93: approx. mag est. based on 'assumed' image of faint galaxy; coma slightly extended toward p.a. ~ 135° [ZHU]. July 10.88, 11.92, 12.88: mag estimates made by comparison w/ galaxies NGC 1058 and 772 (ref: UM — correction to *ICQ* **13**, 168) [ZHU]. July 17.756: a 60-min exp. on ORWO ZU-21 astroplate w/ 23-cm *f*/10 astrograph of Sternberg Astronomical Institute shows straight tail ~ 2′ long in p.a. ~ 10° [ZHU]. July 17.83, 18.84: coma weakly extended twoard p.a. ~ 135° [ZHU]. July 17.83: coma extended toward p.a. ~ 135° [KOR01]. Aug. 6.29: at 167×, stellar central cond. of mag ~ 13 [MOD]. Aug. 6.33: in 32-cm L (68×), coma condenses steadily from the edges to the center; at 110×, no nucleus visible [BOR]. Aug. 6.90: m_2 = 10.6 [KOR01]. Aug. 6.90, 7.94, 11.90: "type-II tail" [KOR01]. Aug. 7.39: in 40-cm *f*/7 L (100×), coma dia. 1′.9, DC = 5 [MOD]. Aug. 7.96: m_2 = 10.4 [KOR01]. Aug. 8.39: in 40-cm *f*/7 L (190×), DC = 5, stellar cond. of mag 13.5 ± 0.3 offset ~ 1′ in p.a. 80° ± 5° [MOD]. Aug. 9.82: in 15.2-cm *f*/5 L (47×), coma dia. 4′, DC = 5, more conspicuous using Swan Band filter [SEA]. Aug. 12.34: in 31.7-cm *f*/6 L (68×), circular coma of dia. 4′.9, DC = 5; no nucleus at 110× [BOR]. Aug. 12.94, 13.93, 13.93, 14.96, 14.98: "type-I tail" [KOR01]. Aug. 15.96: at 129×, stellar central cond. of $m_2 \simeq$ 12.5: [ZHU]. Aug. 16.94: nucleus extended ~ 1′.5 long [KOR01]. Aug. 16.98: at 129×, no separate central cond. was present [ZHU]. Aug. 17.92: m_2 = 10.8 [KOR01]. Aug. 19.36: in 35.9-cm L, stellar central cond. of mag 13.0 ± 0.3 [MOD]. Aug. 24.36: at 167×, stellar central cond. of mag 12.5 ± 0.2 [MOD]. Sept. 5.06: "bright background sky, outer coma invisible" [MEY]. Sept. 6.39: in 20-cm L (167×), stellar central cond. of mag 12.0 ± 0.2 [MOD]. Sept. 7.35: in 31.7-cm *f*/6 L (68×), coma dia. 2′.7, DC = 5; coma condenses more or less steadily from the edges to the center; no nucleus or separate central cond. at 110× [BOR]. Sept. 12.38: in 31.7-cm *f*/6 L (68×), coma dia. 2′.9, DC = 6; at 110×, a faint, non-stellar nucleus suspected [BOR]. Sept. 12.98: at 129×, separate central cond. of $m_2 \simeq$ 12.5: [ZHU]. Sept. 13.35: in 31.7-cm L (110×), non-quite-stellar nucleus of mag ~ 12.5, heavily involved w/ bright coma material; very vague, straight, narrow tail is just suspected, extending ~ 9′ in p.a. 280° [BOR]. Sept. 21.36: in 32-cm L, "well-condensed coma condenses steadily from the edges to the center of the coma; very weak outer halo suspected; no definite nucleus; occasionally there are suggestions of a very weak, vague tail (if real, it is straight and fairly narrow, but its length cannot be defined w/ any certainty)" [BOR]. Oct. 5.02: m_2 = 12-12.5 [OST]. Oct. 6.05: at 129×, no separate central cond. was present [ZHU]. Oct. 7.05, 8.08: at 90×, strong nuclear cond. of $m_2 \simeq$ 12.5 [OST]. Oct. 8.39: "bright, circular, well-condensed coma which condenses more or less steadily to the center" [BOR]. Oct. 9.39: in 31.7-cm *f*/5.6 L (68×), coma dia. 2′.8, DC = 5; there's a minute, non-stellar nucleus ~ 0′.1 in size at 110×, heavily involved in coma material; "magnitude difference from this morning to last is simply an effect of different comparison-star sequences" [BOR]. Oct. 12.51: streamers at p.a. 270° [SPR]. Oct. 13.52: fan-shaped tail spans p.a. 270°-280° [SPR]. Oct. 14.52: "wedge-shaped streamers" [SPR]. Oct. 20.39: very faint, tenuous, outer halo suspected surrounding coma to a total dia. of 5′.5 [BOR]. Dec. 4.16: "comet diffuse with central cond." [MIK]. Dec. 15.03: "diffuse with slight cond." [MIK].

◇ *Periodic Comet Levy (1991q)* ⟹ 1991 June 15.82: in 15.2-cm L (47×), "brighter using Swan-band filter; no distinct central cond." [SEA]. June 21.32: small, faint, circular, noticeably condensed coma; "much fainter than discovery reports" [BOR]. June 21.32-Sept. 13.38: "very minor extinction corrections were applied to a few of the magnitude determinations" [BOR]. June 21.34: at 164×, DC = 6; almost stellar cond. of mag 12.5 ± 0.2, not centered in coma; sunward-pointing fan in p.a. 80° ± 5° [MOD]. June 24.06: coma fan-shaped [HAV]. June 24.35: in 35.9-cm L (164×), "almost stellar cond. of mag 12.5 ± 0.1, not centered in coma; round coma, extends from cond. in p.a. 90° ± 5° (sunward-pointing fan)" [MOD]. June 30.94: "nucleus has an oval shape" [KOR01]. June 30.96: coma is a little extended toward p.a. ~ 170° [ZHU].

July 1.94: a 30-min exp. on ORWO ZU-21 astroplate w/ 23.0-cm *f*/10 astrograph of Sternberg Astronomical Institute shows a short fan tail spanning p.a. 0°-90° [ZHU]. July 1.96: possible straight tail ~ 7′ long in p.a. ~ 160° [ZHU]. July 5.91: "type-II tail ~ 5′ long in p.a. ~ 130° [KOR01]. July 6.35: in 35.9-cm *f*/7 L (214×), DC = 6; cond. almost centered in coma (offset ~ 0′.1 in p.a. ~ 270°) [MOD]. July 6.90: "comet has bluish color w/ oval-shaped nucleus" [KOR01]. July 6.90: asymmetrical bluish coma [SHU]. July 6.94: possible straight tail ~ 7′ long in p.a. ~ 160°; at 141×, inner coma is slightly offset towards p.a. ~ 150° from an oval-shaped central cond. [ZHU]. July 7.92: stellar cond. at center of asymmetrical bluish coma [SHU]. July 7.93: coma more condensed and central cond. more symmetrical than during previous obs. [ZHU]. July 8.93: in 22.9-cm L (141×), stellar central cond. of m_2 = 11.0; inner coma more symmetrical than during previous obs. [ZHU]. July 9.88: $m_2 \simeq$ 9.9: [SHU]. July 9.93: in 22.9-cm L, 32×, total coma fairly round; at 141×, inner coma slightly offset from stellar central cond. (m_2 = 11.5:) towards p.a. ~ 150° [ZHU]. July 10.31: "small, circular, dense, noticeably condensed coma w/ soft edges" [BOR]. July 10.36: in 35.9-cm *f*/7 L (164×), DC = 6; cond. centered in coma [MOD]. July 10.92: in 22.9-cm L (141×), no nucleus or separate central cond.; at 32×, both inner and outer coma fairly round; a 30-min exp. on ORWO ZU-21 astroplate w/ 23.0-cm *f*/10 astrograph of Sternberg Astronomical Institute shows a short fan tail spanning p.a. 10°-100° [ZHU]. July 11.34: in 35.9-cm L (214×), stellar central cond. of mag 11.2 ± 0.2 [MOD]. July 11.95: in 20.0-cm *f*/12.5 R (375×), coma dia. 2′, DC = 3, central cond. has dia. ~ 30″; no nucleus [ZHU]. July 12.36: at 167×, stellar central cond. of mag 11.7 ± 0.2 [MOD]. July 13.91: 60-min exp. on A-500V New Technology Astroplate (U.S.S.R.) w/ 23.0-cm *f*/10 astrograph of Sternberg Astronomical Institute shows an envelope ~ 2′.5 in dia. slightly offset from the nucleus toward p.a. ~ 45° [ZHU]. July 15.35: in 35.9-cm *f*/7 L (164×), cond. offset ~ 0′.3 in p.a. 275° ± 5°; at 214×, stellar cond. of mag 12.0 ± 0.2 [MOD]. July 15.90 and 16.92: at 141×, stellar central cond. of $m_2 \simeq$ 11.5: [ZHU]. July 16.32: in 31.7-cm *f*/6 L (55×), coma dia. 3′.0, DC = 6; at 68×, a bright, well condensed, circular coma w/ a diffuse outer halo of above dia.; no nucleus at 110× [BOR]. July 16.35: in 35.9-cm L, pale blue-white coma, tail subtends 5°-10°; at 214×, stellar cond. of mag 12.0 ± 0.2, offset 0′.2-0′.3 in p.a. 85° ± 5° [MOD]. July 17.07: 14-min exp. on hypered 2415 film w/ 300-mm *f*/4.5 lens shows 0°.2 tail in p.a. 270° [HAV]. July 17.92: a 30-min exp. on ORWO ZU-21 astroplate w/ 23.0-cm *f*/10 astrograph of Sternberg Astronomical Institute shows an envelope ~ 3′ in dia. around nucleus and a straight tail ~ 4′ long in p.a. ~ 180° [ZHU]. July 18.09: in 62-cm *f*/15 C (300×), coma parabolic, DC = 5-6 [REN]. July 18.92: type-I tail ~ 4′ long in p.a. ~ 180°, type-II tail ~ 3′ long in p.a. ~ 60° [KOR01]. July 18.93: "a 60-min exp. on ORWO ZU-21 astroplate w/ 23.0-cm *(Continued...)*

(Continued from previous page) $f/10$ astrograph of Sternberg Astronomical Institute shows an envelope $\sim 2'$ in dia. around nucleus" [ZHU]. July 18.95: in 20.0-cm $f/12.5$ R (375×), coma dia. 3′, DC = 4, stellar central cond. of $m_2 \simeq$ 11.5:; inner coma of dia. 65″; "planetary nebula"-shaped envelope $\sim 2'.5$ in dia. surrounds nucleus [ZHU]. July 24.94: at 70×, type-I tail $\sim 3'$ long in p.a. $\sim 100°$, type-II tail $\sim 6'$ long in p.a. $\sim 60°$ [KOR01]. July 25.36: "at 88×, stellar cond. of mag 12.1 ± 0.1 (offset 0'.2-0'.3 in p.a. 270° ± 10°?)" [MOD]. July 30.94, 31.95, Aug. 3.92: "type-II tail" [KOR01].

Aug. 1.94: type-II tail; extended nucleus $\sim 1'.5$ long [KOR01]. Aug. 5.97: coma slightly extended E-W, $5' \times 8'$ [ZHU]. Aug. 6.34: comet is clearly fainter than P/Hartley 2; dense circular coma [BOR]. Aug. 6.38: at 167×, stellar central cond. of mag 12.5 ± 0.2 [MOD]. Aug. 7.11: in 20.3-cm $f/10$ T (62.5×), $m_1 \sim 9.5$ (compared to P/Hartley 2), coma dia. 2′, DC = 4 [GAR02]. Aug. 7.96: at 70×, "type-II tail and extended nucleus $\sim 1'$ long" [KOR01]. Aug. 9.96: type-I tail in p.a. $\sim 115°$; type-II tail spans p.a. 115°-220°; some interference from zodiacal light [KOR01]. Aug. 11.96, 12.95, 13.95, 14.96: "type-I tail" [KOR01]. Aug. 12.36: coma is well condensed w/ suggestions of a tiny central knot of bright material [BOR]. Sept. 7.37: comet much fainter and more diffuse than previously; coma vague and diffuse w/ little evidence of condensing toward the center [BOR]. Sept. 13.38: viewed against the upper edge of the Zodiacal Light; no nucleus at 110× [BOR].

◇ *P/Machholz* ⟹ 1991 Aug. 6.08: "comet clearly seen at 78×; rather small circular coma w/ noticeable cond. toward the center; no nucleus evident, coma boundaries diffuse" [BOR]. Aug. 8.68: tail data are for type-I tail; also type-II tail in p.a. $\sim 130°$ [KOR01]. Aug. 12.07: comet not seen, although the galaxy NGC 4382 (mag 10.5) is easily seen; galaxy NGC 4293 (mag 11.7) nearby is not detectable [BOR].

◇ *Periodic Comet Mrkos (1991k)* ⟹ 1991 Mar. 23.67: 20-min exp. on 2415 film w/ 200-mm $f/4$ telephoto lens shows this as an asteroid-like object w/ no coma visible (m_{pg} 14) [CAM03].

◇ *P/Schwassmann-Wachmann 1* ⟹ 1991 Aug. 7.38: in 40-cm $f/7$ L (190×), DC = 4 [MOD]. Aug. 13.31: light haze; comet hard to distinguish from two nearby stars of mag ~ 13 [MOD]. Aug. 19.34: light haze; star of mag ~ 13.7 involved w/ comet [MOD]. Aug. 22.09: for a comet as large and diffuse as this, the limiting magnitude was ~ 13.2 [GAR02]. Dec. 5.85: "dense coma; stellar nucleus visible" [MIK]. Dec. 9.83: "diffuse with central cond." [MIK]. Dec. 9.866: 1-min exp. w/ 19-cm $f/4$ flat-field camera (+ 574×384 Wright CCD) shows stellar-like object with $\sim 5'$ delicate coma surrounding [MIK]. Dec. 11.853: 1-min exp. w/ 19-cm $f/4$ flat-field camera (+ 574×384 Wright CCD) shows stellar-like central cond. of dia. 40″ and round, delicate coma of dia. $\sim 6'$ [MIK]. Dec. 16.130: 1-min exp. w/ 19-cm $f/4$ flat-field camera (+ 574×384 Wright CCD) shows stellar central cond. of dia. 25″ and circular coma of dia. $\sim 2'$; looks much fainter than on Dec. 9 and 11 frames [MIK]. Dec. 27.794: 1-min exp. w/ 19-cm $f/4$ flat-field camera (+ 574×384 Wright CCD) shows an almost-starlike central cond. of dia. 50″ and a very faint coma of dia. $\sim 2'$ [MIK].

◇ *Periodic Comet Shoemaker-Levy 6 (1991b$_1$)* ⟹ 1991 Dec. 3.85: "diffuse object near the telescope limit" [MIK]. Dec. 28.77: "diffuse with noticeable cond." [MIK].

◇ *Periodic Comet Van Biesbroeck (1989h$_1$)* ⟹ 1991 July 9.28, 15.27, and 16.29: at 250×, stellar central cond. of mag 15.2 ± 0.2 [MOD]. July 17.33: at 250×, central cond. less obvious than on July 16 [MOD]. Aug. 7.13: "comet not detectable at low power; at 157×, a very faint, circular coma w/ extremely vague, diffuse boundaries — noticeably condensed toward center; at 241×, the coma appears rather more condensed and is seen to condense steadily from the edges to the center; no nucleus evident" [BOR]. Aug. 7.31: at 250×, almost stellar central cond. of mag 15.5 ± 0.2 [MOD]. Aug. 12.17: stellar central cond. of mag 14.2 ± 0.1 [MOD]. Sept. 7.11: star of mag 10-11 w/in 2′-3′ of comet's predicted position [MOD].

◇ *Periodic Comet Wild 2 (1990 XXVIII)* ⟹ 1991 July 10.20: "comet very close to two 14th-mag stars; observation somewhat uncertain" [MOD].

◇ *Periodic Comet Wirtanen (1991s)* ⟹ 1991 Sept. 7.36-21.38: "modest extinction corrections applied to magnitude where required for varying altitudes of comet and comparison-star fields" [BOR]. Sept. 7.36: small, circular, moderately condensed coma w/ diffuse boundaries; no nucleus or separate central cond. at 110× [BOR]. Sept. 12.38: at 110×, a tiny, essentially stellar nucleus (mag 13) is glimpsed at the coma's center [BOR]. Sept. 13.37: w/ Lumicon comet filter there is very slight image enhancement; at 110×, there was the suggestion of a minute, stellar nucleus [BOR]. Sept. 18.78: comet more conspicuous using Swan Band Filter [SEA]. Sept. 21.38: no nucleus or separate central cond. at 110× [BOR]. Nov. 16.54: "comet was involved with a field star" [MOR]. Dec. 4.20: "very difficult diffuse object at the telescope limit; detected with averted vision only" [MIK]. Dec. 10.21: "diffuse object near the telescope limit" [MIK].

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OBSERVATIONS OF COMETS

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 limiting magnitude, comet not seen.) "RF" = reference for magnitude estimates (see the April 1988 issue, page 34). "AP." = aperture in centimeters of the instrument used for the *(Continued...)*

(Continued from previous page) 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 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.)

A complete list of the Keys to abbrevations used in the *ICQ* is available from the Editor for $4.00 postpaid.

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Key to observers with observations published in this issue, with 2-digit numbers between Observer Code and Observer's Name indicating source [05 = Comets Section, A.L.P.O.; 16 = Yamaneko Group of Comet Observers (c/o Akimasa Nakamura, Aichi, Japan); etc.]. Those with asterisks (*) preceding the 5-character code are new additions to the Observer Key:

CODE	S	OBSERVER, LOCATION
*ABE01	16	Ikuo Abe, Japan
ADA	05	James E. Adams, Jr., NJ, U.S.A.
AKI	16	Isao Akita, Japan
AMO		Mauro Amoretti, Italy
AND04		Clara Andrade e Silva, Portugal
ARP	05	Pierre Arpin, Canada
BOR		John E. Bortle, NY, U.S.A.
CAM03	14	Paul Camilleri, Australia
CAV		Marco Cavagna, Italy
CHE03		Kazimir T. Cernis, Lithuania, U.S.S.R.
CON	05	Darrell Conger, WV, U.S.A.
COS	05	Daniel Costanzo, VA, U.S.A.
DEA		Vicente Ferreira de Assis Neto, Brazil
DEL	05	Kenneth J. Delano, MA, U.S.A.
DIL	05	William G. Dillon, VA, U.S.A.
*GAS		C. Martin Gaskell, OK, U.S.A.
GRE	05	Daniel W. E. Green, NC, U.S.A.
HAS02		Werner Hasubick, West Germany
*HAS07	16	Akie Hashimoto, Japan
HAY01	16	Hironori Hayashi, Japan
HER02		Carl Hergenrother, NJ, U.S.A.
*HUD01	05	La'szlo' Hudi, Hungary
ICH	16	Kazuhiko Ichikawa, Japan
ISH02	16	Akiyoshi Ishikawa, Japan
JAH		Jost Jahn, West Germany
JON	09	Albert F. Jones, New Zealand
KAN	16	Kiyotaka Kanai, Japan
KEE	05	Richard A. Keen, CO, U.S.A.
*KLA	05	Ga'bor Klausz, Hungary
KOB01	16	Juro Kobayashi, Japan
KON03	16	Eitoshi Konno, Japan
LEV		David Levy, AZ, U.S.A.
LUK	05	Rainer Lukas, West Germany
MAL	05	Paul Maley, TX, U.S.A.
MAL03	05	Anthony D. Mallama, OH, U.S.A.
MAR02		Jose Carvajal Martinez, Spain
*MAR10	05	Attila Marosi, Hungary
MCC01	05	Mark McConnell, NY, U.S.A.
MEY	28	M. Meyer, Germany
MEZ	05	Csaba Mezosi, Hungary
MIK		Herman Mikuz, Yugoslavia
MIL	05	Dennis Milon, MA, U.S.A.

CODE	S	OBSERVER, LOCATION
MIN	05	R. B. Minton, AZ, U.S.A.
MOE		Michael Moeller, West Germany
MOR		Charles S. Morris, U.S.A.
MUH	05	Wolfgang Muehle, West Germany
NAG04	16	Kazuro Nagashima, Japan
NAK01	16	Akimasa Nakamura, Japan
NAK05	16	Tetsuya Nakamura, Japan
NAK06	16	Yuuzi (Yuji) Nakamura, Japan
NII	16	Tsuneo Niijima, Japan
NOW	05	Gary T. Nowak, VT, U.S.A.
OHT	16	Tadao Ohtsuka, Japan
OKA02	16	Masanori Okada, Japan
OKA03	16	Akio Oka, Japan
*ONO	16	Osamu Onodera, Japan
PAP01	05	Janos Papp, Hungary
PER01		Alfredo Jose Serra Pereira, Portugal
POR	05	Alain Porter, RI, U.S.A.
PRY		Jim Pryal, WA, U.S.A.
REN		Alexandre Renou, France
SAN	05	John Sanford, CA, U.S.A.
SEA	14	David A. J. Seargent, Australia
SIM	05	Karl Simmons, FL, U.S.A.
SMI01	05	Doug Smith, NY, U.S.A.
SPR		C. E. Spratt, BC, Canada
STE01	05	Christopher Stephan, OH, U.S.A.
SUT	05	David A. Sutherland, VA, U.S.A.
SWE	05	Richard A. Sweetsir, FL, U.S.A.
SZE	05	Bela Szentmartoni, Hungary
TAK05	16	Kesao Takamizawa, Japan
TOM	16	Akira Tominaga, Japan
TOM01		Maura Tombelli, Italy
TOT	05	Sa'ndor To'th, Hungary
*TOT01	05	Imre To'th, Hungary
*TRE02	05	L. Trexler, Hungary
TRU	05	Joseph D. Truxton, CA, U.S.A.
UJV	05	Antal Ujva'rosy, Hungary
VIE		Jean-Francois Viens, Quebec, Canada
WAL	05	Derek Wallentinsen, NM, U.S.A.
WAT01	16	Nobuo Watanabe, Japan
YAS	16	Masanori Yasuki, Japan
*YOS02	16	Katsumi Yoshimoto, Japan

Comet Bradfield 1974 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 03 12.06	B	6.2	S	12.7	R	5	20		8			MAL
1974 03 15.04	o	4.8	S	5.1	R	4	6	3	6	0.23		SUT
1974 03 17.10	B	4.9	SP	3.5	B		7			0.5	109	WAL
1974 03 18.02		6.0	Y	15.2	L	4	20		5/	0.5		SMI01
1974 03 19.03	o	5.4	Y	5.1	R	4	6	3	7	0.9		SUT
1974 03 19.04	B	4.8	SP	5.0	B		7			3		SIM
1974 03 21.00		4.4	AT	3.5	B		7			1		MIL
1974 03 22.11	B	4.0	AT	3.5	B		7					WAL
1974 03 22.11	B	4.1	SP	3.5	B		7			2	84	WAL
1974 03 23.02		4.7	Y	5.0	B		7			&0.9		SMI01

Comet Bradfield 1974 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 03 23.02		5.2	Y	15.2	L	4	20			0.33	75	SMI01
1974 03 23.07	B	4.5	S	3.5	B		7		9	2.5	93	MAL
1974 03 23.11	B	4.6	SP	3.5	B		7			1	74	WAL
1974 03 24.02		5.4	Y	15.2	L	4	20		8/	0.5		SMI01
1974 03 24.07	B	4.5	S	3.5	B		7		9	1.3	82	MAL
1974 03 25.02		4.6:	Y	5.0	B		7			1	100	DIL
1974 03 25.05	! B	4.5	Y	5.2	R		8					MOR
1974 03 25.05	! E	4.3	Y	5.2	R		8		9	2.5	95	MOR
1974 03 25.05	! S	4.5	Y	5.2	R		8					MOR
1974 03 25.13	W	4.87	Y	15	L	17		+ 8		&2	80	MIN
1974 03 25.79	B	5.9	SP	7.6	L	9	35	2.6		0.17	70	MUH
1974 03 26.00	O	4.3	AT	5.0	B		7	& 7	4	4	52	CON
1974 03 26.02		5.2:	Y	5.0	B		7			&1	69	MCC01
1974 03 26.02		5.5	Y	5.0	B		7		8	0.67		SMI01
1974 03 26.04	o	4.4	Y	5.1	R	4	6	7	7	2.7		SUT
1974 03 26.05		4.4:	AT	3.5	B		7		4	2	110	STE01
1974 03 26.06				15	L	4	24	2	8/	0.5	100	MOR
1974 03 26.06	! B	4.7	Y	5.2	R		8					MOR
1974 03 26.06	! E	4.6	Y	5.2	R		8					MOR
1974 03 26.06	! S	4.7	Y	5.2	R		8		9	2	85	MOR
1974 03 26.13	W	4.71	AT	15	L	17		+ 8				MIN
1974 03 26.14	B	5.1	SP	3.5	B		7			1	69	WAL
1974 03 27.00	O	4.0	AT	5.0	B		7			2	67	CON
1974 03 27.02		3.5:	AE	5.0	B		7					DIL
1974 03 27.06	! E	4.3	Y	5.2	R		8					MOR
1974 03 27.06	! S	4.5	Y	5.2	R		8	& 2.5	8/	>1		MOR
1974 03 27.13	W	3.60	AT	15	L	17		+ 8		2		MIN
1974 03 28.03	O	4.5	AT	4.0	B		10	3	7	0.5		DEL
1974 03 28.07	B	4.7	S	3.5	B		7		7	1.4	70	MAL
1974 03 28.13	w	4.87	Y	15	L	17		+ 8		&1		MIN
1974 03 28.15		5.4:	UX	5.0	B		10		7	>2	60	TRU
1974 03 29.06		4.0:		0.0	E		1					GRE
1974 03 29.13	w	4.88	Y	15	L	17		+ 8				MIN
1974 03 29.80	B	4.9	SP	4.0	B		8					MUH
1974 03 29.80	B	5.4	SP	7.6	L	9	35	2.5		0.17	60	MUH
1974 03 30.02	B	5.2	SP	5.0	B		7					SIM
1974 03 30.07	B	4.6	S	3.5	B		7					MAL
1974 03 30.13		5.2	SP	3.5	B		7			&1.1	56	WAL
1974 03 30.80	B	5.5	SP	7.6	L	9	35	& 3.5				MUH
1974 03 31.03		5.2	SP	5.0	B		10			1.5	60	SWE
1974 03 31.81	B	5.2	SP	7.6	L	9	35	& 4		0.08		MUH
1974 04 01.04				20.3	L	6	67	& 6	3	&0.83	120	GRE
1974 04 01.04		4.6:	Y	5.0	B		7					DIL
1974 04 01.04	O	4.7	Y	3.0	B		8			&0.75		GRE
1974 04 01.09	o	4.3	Y	5.1	R	4	6	7	7	1.35		SUT
1974 04 01.14	w	4.77	Y	15	L	17		+ 8				MIN
1974 04 01.15		5.0:	UX	5.0	B		10		7	2	55	TRU
1974 04 01.80	O	4.7	SP	7.0	B		20	15	5	0.75	72	LUK
1974 04 01.81	B	4.9	SP	4.0	B		8					MUH
1974 04 01.83	B	5.4	SP	7.6	L	9	35	3.4		0.1	45	MUH
1974 04 02.03		5.4	SP	5.0	B		7					MCC01
1974 04 02.04		5.3	SP	5.0	B		7		6	0.5	60	COS
1974 04 02.07	B	4.6	S	3.5	B		7					MAL
1974 04 02.78		5.8		3.0	B		10					PAP01
1974 04 02.80		5.7	SP	8.0	B		11					MUH
1974 04 03.04		4.8	Y	5.0	B		7					DIL
1974 04 03.04	O	5.2	Y	3.0	B		8			&0.5	120	GRE
1974 04 03.06	B	5.0:	Y	15	L	4	24	& 2	8	&0.5		MOR
1974 04 03.81		5.1	SP	3	R	5	5	2.5	6	0.25	90	MEZ

Comet Bradfield 1974 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 04 04.07		4.6	S	3.5	B		7					MAL
1974 04 04.14	w	4.63	Y	15	L	17		+ 8				MIN
1974 04 04.15		5.0:	Y	5.0	B		10		7	>2	52	TRU
1974 04 04.73		5.5	UM	4.5	R	6	38	4	5	0.25	58	TRE02
1974 04 04.77		5.2:	SP	3	R	5	5	3	5	0.5	90	MEZ
1974 04 04.79		5.0	V	5.0	B		7	5				TOT
1974 04 04.79		5.1		3.0	B		10					PAP01
1974 04 04.79		5.3	V	5.0	B		7					UJV
1974 04 05.07		4.6	S	3.5	B		7		7	1.2	44	MAL
1974 04 05.14	w	4.62	Y	15	L	17		+ 8				MIN
1974 04 05.76		5.0		3.0	B		10					PAP01
1974 04 05.77	O	4.8	Y	5.0	B		7					TOT
1974 04 05.78		5.3		3	R	5	5					MEZ
1974 04 06.03	B	5.2	SP	5.0	B		7					SIM
1974 04 06.04	o	4.8	Y	5.1	R	4	6	10	7	1.35		SUT
1974 04 06.08	B	4.7	S	3.5	B		7					MAL
1974 04 06.14	w	4.71	Y	15	L	17		+ 8				MIN
1974 04 06.74		5.5		3.0	B		10					PAP01
1974 04 06.78		5.4		3	R	5	5					MEZ
1974 04 06.79		5.8	UM	4.5	R	6	38	4	6	0.17	46	TRE02
1974 04 06.81		5.8	SP	4.0	B		8					MUH
1974 04 06.81		5.8	SP	15.2	L	8	30			&0.11	35	MUH
1974 04 07.03		5.5:	SP	5.0	B		7			&1	40	MCC01
1974 04 07.04		4.6	Y	5.0	B		7					DIL
1974 04 07.05		5.4	SP	5.0	B		7		6	0.2	50	COS
1974 04 07.06	B	5.0	S	3.5	B		7		6	2	100	STE01
1974 04 07.06	O	4.9	Y	3.0	B		8					GRE
1974 04 07.08	B	4.8	S	3.5	B		7					MAL
1974 04 07.09		5.4	S	8.0	R		18					MAL03
1974 04 07.73		5.4		3.0	B		10					PAP01
1974 04 07.81		5.8	SP	4.0	B		8					MUH
1974 04 07.82		6.0	SP	15.2	L	8	30					MUH
1974 04 08.08	B	4.8	S	3.5	B		7					MAL
1974 04 08.14	w	5.17	Y	15	L	17		+ 8				MIN
1974 04 08.74		5.7		3.0	B		10					PAP01
1974 04 08.83	B	6.3	S	4.0	B		8					MUH
1974 04 08.83	B	6.7	S	15.2	L	8	30			0.1	35	MUH
1974 04 09.07	! B	5.7	Y	5.2	R		8					MOR
1974 04 09.07	! E	5.5	Y	5.2	R		8					MOR
1974 04 09.07	! E	5.6	Y	15	L	4	24	2.7	7/	0.53	39	MOR
1974 04 09.07	! S	5.7	Y	5.2	R		8					MOR
1974 04 09.08	B	5.4	S	3.5	B		7					MAL
1974 04 09.76		5.9		3.0	B		10					PAP01
1974 04 09.81	B	6.9:	S	15.2	L	8	30			0.13	27	MUH
1974 04 09.83	B	6.2	S	4.0	B		8					MUH
1974 04 10.06	B	5.7:	S	3.5	B		7		7	1.5	65	STE01
1974 04 10.06	O	5.8	Y	3.0	B		8			&0.67		GRE
1974 04 10.08		5.5	S	5.0	B		7					MAL
1974 04 10.14	w	6.82	Y	15	L	17		+ 8				MIN
1974 04 10.17		5.5:	UX	5.0	B		10		6	&2	38	TRU
1974 04 10.19	O	6.0	S	5.0	B		7					SAN
1974 04 10.78		6.4		3.0	B		6		4	?	40	TOT01
1974 04 10.83	B	6.7	S	4.0	B		8					MUH
1974 04 10.83	B	7.1	S	15.2	L	8	30					MUH
1974 04 10.89		7.2:	UX	12.2	L		24		6/	&0.3	320	HUD01
1974 04 11.04		5.1:	Y	5.0	B		7			0.5	30	DIL
1974 04 11.04		6.3	S	3.5	B		7		4	1		POR
1974 04 11.04		6.4	SP	5.0	B		7		5	0.4	45	COS
1974 04 11.06	O	6.4	S	20.3	L	6	44			0.9		GRE

Comet Bradfield 1974 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 04 11.07	B	6.0:	S	3.5	B		7		7	1	50	STE01
1974 04 11.08	o	5.4	Y	5.1	R	4	6	5	6	0.45		SUT
1974 04 11.15	w	6.55	S	15	L	17		+ 8				MIN
1974 04 11.78		6.7	V	8.0	B		10		4/	0.17	310	TOT
1974 04 12.04	B	5.6	SP	5.0	B		7			0.33	45	SIM
1974 04 12.15	w	6.48	S	15	L	17		+ 8				MIN
1974 04 12.91		8.5		30	L		60	3	3	0.2	60	MAR10
1974 04 13.81		5.7		3.0	B		6		7	?	30	TOT01
1974 04 13.84		7.3		15	L		80		3/	0.15		KLA
1974 04 13.84	B	7.2:	S	15.2	L	8	30				30	MUH
1974 04 14.06		7.5:		5.0	B		7					DIL
1974 04 14.15	w	7.03	S	15	L	17		+ 8				MIN
1974 04 14.17		7.2	AC	10.8	L	10	40	0.33	3/	0.06	39	WAL
1974 04 14.79		7.2		3.0	B		10					PAP01
1974 04 14.83	B	7.4	S	15.2	L	8	30					MUH
1974 04 14.84		5.7		3.0	B		6		5	?	30	TOT01
1974 04 14.85	B	7.3	S	4.0	B		8			0.1	20	MUH
1974 04 15.15		6.7:		5.0	B		10		4/	&1	45	TRU
1974 04 15.15	w	7.00	S	15	L	17		+ 8				MIN
1974 04 16.06	b	5.9	S	5.1	R	4	6	4	7	0.45		SUT
1974 04 16.11	! B	7.0	S	5.2	R		8					MOR
1974 04 16.11	! E	6.8	S	5.2	R		8					MOR
1974 04 16.11	! S	6.9	S	5.2	R		8		6			MOR
1974 04 16.16	w	7.3	S	15	L	17		+ 8				MIN
1974 04 16.16	w	7.57	S	15	L	17		+ 4				MIN
1974 04 17.04		7.0:		20.3	L					&0.5		GRE
1974 04 17.06	o	6.3	S	5.1	R	4	6	4	7	0.22		SUT
1974 04 17.10	S	6.7	S	5.2	R		8					MOR
1974 04 17.10	S	7.0	S	15	L	4	24	2.9	7	1.5	41	MOR
1974 04 17.12	B	6.2	S	3.5	B		7					MAL03
1974 04 17.15	w	7.82	S	15	L	17		+ 4				MIN
1974 04 17.88	O	7.1	S	7.0	B		20	5	3	0.37	44	LUK
1974 04 18.05		8.1	S	7.6	L	10	30	13	6	0.4	51	ADA
1974 04 18.06		8.5:	S	20.3	L	6	68	& 3.5		0.38		GRE
1974 04 18.07		8.0	S	3.5	B		7	3	3	0.5		POR
1974 04 18.08	B	6.8	S	3.5	B		7					MAL03
1974 04 18.10	B	6.9	S	5.2	R		8					MOR
1974 04 18.10	B	7.1	S	15	L	4	24					MOR
1974 04 18.10	E	6.8	S	5.2	R		8					MOR
1974 04 18.10	E	6.9	S	15	L	4	24					MOR
1974 04 18.10	S	6.9	S	5.2	R		8		6			MOR
1974 04 18.10	S	7.1	S	15	L	4	24	3.5	7	0.67	43	MOR
1974 04 18.15	w	7.90	S	15	L	17		+ 4				MIN
1974 04 18.90	O	7.4	S	7.0	B		20	5	3	0.17	42	LUK
1974 04 19.04		7.6	S	3.5	B		7					POR
1974 04 19.04		8.0	S	15	L	8	45	2	2	0.25	28	POR
1974 04 19.05	O	7.9	S	20.3	L	6	44	& 4		0.4	35	GRE
1974 04 19.15	w	8.09	S	15	L	17		+ 4				MIN
1974 04 19.81		8.5	V	6.3	R		50		3/	0.17	20	SZE
1974 04 20.02	B	7.9	AC	5.0	B		7			0.17		SIM
1974 04 20.06	O	8.0	S	20.3	L	6	44	4		>0.25	40	GRE
1974 04 20.09	B	7.5	S	5.2	R		8					MOR
1974 04 20.09	B	7.6	S	15	L	4	24					MOR
1974 04 20.09	S	7.5	S	5.2	R		8					MOR
1974 04 20.09	S	7.5	S	15	L	4	24	3.7	6	0.25	33	MOR
1974 04 20.10	o	7.7	S	5.1	R	4	6	4	7	0.45		SUT
1974 04 20.10	o	8.1	S	40.6	L	4	50	1.5	7	0.35		SUT
1974 04 20.24		7.9	S	8.0	R		18				40	MAL03
1974 04 21.07		9.0:		3.0	B		10					PAP01

Comet Bradfield 1974 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 04 21.08	O	8.0	S	20.3	L	6	44	& 0.83		&0.28	25	GRE
1974 04 21.88	O	8.1	S	7.0	B		20	8	3	0.3	37	LUK
1974 04 22.06	O	8.2	S	20.3	L	6		3		0.2		GRE
1974 04 23.09	B	7.6	S	5.2	R		8					MOR
1974 04 23.09	B	7.7	S	15	L	4	24					MOR
1974 04 23.09	S	7.5	S	5.2	R		8					MOR
1974 04 23.09	S	7.6	S	15	L	4	24		6	0.42	36	MOR
1974 04 23.81		8.6	V	5	R		10					SZE
1974 04 24.10	O	8.5	S	20.3	L	6	68	& 1.5		0.17	65	GRE
1974 04 24.13	b	8.0	S	5.1	R	4	6	4	6	0.45		SUT
1974 04 24.13	b	8.5	S	40.6	L	4	50	2	6	0.2		SUT
1974 04 24.13	e	7.7	S	5.1	R	4	6					SUT
1974 04 24.13	e	7.8	S	40.6	L	4	50					SUT
1974 04 24.13	s	8.1	S	5.1	R	4	6					SUT
1974 04 24.13	s	8.6	S	40.6	L	4	50					SUT
1974 04 25.08	B	7.8	S	8.0	R		18				40	MAL03
1974 04 25.10	B	8.4	S	15	L	4	24	4.1	6	0.42	45	MOR
1974 04 27.12	O	8.8	S	20.3	L	6	43	& 1.5		>0.13	155	GRE
1974 04 27.13	b	7.5	S	5.1	R	4	6	4	5	0.5	11	SUT
1974 04 27.13	b	8.0	S	40.6	L	4	50	2	5	0.25	11	SUT
1974 04 27.13	e	7.5	S	5.1	R	4	6					SUT
1974 04 27.13	e	7.5	S	40.6	L	4	50					SUT
1974 04 27.13	s	7.9	S	5.1	R	4	6					SUT
1974 04 27.13	s	8.4	S	40.6	L	4	50					SUT
1974 04 27.21		8.5:	UA	20.3	T		56	2	7	0.5	20	ARP
1974 04 27.22	B	8.4	S	8.0	R		18					MAL03
1974 04 28.06	O	8.9	S	20.3	L	6	43			>0.13	40	GRE
1974 04 28.15		9.2:	S	15	L	17	93	& 1				MIN
1974 04 29.17		8.3:		5.0	B		10		0/			TRU
1974 04 30.33	b	7.9	S	5.1	R	4	6	4	5	0.42	51	SUT
1974 04 30.33	e	7.9	S	5.1	R	4	6					SUT
1974 04 30.33	s	8.1	S	5.1	R	4	6					SUT
1974 05 01.11	B	8.6	S	15	L	4	24					MOR
1974 05 01.11	S	8.6	S	15	L	4	24	& 4	5	0.17	13	MOR
1974 05 04.17	B	9.0	S	10	R	15			6			MOR
1974 05 04.17	B	9.0	S	32	L	6	52					MOR
1974 05 04.17	S	8.9	S	32	L	6	52	& 1.5	7			MOR
1974 05 07.10	S	9.2	S	15	L	4	24	& 1	7			MOR
1974 05 07.16	B	9.3	S	32	L	6	52					MOR
1974 05 07.16	S	9.3	S	32	L	6	52	& 1	8			MOR
1974 05 09.88	B	8.8	S	15.2	L	8	30	& 3				MUH
1974 05 11.16	S	7.9	NP	15	L	4	24	5	6	?		MOR
1974 05 11.28	B	9.2	NP	10.8	L	10	40		1/			WAL
1974 05 11.88	B	8.8	S	15.2	L	8	30					MUH
1974 05 12.06		9.2	S	15	L	8	45	5	2			POR
1974 05 12.17		9.0:		5.0	B		10		0			TRU
1974 05 12.27	B	9.3	NP	10.8	L	10	40	0.8	1/			WAL
1974 05 12.88	B	9.0	S	15.2	L	8	30	& 2		0.05	10	MUH
1974 05 13.09		9.4:		10.8	L	10		2	4			DIL
1974 05 13.11	b	8.3	S	5.1	R	4	6	6	5	0.4	320	SUT
1974 05 13.11	b	8.4	S	5.1	R	25	40	4	5	0.23	320	SUT
1974 05 13.11	e	8.3	S	5.1	R	4	6					SUT
1974 05 13.11	e	8.4	S	5.1	R	25	40					SUT
1974 05 14.08	O	8.8	S	20.3	L	6	43	& 4		&0.1		GRE
1974 05 14.11	B	8.7	NP	15	L	4	24	5	6	?		MOR
1974 05 15.08		11.7:		10.8	L	10		3.5	2			DIL
1974 05 15.11	b	8.7	S	5.1	R	4	6	3	5	0.2	120	SUT
1974 05 15.11	b	8.7	S	5.1	R	25	40	3	5	0.13	120	SUT
1974 05 15.11	e	8.7	S	5.1	R	4	6					SUT

Comet Bradfield 1974 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 05 15.11	e	8.7	S	5.1	R	25	40					SUT
1974 05 15.23		9.0:	UM	5.0	B		10		0			TRU
1974 05 15.40	B	9.1	NP	11	L	10	40	& 1	2			WAL
1974 05 16.13	B	8.5	NP	15	L	4	24	5	5	0.17	180	MOR
1974 05 17.08	b	9.2	S	5.1	R	4	6	4	5	0.2	165	SUT
1974 05 17.08	b	9.2	S	5.1	R	25	40	4	5	0.13	165	SUT
1974 05 17.08	e	9.2	S	5.1	R	4	6					SUT
1974 05 17.08	e	9.2	S	5.1	R	25	40					SUT
1974 05 17.08	e	9.2	S	40.6	L	4	50	2	5	0.17	165	SUT
1974 05 18.23	B	9.0:	NP	15	L	4	24					MOR
1974 05 20.30		9.4:	UM	5.0	B		10		0			TRU
1974 05 21.18	B	9.2	NP	15	L	4	24	2.5	3	?	180	MOR
1974 05 22.21		9.4:	UM	5.0	B		10		0			TRU
1974 05 23.17	S	9.9	NP	15	L	4	24	2	5	0.33	180	MOR
1974 05 24.08	b	8.8	S	5.1	R	4	6	6	4	0.45	160	SUT
1974 05 24.08	b	8.8	S	5.1	R	25	40	6	4	0.27	160	SUT
1974 05 24.08	e	8.8	S	5.1	R	4	6					SUT
1974 05 24.08	e	8.8	S	5.1	R	25	40					SUT
1974 05 24.08	e	8.8	S	40.6	L	4	50	3	4	0.2	160	SUT
1974 05 25.13	S	9.8	NP	15	L	4	24	4	3	0.1	150	MOR
1974 05 25.91	B	9.5:	S	15.2	L	8	30	& 1				MUH
1974 05 26.92	B	9.7:	S	15.2	L	8	30	1.5				MUH
1974 05 27.21		9.6:	UX	20.3	L	8	125	& 0.5	1	0.01		TRU
1974 06 04.95		9.9:	UX	15.2	L	8	50	& 1.5				MUH
1974 06 13.22	S	11.5	AC	32	L	6	52	2	2	0.05	170	MOR
1974 06 14.27		10.6:		20.3	L	8	125	& 1	0/			TRU
1974 06 26.29		11.0:		20.3	L	8	125		0			TRU

Comet Sugano-Saigusa-Fujikawa 1983 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 09.75	S	7.7	A	15	L	6	28	1.8				KAN
1983 05 14.74	S	8.2	A	15	L	6	28	2				KAN
1983 05 14.75	S	8.0	A	13	L	6	25	3	7			ISH02
1983 05 14.75	S	8.5	A	15	L	6	28	2				NII
1983 05 14.78	B	8.4	AC	15	L	6	50	2.3	6			NAK01
1983 05 17.73	B	8.3	AC	15	L	6	50	2.9	5			NAK01
1983 05 17.74	S	8.3	A	13	L	6	25	2.5	5			ISH02
1983 05 17.76	S	8.4	S	20	T	10	50	3	3			OHT
1983 05 18.74	B	8.3	AC	15	L	6	28	4	5			NAK01
1983 05 29.74	S	8.9	S	15	L	6	51	5.4	2			WAT01
1983 05 29.75	S	9.5	AC	15	L	6	50	3	1/			NAK01
1983 06 01.70	S	8.9	AC	15	L	6	50	5.5	1			NAK01
1983 06 01.74	S	9.5	A	20	L	6	48	7	3			ISH02
1983 06 03.75	S	9.2	A	15	L	6	51	2	4			WAT01
1983 06 04.72	S	8.8	AC	15	L	6	28	6	0/			NAK01
1983 06 04.74	S	9.3	A	15	L	6	37	4	0			WAT01
1983 06 05.72	S	8.8	AC	15	L	6	28	8	1			NAK01
1983 06 05.75	S	9.6	A	15	L	6	37	3	2			WAT01
1983 06 11.74	S	7.1	S	15	L	6	23	39	0			WAT01

Comet IRAS-Araki-Alcock 1983 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 04.60	S	7.5	S	20	L	6	38	8	3			ISH02
1983 05 04.63	S	6.1	S	5.0	B		7	22.0				KAN
1983 05 05.56	S	6.9	AA	5	R		7	16	1			WAT01
1983 05 05.66	S	6.3	S	7.0	B		10	18	3			NAK01
1983 05 07.58	B	4.9	A	5.0	B		7	37.5	3			KAN

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

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 05 07.58	S	7.0	AC	10	L	10	30	25				ICH
1983 05 07.64	S	5.0	S	7.0	B		10	37	3/			NAK01
1983 05 07.65	S	6.3	S	20	L	6	48	20	4			ISH02
1983 05 08.57	S	4.6	S	7.0	B		10	36	3			NAK01
1983 05 08.68	B	4.5	A	5.0	B		7	52.0	4			KAN
1983 05 08.72	B	4.2	A	0.0	E		1	75				KAN
1983 05 08.74	S	5.9	S	20	L	6	48	25	5			ISH02
1983 05 08.76	S	4.2	A	3	R		6	45				ICH
1983 05 09.60	S	3.0	S	0.0	E		1	75	3			NAK01
1983 05 09.64	B	3.2	A	0.0	E		1	96	2			KAN
1983 05 09.67	B	2.9	A	0.0	E		1	126	4			WAT01
1983 05 09.73	B	4.1	S	5.0	B		7	50	5			ISH02
1983 05 10.56	S	2.9	S	0.0	E		1	100	3			NAK01
1983 05 10.57	B	2.3	A	0.0	E		1	168	2			WAT01
1983 05 11.57	B	2.6	A	0.0	E		1	126	1			WAT01

Comet Bradfield 1987 XXIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 01 06.38	B	6.9	S	3.5	B		7					OKA02
1988 01 09.37	E	8.1	AA	15	L	5	38	4	5			ONO
1988 01 09.43	B	7.3	S	3.5	B		7					OKA02
1988 01 10.45	S	7.7	S	12	L	6	40	8	4			HAY01
1988 01 11.38	S	7.8	AA	15	L	5	38	5	5			ONO
1988 01 13.53	B	7.5	S	3.5	B		7					OKA02
1988 01 17.45	S	7.5	S	12	L	6	40	10	3		30	HAY01
1988 01 18.37	S	8.2	AA	15	L	5	38	4	5			ONO
1988 01 20.44	B	7.9	S	3.5	B		7					OKA02
1988 01 24.38	S	8.7	AA	15	L	5	38	3	4			ONO
1988 01 27.40	S	8.5	AA	15	L	5	38	4	4			ONO
1988 02 03.39	S	9.3	AA	15	L	5	38	3	3			ONO
1988 02 07.46	B	8.8	S	10.0	B		14					OKA02
1988 02 16.49	B	9.2	S	10.0	B		14					OKA02

Comet Liller 1988 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 02 03.37	S	9.5	AA	15	L	5	38	1	4			ONO
1988 02 14.39	S	8.4	S	12	L	6	23	2.2	3			ABE01
1988 02 17.39	S	8.5	S	12	L	6	23		3			ABE01
1988 04 08.44	E	6.0	S	10	R		20	3	6			NAK06
1988 04 15.77	B	5.6	S	7.0	B		10		6	0.8		ABE01
1988 04 17.43	B	6.0	S	7.0	B		10	5.9	4			ABE01
1988 04 25.76	S	5.5	AA	8.0	B		11	6	6	2.0		AKI
1988 04 30.77	S	5.9	AA	8.0	B		11	7	5			AKI
1988 05 02.62	S	6.3	AC	15	L	5	38	6	6			ONO
1988 05 03.47	S	7.2	AC	15	L	5	38	5	6			ONO
1988 05 04.74	B	6.7	AA	12.5	T	10	30	4	6	0.5	0	HAY01
1988 05 04.78	S	6.6	S	6	R	5	14					ABE01
1988 05 05.52	B	6.3	S	3.5	B		7					OKA02
1988 05 06.46	S	6.6	AC	15	L	5	38	4	6			ONO
1988 05 08.46	B	6.7	AA	12	L	6	40	4	4	0.3	0	HAY01
1988 05 08.50	S	7.4	AA	15	L	5	38	5	7			ONO
1988 05 08.51	B	6.5	S	3.5	B		7					OKA02
1988 05 13.47	B	6.8	AA	12	L	6	40	5	4	0.2	0	HAY01
1988 05 13.48	B	6.8	S	3.5	B		7					OKA02
1988 05 13.60	B	6.8	S	6	R	5	14		4	0.6		ABE01
1988 05 14.58	B	6.8	AA	12	L	6	40	6	4	0.2	0	HAY01
1988 05 18.55	B	6.7	S	3.5	B		7					OKA02

Comet Liller 1988 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 18.71	S	7.0	S	8	R	8	19		4			ABE01
1988 05 28.72	S	7.7	S	8	R	8	19		3			ABE01
1988 06 04.56	B	8.7	S	8	R	8	19	6.5	3			ABE01
1988 06 10.55	B	8.3	S	12.0	B		20	5	4	1		NAK06

Comet Austin 1989c1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 02 17.41	B	8.1	S	12.0	B		20	5				HAS07
1990 03 13.42	B	6.2	S	12.0	B		20	5	5			NAK06
1990 03 13.44	B	5.5	AA	15	L	6	36	5	6			YOS02
1990 03 17.40	E	5.0	AA	30	H	4	57	5	6			KON03
1990 03 21.44	S	6.0	AA	10.0	B		20	3	5			OKA03
1990 03 26.42	B	5.5	AA	12.0	B		20	4	5/			HAS07
1990 03 26.44	S	5.0	AA	10.0	B		20	3	5			OKA03
1990 03 26.44	S	5.7	AA	15	L	6	36	5	6	0.17	80	YOS02
1990 04 02.44	S	4.5	AA	10.0	B		20	2	5			OKA03
1990 04 05.44	S	3.9	AA	10.0	B		20	2	5			OKA03
1990 04 06.42	B	4.9	AA	12.0	B		20	4	6/			HAS07
1990 04 17.81	B	5.5	AA	7.0	B		10		7			NAG04
1990 04 18.80	B	5.0	AA	10.0	B		14					OKA02
1990 04 18.80	B	5.3	AA	10.0	B		20	4	6			OKA03
1990 04 18.81	B	5.4	AA	7.0	B		10		7			NAG04
1990 04 24.76	B	5.0	AA	5.0	B		7	8	7	>2	310	TOM
1990 04 24.77	B	5.3	AA	12.0	B		20	5	6	>2		HAS07
1990 04 24.78	B	5.0	AA	3.5	B		7			>1		OKA02
1990 04 24.78	S	5.1	AA	15	L	5	38	4	7	0.42	315	ONO
1990 04 26.78	B	4.9	AA	3.5	B		7					OKA02
1990 04 26.78	B	5.3	AA	10	R	4	20	& 7	6	2	335	NAG04
1990 04 27.80	B	5.3	AA	10	R	4	20		6	2		NAG04
1990 04 28.79	S	5.2	AA	4.2	B		7	6	4	0.5	330	YOS02
1990 04 29.74	B	5.3	AA	12.0	B		20	6	5	2		HAS07
1990 04 29.75	S	4.4	AA	10.0	B		20	5	5	4		HAY01
1990 04 29.77	B	4.5	AA	10.0	B		20	5	7	2.0	295	OKA03
1990 04 29.77	S	5.0	AA	15	L	5	38	5	6	0.33	315	ONO
1990 04 29.78	B	5.0	AA	10.0	B		14			1.0		OKA02
1990 04 29.79	B	5.2	AA	10	R	4	20		4	2		NAG04
1990 04 29.79	B	5.4	S	12.0	B		20	5	6	3		NAK06
1990 04 30.76	B	4.9	AA	3.5	B		7					OKA02
1990 04 30.76	E	5.6	AA	6.0	B		8	6	6			ONO
1990 04 30.76	S	5.0	AA	4.2	B		7	6	4	1	330	YOS02
1990 04 30.77	B	4.9	AA	10.0	B		20	6	7	1.5	290	OKA03
1990 04 30.78	B	5.2	AA	10	R	4	20		4	2		NAG04
1990 05 01.74	B	5.1	AA	5.0	B		7	10	8			TOM
1990 05 01.75	E	5.3	AA	16	H	3	21	7	7			KON03
1990 05 05.73	B	5.0	AA	5.0	B		7	8	8	0.5		TOM
1990 05 05.74	E	5.6	AA	16	H	3	21	8	6			KON03
1990 05 05.77	B	5.0	AA	10.0	B		20	8	7	1.5	275	OKA03
1990 05 06.77	S	5.0	AA	4.2	B		7	10	3	>1	290	YOS02
1990 05 08.76	B	5.4	AA	12	L	6	40	9	3			HAY01
1990 05 15.72	B	5.6	AA	5.0	B		7	15	3			HAY01
1990 05 15.73	B	5.5	AA	12.0	B		20	20	4			HAS07
1990 05 15.77	B	5.6	AA	5.0	B		7	10	6			OKA03
1990 05 16.64	B	5.7	AA	5.0	B		7	15	6			TOM
1990 05 17.64	B	5.7	AA	5.0	B		7	&10	4			TOM
1990 05 17.72	S	5.8	AA	16	H	3	21	13	5			KON03
1990 05 19.70	S	5.8	AA	16	H	3	21	18	5			KON03
1990 05 19.72	B	5.7	AA	5.0	B		7	25	2			HAY01
1990 05 19.78	B	5.8	AA	5.0	B		7	15	4			OKA03

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 21.67	S	5.8	AA	16	H	3	21	20	5			KON03
1990 05 21.76	B	5.2	AA	6.3	R		9	&10	2/			NAG04
1990 05 23.68	S	5.7	AA	16	H	3	21	&20	4			KON03
1990 05 24.69	B	5.4	AA	5.0	B		7	20	3			TOM
1990 05 25.61	B	5.9	AA	3.5	B		7	18				OKA02
1990 05 25.69	B	5.7	AA	5.0	B		7	20	3			TOM
1990 05 25.76	B	5.6	AA	5.0	B		7	25	3			OKA03
1990 05 26.65	E	6.8	S	15	L	5	38	10	3			ONO
1990 05 26.67	B	5.6	AA	5.0	B		7	30	1/	2		HAY01
1990 05 26.72	S	6.3	AA	4.2	B		7	20	2			YOS02
1990 05 26.75	B	5.5	AA	10.0	B		20	30	3			OKA03
1990 05 27.58	E	7.5	S	15	L	5	38	8	3			ONO
1990 05 27.66	B	5.7	AA	5.0	B		7	15	4			TOM
1990 05 27.71	B	5.6	AA	5.0	B		7	25	3			OKA03
1990 05 28.68	B	6.1	S	3.5	B		7					OKA02
1990 05 28.71	B	5.6	AA	5.0	B		7	20	3			OKA03
1990 05 29.61	B	5.9	AA	5.0	B		7	20	1/			HAY01
1990 06 11.53	S	8.8	S	20	L	6	30	7.5	1			NAG04

Comet Levy 1990c

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 27.70	S	10.5	S	16	L	6	40	2	3			TOM
1990 07 01.66	B	8.5	S	16	L	6	40	5	4			TOM
1990 07 05.71	B	8.5	S	12.0	B		20	5	5	0.28		NAK06
1990 07 05.74	M	8.4	AA	16	L	6	40	5	4	0.08	310	TOM
1990 07 17.57	S	8.5	AA	15	L	5	38	2				ONO
1990 07 17.63	B	7.2	S	7.0	B		10	10	5	0.68		NAK06
1990 07 17.63	S	8.1	AA	12	L	6	40	5	4			HAY01
1990 07 17.65	B	7.7	AA	5.0	B		7	5	4			TOM
1990 07 18.57	S	8.0	AA	12	L	6	40	5	4			HAY01
1990 07 21.67	B	7.0	S	10.0	B		20	6	5			OKA03
1990 07 24.56	B	7.4	S	12	L	6	40	6	3			HAY01
1990 07 24.58	B	7.5	AA	5.0	B		7	10	4			TOM
1990 07 24.59	S	7.0	AA	15	L	5	38	7	5			ONO
1990 07 25.69	B	6.9	AA	15	L	6	36	> 6	4			YOS02
1990 07 25.73	B	6.9	AA	10.0	B		20	8	6			OKA03
1990 07 26.61	B	6.8	AA	10.0	B		20	8	6			OKA03
1990 07 26.66	B	6.9	AA	5.0	B		7	8	4			TOM
1990 07 26.75	B	6.7	AA	4.2	B		7	7	5	0.33	250	YOS02
1990 07 29.60	B	6.3	S	3.5	B		7	11				OKA02
1990 07 30.61	B	6.2	S	3.5	B		7					OKA02
1990 07 30.67	B	6.6	S	10.0	B		20	10	5			OKA03
1990 07 31.63	B	6.3	S	3.5	B		7	10				OKA02
1990 07 31.69	B	6.5	AA	10.0	B		20	10	5			OKA03
1990 07 31.73	B	6.3	AA	4.2	B		7	7	5	0.25	250	YOS02
1990 08 01.57	B	6.1	AA	5.0	B		7	10	4			TOM
1990 08 01.76	B	6.4	AA	10.0	B		20	12	5			OKA03
1990 08 02.51	B	6.8	S	12.0	B		20	6				HAS07
1990 08 02.71	B	6.2	AA	5.0	B		7	10	5	0.5	210	TOM
1990 08 04.55	B	5.8	AA	5.0	B		7	15				HAY01
1990 08 05.63	S	5.3	AA	15	L	5	38	15	4			ONO
1990 08 06.55	B	5.6	AA	5.0	B		7	20	4	0.67		HAY01
1990 08 06.58	S	5.4	AA	6.0	B		8	12	4			ONO
1990 08 06.59	B	5.5	AA	10.0	B		20	15	5			OKA03
1990 08 10.49	B	5.8	S	12.0	B		20	8	4			HAS07
1990 08 10.60	S	4.9	AA	15	L	5	38	12	4	0.17		ONO
1990 08 11.60	S	5.5	AA	15	L	5	38	8	5			ONO
1990 08 11.66	B	5.0	AA	5.0	B		7	20				HAY01

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 12.50	B	4.8	AA	5.0	B		7	>15	5	1	190	TOM
1990 08 12.51	B	4.7	AA	5.0	B		7					HAY01
1990 08 12.51	B	5.1	AA	4.2	B		7	12	5	0.67	210	YOS02
1990 08 12.52	B	5.3	AA	10.0	B		20	15	5			OKA03
1990 08 13.47	S	5.0	AA	5.6	B		8		5	1		ABE01
1990 08 13.56	S	5.1	AA	15	L	5	38	12	4	0.33		ONO
1990 08 14.50	B	4.8	AA	12.0	B		20	15	4			HAS07
1990 08 14.54	B	4.7	AA	3.5	B		7	18		1.0		OKA02
1990 08 14.56	S	4.6	AA	6.0	B		8	16	4			ONO
1990 08 14.58	B	5.3	AA	10.0	B		20	15	5			OKA03
1990 08 14.59	B	4.5	AA	5.0	B		7	20		3.5		HAY01
1990 08 14.60	S	4.7	AA	5.6	B		8		6	1.5		ABE01
1990 08 15.49	B	4.5	AA	5.0	B		7	20		2		HAY01
1990 08 15.51	S	4.2	AA	6.0	B		8	20	4	0.33		ONO
1990 08 15.51	S	4.6	AA	5.6	B		8		5	1		ABE01
1990 08 15.55	B	4.4	AA	3.5	B		7					OKA02
1990 08 15.64	B	4.5	AA	4.2	B		7	20	5	1.5		YOS02
1990 08 16.48	B	4.3	AA	5.0	B		7	18	4			HAS07
1990 08 16.54	E	4.4	AA	6.0	B		8	20	4			ONO
1990 08 16.65	B	4.5	AA	3.5	B		7	22				OKA02
1990 08 18.54	B	4.5	AA	5.0	B		7	30	6	0.33	70	TOM
1990 08 18.58	B	3.9	AA	0.0	E		1					HAY01
1990 08 19.58	B	4.5	AA	10.0	B		20	30	5	1		OKA03
1990 08 19.60	B	4.2	AA	3.5	B		7	25				OKA02
1990 08 19.63	S	3.5	AA	0.0	E		1	30	4			ONO
1990 08 19.71	S	4.5	AA	5.6	B		8		5			ABE01
1990 08 19.74	S	4.0	AA	4.2	B		7	25	4	1.5	150	YOS02
1990 08 20.47	B	4.0	AA	5.0	B		7	30	4	1		HAY01
1990 08 20.52	B	4.1	AA	5.0	B		7	40	6	0.5	75	TOM
1990 08 20.53	S	3.9	AA	6.0	B		8	25	4			ONO
1990 08 20.56	B	4.4	AA	5.0	B		7	>20	3/	0.5		HAS07
1990 08 20.66	B	4.2	AA	3.5	B		7					OKA02
1990 08 20.75	B	4.2	AA	10.0	B		20	30	5	1		OKA03
1990 08 21.55	S	4.0	AA	6.0	B		8	20	5			ONO
1990 08 21.59	B	4.0	AA	3.5	B		7					OKA02
1990 08 21.65	B	4.1	AA	12.0	B		20	25		1		HAS07
1990 08 22.48	S	4.3	AA	6.0	B		8	20	5	0.5		ONO
1990 08 22.50	B	4.0	AA	12.0	B		20	25		>1		HAS07
1990 08 22.51	B	3.8	AA	5.0	B		7	30	5	1		HAY01
1990 08 22.57	B	4.0	AA	5.0	B		7	30	6	0.5	55	TOM
1990 08 23.50	S	4.1	AA	6.0	B		8	20	5	0.33		ONO
1990 08 24.54	M	3.7	AA	10.0	B		20	30	5	2	120	OKA03
1990 08 24.56	B	4.0	AA	5.0	B		7	25	6	0.5	60	TOM
1990 08 24.67	S	3.7	AA	5.6	B		8		4			ABE01
1990 08 25.56	S	3.4	AA	4.2	B		7	20	4	2	90	YOS02
1990 08 25.60	B	3.3	AA	0.0	E		1					HAY01
1990 08 25.60	B	3.6	AA	3.5	B		7	18		1.2		OKA02
1990 08 25.61	S	3.8	AA	5.6	B		8		4	1.5		ABE01
1990 08 26.46	S	4.4	AA	6.0	B		8	20	5			ONO
1990 08 26.52	B	4.1	AA	5.0	B		7	30	6	>1.33	70	TOM
1990 08 26.59	M	3.4	AA	10.0	B		20	30	5	2	110	OKA03
1990 08 27.57	M	3.4	AA	10.0	B		20	30	5	2	100	OKA03
1990 08 28.53	B	3.9	AA	3.5	B		7			0.9		OKA02
1990 08 28.59	M	3.4	AA	10.0	B		20	30	5	1	90	OKA03
1990 08 30.51	B	4.0	AA	5.0	B		7	15	5	0.5		HAY01
1990 08 30.51	S	4.8	AA	6.0	B		8	15	4			ONO
1990 08 31.51	S	4.5	AA	6.0	B		8	15	5			ONO
1990 09 01.52	B	3.7	AA	5.0	B		7	15	6	1		HAY01
1990 09 02.51	B	3.9	AA	5.0	B		7	20	6	1		HAY01

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 08.42	M	5.4	AA	10.0	B		20	15	5	1	100	OKA03
1990 09 08.43	B	4.8	AA	3.5	B		7					OKA02
1990 09 09.44	B	4.9	AA	3.5	B		7	11		0.5		OKA02
1990 09 09.45	B	4.4	S	5.0	B		7					HAY01
1990 12 18.84	B	7.4	S	12	L	6	40	4	6			HAY01
1990 12 23.84	B	7.9	S	12.0	B		20	3	4			HAS07
1990 12 23.85	B	7.8	S	12	L	6	40	3	6			HAY01
1990 12 24.84	B	7.9	S	12.0	B		20	3	3/			HAS07
1990 12 24.86	B	7.5	S	15	L	6	36	4	5	>0.08	300	YOS02
1990 12 26.85	B	7.8	S	12	L	6	40	4	5			HAY01
1990 12 27.84	B	7.5	S	12.0	B		20	3	4			HAS07
1990 12 29.86	B	7.6	S	7.5	R	7	20	4	4			HAS07

Comet Tsuchiya-Kiuchi 1990i

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 18.82	B	8.0	S	15	L	6	36	4	4			YOS02
1990 10 19.79	M	8.3	AC	16	L	6	40	4	5			TOM
1990 10 19.83	S	7.6	S	10.0	B		14	3	4			ABE01
1990 10 20.80	S	6.8	S	16	H	3	21	4	4	0.25	280	KON03
1990 10 20.82	B	7.5	S	10.0	B		20	3	5			OKA03
1990 10 21.81	S	6.8	S	16	H	3	21	4	4	0.17	280	KON03
1990 10 21.83	S	7.7	S	10.0	B		14	3	5			ABE01
1990 10 22.81	M	8.2	AC	16	L	6	40	5	4	0.17	280	TOM
1990 10 28.82	B	7.5	S	7.0	B		10					NAG04
1990 10 28.82	B	7.6	S	3.5	B		7					OKA02
1990 10 31.83	S	7.3	S	12	L	6	40	7	2			HAY01
1990 11 04.80	S	7.2	S	12	L	6	40	6	3			HAY01
1990 11 10.82	S	7.6	S	12	L	6	40	8	2			HAY01
1990 11 11.82	S	7.7	S	12	L	6	40	8	2			HAY01
1990 11 15.80	B	7.0	S	10.0	B		20	5				OKA03
1990 11 21.83	B	7.5	S	7.0	B		10					NAG04
1990 11 21.84	S	8.2	S	15	L	6	36	5	2			YOS02
1990 11 22.82	B	7.8	S	12.0	B		20	5	2/			HAS07
1990 11 23.82	S	7.9	S	12	L	6	40	6	3			HAY01
1990 11 24.77	B	8.3	S	12.0	B		20	6	2			HAS07

Comet Arai 1991b

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 09.55	S	10.6	AC	20	L	6	58	4	2			NAK01
1991 01 09.57	S	10.4	AC	12	L	7	44	3	2			YAS
1991 01 11.64	S	10.6	AC	12	L	7	44	2	2			YAS
1991 01 12.74	S	9.7	AA	25	L	5	40	7	1			NAK05
1991 01 13.59	S	10.6	AC	20	L	6	58	3.5	2/			NAK01
1991 01 18.53	S	10.6	AC	20	L	6	58	4	2			NAK01
1991 01 18.71	S	10.1	AC	25	L	5	40	5	1			NAK05
1991 01 19.50	S	10.3	AC	20	L	6	58	4.5	2			NAK01
1991 01 19.55	S	10.8	AC	20	L	6	48	3.5	2			YAS
1991 01 23.64	S	10.7	AC	20	L	6	48	3.5	3			YAS
1991 01 23.73	S	10.2	AC	20	L	6	58	5	2			NAK01
1991 02 02.47	S	11.2	AC	20	L	6	58	3	2			NAK01
1991 02 03.44	S	11.3	AC	20	L	6	58	3	0/			NAK01
1991 02 08.63	S	11.8	AC	20	L	6	106	2.5	0/			NAK01
1991 02 12.60	S	12.0	AC	20	L	6	106	2	0/			NAK01
1991 02 17.47	S	12.6	AC	20	L	6	106	1.5				NAK01

Comet Shoemaker-Levy 1991d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 11 12.56	M	10.7	NP	25.6	L	4	67	3.5	3			MOR
1991 11 16.52	M	10.7	NP	25.6	L	4	67	3.4	4			MOR
1991 12 04.18	S	11.2	AC	20.0	L	4	50	& 4	7/			MIK
1991 12 06.22	B	10.9	AC	20.4	L	6	72					JAH
1991 12 06.22	S	10.7	AC	20.4	L	6	72	4.8	5			JAH
1991 12 10.17	S	10.9	AC	20.0	L	4	40	& 4	5			MIK
1991 12 10.20	B	10.7	AC	20.4	L	6	72					JAH
1991 12 10.20	S	10.3	AC	20.4	L	6	72	2.5	7			JAH
1991 12 12.21	M	10.7	AC	20.0	L	4	40	& 5	5/			MIK
1991 12 12.22	S	10.7	AC	20.4	L	6	72	2.3	6			JAH
1991 12 12.22	S	10.9	AC	20.4	L	6	72					JAH
1991 12 16.19	S	10.2	AC	20.0	L	4	40	& 7	5			MIK
1991 12 16.23	B	10.9	AC	20.4	L	6	72					JAH
1991 12 16.23	S	10.8	AC	20.4	L	6	72	2.9	6			JAH
1991 12 16.56	M	10.1	NP	25.6	L	4	67	3.0	4/	0.1	300	MOR
1991 12 16.56	M	10.3	AA	25.6	L	4	67					MOR
1991 12 19.44	S	9.7	AC	31.7	L	6	68	2.5	5			BOR
1991 12 31.12	S	10.6	AC	20.0	L	4	40	& 4	5			MIK
1992 01 01.44	S	10.0	AC	31.7	L	6	68	1.8	5/			BOR
1992 01 07.20	S	10.7	AC	20.0	L	4	40	& 6	5			MIK
1992 01 14.49	S	9.7	AC	40.6	L	5	53	4	4		110	LEV

Comet Helin-Lawrence 1991l

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 09.62	S	12.0	VN	31.7	L	5	86	0.5	1			JON

Comet Shoemaker-Levy 1991a1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 30.76	I	[14.5	AC	35.5	T	11	80					MIK

Comet Zanotta-Brewington 1991g1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 24.74	S	10.0	AC	20.0	L	4	40	& 4	6			MIK
1991 12 25.12	S	9.2	AA	25.6	L	4	45	2.5	2			MOR
1991 12 26.78	S	9.3	AA	15.0	L	4	26	& 3	5			PER01
1991 12 26.81	S	9.1	AA	15.0	L	4	26					AND04
1991 12 27.76	S	9.9	AA	20.0	L	4	40	& 4	6			MIK
1991 12 27.79	S	9.4	AA	15.0	L	4	26		4/			PER01
1991 12 27.82	S	9.2	AA	15.0	L	4	26					AND04
1991 12 27.97	S	8.9	AC	31.7	L	6	68	2.8	4			BOR
1991 12 28.73	S	9.8	AA	20.0	L	4	40	& 4	6/			MIK
1991 12 28.74	S	9.6	AA	6.0	B		20	& 3.5	5			MIK
1991 12 28.80	S	9.1	AA	15.0	L	4	26	& 3	3			PER01
1991 12 28.81	S	9.0	AA	15.0	L	4	26	& 2				AND04
1991 12 29.07	M	9.3	AA	31.8	L	4	48	3.5	2			KEE
1991 12 30.73	S	9.3	AC	15.2	L	5	44	7	3			MOE
1991 12 30.73	S	9.6	AA	6.0	B		20	& 3	3			MIK
1991 12 30.75	S	9.5	AC	15.2	L	5	100	5	3			MOE
1991 12 30.75	S	9.6	AA	20.0	L	4	40	& 5	6			MIK
1991 12 30.80	S	9.2	AA	15.0	L	4	26	& 3.5	3			PER01
1991 12 30.98	S	8.9	AC	31.7	L	6	68	2.8	4			BOR
1991 12 31.80	S	9.2	AA	15.0	L	4	26	& 4	5			PER01

Comet Zanotta-Brewington 1991g1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 31.98	S	8.9	AC	31.7	L	6	68	2.2	4/			BOR
1992 01 01.81	S	9.0	AA	15.0	L	4	26		5			PER01
1992 01 02.73	S	9.5	AA	6.0	B		20	4	5			MIK
1992 01 02.75	S	9.7	AA	20.0	L	4	40	& 4	7			MIK
1992 01 05.97		8.8	AC	31.7	L	6	68	2.6	5/	?	45	BOR
1992 01 05.97	S	8.8	AC	8.0	B		20	3.3	5			BOR
1992 01 06.08	M	8.2	S	15.2	L	3	16	5	2			KEE
1992 01 06.75	S	9.2	AA	6.0	B		20	& 4	6			MIK
1992 01 08.05	O	8.7	S	25	L	8	72					GAS
1992 01 09.06	O	8.9	S	25	L	8	72					GAS
1992 01 10.06	O	9.3	S	25	L	8	72					GAS
1992 01 12.72	S	8.6	AA	6.0	B		20	& 5	6			MIK

Periodic Comet Encke

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 20.77	S	9.0	S	16	L	6	40	4	2			TOM
1990 09 22.77	S	9.4	AC	16	L	6	40	4	2			TOM
1990 10 02.79	M	8.4	AC	16	L	6	40	4	4			TOM
1990 10 19.82	S	8.0	S	16	L	6	40	0.5	8			TOM

Periodic Comet Tempel 2 (1988 XIV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 08 08.57	S	10.2	AA	31	L	6	62	5	2			KOB01
1988 09 07.45	S	8.6	AA	31	L	6	62	4	3			KOB01
1988 09 16.46	S	8.3	AA	31	L	6	62	7	3			KOB01
1988 10 07.44	S	8.9	AA	31	L	6	62	7	4			KOB01
1988 10 08.43	S	8.8	AA	31	L	6	62	9	3			KOB01
1988 10 10.45	S	9.0	AA	31	L	6	62	4	2			KOB01
1988 10 13.44	S	8.9	AA	31	L	6	62	6	4			KOB01
1988 10 15.41	S	9.9	AA	25	L	5	46	3	2			NAK05
1988 10 31.44	S	9.6	S	31	L	6	62	4	2			KOB01
1988 11 02.43	S	9.8	S	31	L	6	62	3.5	2			KOB01
1988 11 10.46	S	10.2	AA	15.0	B		25	3	2			TAK05
1988 11 11.45	S	9.9	S	31	L	6	62	3	1			KOB01
1989 01 02.42	S	13.1	A	31	L	6	62	1.5	1			KOB01

Periodic Comet Schwassmann-Wachmann 3 (1989d1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 04 02.74	S	10.6	AC	12	L	7	44	1.2	2			YAS
1990 04 05.78	S	10.5	AC	12	L	7	44	1.5	4			YAS
1990 04 06.78	S	11.3	AC	20	L	6	106	2.2	5			NAK01
1990 04 23.77	S	9.7	AC	20	L	6	58	3	6/		255	NAK01
1990 04 24.75	S	9.5	AC	16	L	6	40	4	2			TOM
1990 04 24.75	S	9.8	AC	12	L	7	44	1.8	3			YAS
1990 04 27.78	S	9.3	AC	20	L	6	58	4.5	4/			NAK01
1990 04 29.77	S	9.4	AC	20	L	6	58	3.5	5		250	NAK01
1990 04 29.78	S	10.2	AA	15	L	5	38	2				ONO
1990 04 30.78	S	9.0	S	25	L	5	170	2	4			NAK05
1990 05 05.78	S	9.2	AC	12	L	7	44	2.5	3			YAS
1990 05 26.75	S	9.7	AC	20	L	6	58	2.5				NAK01
1990 06 02.75	S	10.5	AC	20	L	6	106	1.3				NAK01

Periodic Comet Honda-Mrkos-Pajdušáková (1990f)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 24.77	S	9.0	S	16	L	6	40	3	4			TOM
1990 09 02.77	B	8.5	S	16	L	6	40	3	6			TOM
1990 09 11.80	B	8.0	S	12.0	B		20	2	5	0.17		NAK06
1990 09 22.79	M	8.7	AC	16	L	6	40	1.5	7			TOM

Periodic Comet Wirtanen (1991s)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 06.14	B	10.6	VF	25	L	6	60	1.2	3			REN
1991 09 07.95	B	9.8	PL	25.0	T	5	50	& 3.2	3			CHE03
1991 09 08.10	B	10.7	VF	25	L	6	60	1.1	3			REN
1991 09 08.96	B	10.1	PL	25.0	T	5	50					CHE03
1991 09 13.98	B	10.2	PL	25.0	T	5	50	& 4.3	3			CHE03
1991 09 18.78	S	9.5	AA	15.2	L	5	47					SEA
1991 10 03.16	S	10.0	VF	12	L	6	40	3.5	3			REN
1991 10 11.55	S	9.9	AA	20.0	T	10	64	3	3			SPR
1991 10 12.52	S	10.0	AA	20.0	T	10	64	5	2			SPR
1991 10 13.16	S	10.2	VF	12	L	6	40	3.5	3			REN
1991 10 13.52	S	10.4	AA	20.0	T	10	64	3.5	2			SPR
1991 10 14.52	S	10.3	AA	20.0	T	10	64	2.5	2			SPR
1991 10 19.17	B	10.4	VF	25	L	6	60	3	4			REN
1991 11 05.19	B[	11		25	L	6	60					REN
1991 11 17.19	B[	11.5		25	L	6	60					REN
1991 11 18.41	S	11.5	AC	31.7	L	6	68	1.8	0			BOR
1991 12 04.20	S	13.0:	AC	20.0	L	4	50	& 3	0			MIK
1991 12 10.21	S	13.9	AC	35.5	T	11	80	2.5	1			MIK
1991 12 16.54	S	11.6:	NP	25.6	L	4	111					MOR

Periodic Comet Arend-Rigaux

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 11 16.52	S[	13.3	NP	25.6	L	4	156					MOR

Periodic Comet Wild 2 (1989t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 11 15.82	S	12.5	AC	20	L	6	106	1.0				NAK01
1990 11 21.82	S	12.3	AC	20	L	6	106	1.1	5			NAK01
1990 11 23.83	S	12.0	AC	20	L	6	106	1.4	3			NAK01
1990 11 26.82	S	11.9	AC	20	L	6	106	1.2	4			NAK01
1990 12 12.83	S	12.0	AC	20	L	6	106	1.1				NAK01
1990 12 16.82	S	11.9	AC	20	L	6	106	1.5	5			NAK01
1990 12 21.82	S	12.0	AC	20	L	6	106	1.8	3			NAK01
1990 12 22.83	S	12.7	AC	25	L	5	170	1	4			NAK05
1990 12 27.83	S	11.7	AC	20	L	6	106	1.9	3			NAK01
1991 01 19.82	S	12.3:	AC	20	L	6	106					NAK01
1991 01 23.83	S	12.8:	AC	20	L	6	150					NAK01
1991 01 26.84	S	11.8	AC	20	L	6	106	1.5	2			NAK01
1991 02 17.83	S	12.7	AC	20	L	6	150	1.0	2			NAK01

Periodic Comet Hartley 2 (1991t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 09.82	S	8.6	AA	8.0	B		15					SEA

Periodic Comet Hartley 2 (1991t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 11.10	S	8.4	AC	8.0	B		20	4.5	4			CAV
1991 08 12.07	S	8.9	AC	8.0	B		20	4.5	3			CAV
1991 08 17.78	M	8.3	S	8.0	B		20	5	3			CAM03
1991 08 18.79	M	8.2	S	20	L	7	35	3	4			CAM03
1991 08 20.78	S	7.9	AA	8.0	B		15	5	5			SEA
1991 08 30.99	B	8.0	AA	11.0	B	4	20	& 4.5	4			CHE03
1991 09 01.99	B	8.2	AA	11.0	B	4	20	& 4.5	4			CHE03
1991 09 02.97	B	8.3	AA	11.0	B	4	20		4			CHE03
1991 09 03.97	B	8.4:	AA	11.0	B	4	20		4			CHE03
1991 09 04.96	B	7.8	AA	11.0	B	4	20		4			CHE03
1991 09 05.04	S	7.9	AA	13.0	L	6	36	6	6			MEY
1991 09 05.06	S	8.0	AA	5.0	B		10	> 2	7			MEY
1991 09 05.37	S	8.1	S	11.4	L	8	40		4			VIE
1991 09 05.99	! B	6.8	AA	11.0	B	4	20		4			CHE03
1991 09 07.00	B	7.2:	AA	11.0	B	4	20					CHE03
1991 09 07.77	M	7.8	S	20	L	7	35	5	4			CAM03
1991 09 07.96	B	7.2	AA	11.0	B	4	20		5			CHE03
1991 09 08.33	S	8.1	S	11.4	L	8	40		4			VIE
1991 09 08.93	B	7.4	AA	11.0	B	4	20		4			CHE03
1991 09 09.35	S	8.1	S	5.0	B		10		4			VIE
1991 09 09.99	B	7.4	AA	11.0	B	4	20					CHE03
1991 09 11.01	B	8.2	AA	11.0	B	4	20					CHE03
1991 09 12.00	B	8.2	AA	11.0	B	4	20					CHE03
1991 09 12.94	B	7.6	AA	11.0	B	4	20					CHE03
1991 09 13.35	S	8.0	S	5.0	B		10		4			VIE
1991 09 13.78	S	7.4	AA	8.0	B		15	4	5			SEA
1991 09 13.95	B	7.8	AA	11.0	B	4	20					CHE03
1991 09 14.95	B	8.0	AA	11.0	B	4	20	& 5.8	3			CHE03
1991 09 15.96	B	8.1	AA	11.0	B	4	20		3			CHE03
1991 09 17.93	B	7.4	AA	11.0	B	4	20					CHE03
1991 09 18.94	B	7.7	AA	11.0	B	4	20					CHE03
1991 09 19.96	B	7.9	AA	11.0	B	4	20	& 5.5	3	0.1		CHE03
1991 09 20.95	B	7.9	AA	11.0	B	4	20					CHE03
1991 09 21.98	B	8.3	AA	11.0	B	4	20					CHE03
1991 09 22.35	S	8.3	S	11.4	L	8	40		3			VIE
1991 10 04.09	S	8.5:	AA	13.0	L	6	36	5	3			MEY
1991 10 05.10	S	8.1	AA	13.0	L	6	36	7	4			MEY
1991 10 05.15	B	10.3	AC	35	T	7	122	0.3	3			AMO
1991 10 07.14	B	8.5:	A	12	L	6	40	5.5	5/			REN
1991 10 08.15	B	8.8	A	12	L	6	40	5.5	5/			REN
1991 10 08.39	S	8.3	HR	8.0	B		20	4.7	5			BOR
1991 10 09.39	S	8.0	AC	8.0	B		20	3.3	5			BOR
1991 10 11.51	S	8.8	AA	20.0	T	10	64	3.5	4	0.08	285	SPR
1991 10 11.52	S	8.7	AA	8.0	B		11	4.0	3			SPR
1991 10 12.51	S	8.8	AA	20.0	T	10	64	5	4		285	SPR
1991 10 12.75	M	10 :		20	L	7	56					CAM03
1991 10 13.15	B	8.7	A	12	L	6	40	5	5			REN
1991 10 13.52	S	8.9	AA	20.0	T	10	64	4	4	0.08	275	SPR
1991 10 14.52	S	9.1	AA	20.0	T	10	64	4	4	0.08	280	SPR
1991 10 19.15	B	9.3	A	25	L	6	60	4	5			REN
1991 10 19.48	S	8.8	AA	15.2	R	15	152	3	2			HER02
1991 10 20.39	S	8.5	AC	8.0	B		20	4.1	5			BOR
1991 11 03.50	S	9.5	AA	15.2	R	15	152	4	3			HER02
1991 11 05.18	B	10.2	VF	25	L	6	60	3	4			REN
1991 11 05.48	S	9.9	AA	15.2	R	15	152		2			HER02
1991 11 10.19	B	10.3	VF	12	L	6	40	4	4			REN
1991 11 16.50	M	9.4	AA	25.6	L	4	45		2/			MOR
1991 11 17.17	B	10.8	VF	25	L	6	60	3.5	3			REN
1991 11 18.40	S	10.1	AC	31.7	L	6	68	2.2	3			BOR

Periodic Comet Hartley 2 (1991t) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 04.16	S	11.3	AC	20.0	L	4	50	& 4	3			MIK
1991 12 06.19	S	11.5	AC	20.4	L	6	72	2.9	1			JAH
1991 12 07.17	B	[12	VF	25	L	6	60					REN
1991 12 10.18	S	10.8	AC	20.0	L	4	40	& 5	3			MIK
1991 12 15.03	S	12.9	AC	35.5	T	11	80	& 3.5	1			MIK
1991 12 16.50	S	10.8	NP	25.6	L	4	67	4.2	1/			MOR
1991 12 31.10	S	13.6	AC	35.5	T	11	80	4.5	3			MIK

Periodic Comet Faye (1991n)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 05.91	S	10.7	PL	11.0	B	4	20		1			CHE03
1991 09 05.92	B	11.5	PL	25.0	T	5	50	& 3.0				CHE03
1991 09 06.15	M	12.0	AA	25.0	S	20	105	1	1			NOW
1991 09 06.81	S	10.7	PL	11.0	B	4	20		1			CHE03
1991 09 07.19	S	11.3	AC	50.0	L	5	96	0.8	6/			BOR
1991 09 10.73	S	10.3	PL	11.0	B	4	20		1			CHE03
1991 09 12.36	S	11.1	AC	31.7	L	6	68	1.1	7	0.05	250	BOR
1991 09 12.77	S	10.5	PL	11.0	B	4	20		3			CHE03
1991 09 13.36	S	11.3	AC	31.7	L	6	68	0.9	6			BOR
1991 09 21.37	S	10.8	AC	31.7	L	6	68	1.8	6	0.03	240	BOR
1991 10 02.36	S	9.9	AA	20.0	T	10	64	2.5	4			SPR
1991 10 02.91	S	10.3	AC	40	L	5	66					TOM01
1991 10 02.92	S	9.8	AC	25.4	L	4	31	0.9	3/			CAV
1991 10 02.98	M	9.5	S	33.5	L	4	125	& 1	5			MAR02
1991 10 03.22	S	10.5	AC	20.3	R	15	152	3	3			HER02
1991 10 04.05	S	9.7	AC	13.0	L	6	36	3	5			MEY
1991 10 04.06	B	10.4	VF	12	L	6	40	2.5	6/			REN
1991 10 04.29	S	9.8	AA	20.0	T	10	64	2.5	3	0.02	245	SPR
1991 10 05.01	S	10.0	AC	13.0	L	6	36	6	5			MEY
1991 10 05.08	B	10.1	AC	35	T	7	122	0.3	6	0.1	275	AMO
1991 10 05.23	S	9.7	AA	20	T	10	100	2.9	6		240	PRY
1991 10 05.29	S	9.8	AA	20.0	T	10	64	2.0	4	0.02	250	SPR
1991 10 05.39	S	10.2	AC	20.3	R	15	152	2	7			HER02
1991 10 05.90	S	10.3	AC	13.0	L	6	36	7	4			MEY
1991 10 06.30	S	9.6	AA	20.0	T	10	64	2.0	3			SPR
1991 10 07.02	B	10.2	VF	12	L	6	40	3.5	6			REN
1991 10 08.14	S	9.9	AC	31.7	L	6	68	1.6	7/	?		BOR
1991 10 08.29	S	9.6	AA	20.0	T	10	64	2.5	3			SPR
1991 10 09.11	S	9.9	AC	31.7	L	6	68	1.9	7/			BOR
1991 10 09.30	S	9.5	AA	20.0	T	10	64	3.0	4			SPR
1991 10 10.11	S	9.8	AC	31.7	L	6	68	2.4	7			BOR
1991 10 10.22	S	9.8	AA	20	T	10	100	2.8	4		255	PRY
1991 10 10.28	S	9.4	AA	20.0	T	10	64	3.5	4			SPR
1991 10 11.28	S	9.3	AA	20.0	T	10	64	3.5	4	0.02	255	SPR
1991 10 12.00	B	10.2	VF	12	L	6	40	5	5/			REN
1991 10 12.26	S	9.2	AA	20.0	T	10	64	4.0	4			SPR
1991 10 13.13	S	9.3	S	7.0	B		10	2	3			DEA
1991 10 13.14	M	12.0	A	25.0	S	20	105	& 1				NOW
1991 10 13.26	S	9.2	AA	20.0	T	10	64	4.0	3			SPR
1991 10 13.33	S	9.6	AA	20	T	10	100	2.0	4	&0.02	260	PRY
1991 10 14.04	B	9.8	VF	12	L	6	40	5	5			REN
1991 10 14.11	S	9.0	S	7.0	B		10	4	4			DEA
1991 10 14.27	S	9.3	AA	20.0	T	10	64	3.5	3			SPR
1991 10 14.29	S	9.8	AA	20.3	R	15	152	3	8	0.03		HER02
1991 10 15.20	S	9.3	AA	20.0	T	10	64	3.5	4			SPR
1991 10 16.17	S	9.0	AA	20.0	T	10	64	3.0	4			SPR
1991 10 16.21	S	9.7	AA	20.3	R	15	152	3	8			HER02

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 19.43	S	9.8	AA	20.3	R	15	152	2	4			HER02
1991 10 28.15	S	8.9	AA	20.0	T	10	64	2.5	3			SPR
1991 10 28.88	B	9.8	VF	12	L	6	40	> 5	6			REN
1991 10 30.10	S	9.7	AC	31.7	L	6	68	2.3	6			BOR
1991 10 30.17	S	10.0	AA	20.3	R	15	152	1	3			HER02
1991 10 30.93	S	9.8	AC	13.0	L	6	36	3	5			MEY
1991 10 31.91	S	9.9	AC	13.0	L	6	36	3	5			MEY
1991 11 01.03	B	9.9	VF	12	L	6	40	5.5	6			REN
1991 11 01.89	S	9.3	AC	8.0	B		20	3	7			CAV
1991 11 01.94	S	9.9	AC	13.0	L	6	36	4	5			MEY
1991 11 02.85	S	9.6	AC	10.0	B		25	3.2	4			HAS02
1991 11 02.95	B	9.9	VF	12	L	6	40	5.5	5/		270	REN
1991 11 03.40	S	9.6	AA	20.3	R	15	152	2.5	5			HER02
1991 11 03.92	S	9.5	AC	10.0	B		25	2.6	4			HAS02
1991 11 05.92	S	9.0	AC	15.2	L	5	44	5	4			MOE
1991 11 05.93	B	10.1	VF	25	L	6	60	3	5/	0.13	265	REN
1991 11 06.05	S	9.7	AC	31.7	L	6	68	1.9	6			BOR
1991 11 06.18	S	9.8	AA	20.3	R	15	152		3/			HER02
1991 11 09.84	B	10.6	AC	20.4	L	6	72					JAH
1991 11 09.84	S	10.5	AC	20.4	L	6	72	2.2	8	&0.15	280	JAH
1991 11 09.87	S	9.2	AC	15.2	L	5	44	5.5	5			MOE
1991 11 09.91	B	10.3	VF	12	L	6	40	4.5	5/			REN
1991 11 10.82	S	9.3	AC	15.2	L	5	44	5	4			MOE
1991 11 12.01	S	9.6	AA	15.0	L	4	26	& 5	6			PER01
1991 11 12.22	M	9.5	AA	31.8	L	4	33	2	6			KEE
1991 11 13.27	M	9.7	AA	31.8	L	4	48	2	7			KEE
1991 11 14.83	S	10.0:	S	20.4	L	6	72	2.4	7			JAH
1991 11 15.20	S	9.8	AC	31.7	L	6	68	1.6	7			BOR
1991 11 17.87	B	10.2	VF	12	L	6	40	3	5			REN
1991 11 24.16	S	9.8	AA	20.3	R	15	152	1.5	2/			HER02
1991 11 25.16	S	9.9	AA	20.3	R	15	152	2	2			HER02
1991 11 27.05	S	9.8	AC	31.7	L	6	68	2.1	5/			BOR
1991 11 27.14	S	10.2	AA	20.3	R	15	152	1	4			HER02
1991 11 27.21	M	9.7	AC	31.8	L	4	63	2	3			KEE
1991 11 28.82	S	9.2	AC	10.0	B		25	3.6	3			HAS02
1991 11 28.83	B	10.3	VF	25	L	6	60	3	4			REN
1991 11 28.85	S	10.3	AC	13.0	L	6	36	4	6			MEY
1991 11 28.88	S	10.5	AC	10.0	B		25	4	6			MEY
1991 11 29.84	S	10.4	AC	13.0	L	6	36	4	6			MEY
1991 11 29.88	S	10.6	AC	10.0	B		25	3	6			MEY
1991 11 30.24	S	9.9	AA	20	T	10	100	1.9	5	?		PRY
1991 11 30.81	S	10.4	AC	13.0	L	6	36	3	5			MEY
1991 11 30.84	S	10.5	AC	10.0	B		25	3	5			MEY
1991 12 03.78	S	10.5	AC	20.0	L	4	50	& 6	6			MIK
1991 12 03.95	S	9.5	AA	15.0	L	4	26	& 3	2			PER01
1991 12 04.88	S	10.8:	AC	15.2	L	5	44	3	2			MOE
1991 12 05.72	S	10.6	AC	15.2	L	5	44	3.5	2			MOE
1991 12 05.74	S	11.0	AC	20.4	L	6	72	2.3	3			JAH
1991 12 05.79	S	10.7	AC	15.2	L	5	100	3	2			MOE
1991 12 05.86	S	10.6	AC	35.5	T	11	80	& 5	5			MIK
1991 12 07.81	S	9.9	AC	8.0	B		20	2.7	2			CAV
1991 12 07.89	B	10.3	VF	12	L	6	40	3.5	5			REN
1991 12 09.70	S	10.8	AC	15.2	L	5	44	4	2			MOE
1991 12 09.76	S	11.4	AC	20.4	L	6	72	2.4	1			JAH
1991 12 09.96	S	11.0	AC	20.0	L	4	40	& 3	7			MIK
1991 12 10.71	S	10.9	AC	15.2	L	5	44	3	2			MOE
1991 12 10.77	S	11.0	AC	20.4	L	6	72	4.5	1			JAH
1991 12 11.02	S	10.0	AC	31.7	L	6	68	2.1	6			BOR

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 11.69	S	10.9	AC	15.2	L	5	44	3	2			MOE
1991 12 11.82	S	11.1	AC	20.4	L	6	72	3.0	0			JAH
1991 12 11.97	S	11.3	AC	20.0	L	4	40	2.0	7			MIK
1991 12 13.98	S	11.5	AC	20.0	L	4	40	& 2	4			MIK
1991 12 14.00	B	10.6:	VF	12	L	6	40	& 2.5	4			REN
1991 12 15.75	S	11.2:	AC	15.2	L	5	44	& 2.5				MOE
1991 12 24.70	S	11.4	AC	15.2	L	5	44	2.5	2			MOE
1991 12 24.82	B	10.8	VF	12	L	6	40	2.5	5			REN
1991 12 25.01	S	10.5	AC	31.7	L	6	68	& 1.6	5			BOR
1991 12 25.14	M	10.7	NP	25.6	L	4	67	1.8	3			MOR
1991 12 27.80	S	11.7	AC	48.5	L	4	80	2.5				MOE
1991 12 27.83	S	11.5	AC	15.2	L	5	44	3.5				MOE
1991 12 27.85	S	11.0	AC	20.0	L	4	40	& 3	4			MIK
1991 12 28.02	S	10.6	AC	31.7	L	6	68	2.2	5			BOR
1991 12 28.75	S	11.5	AC	20.0	L	4	40	& 3	5			MIK
1991 12 29.16	M	10.6	AC	31.8	L	4	48	2.5	3			KEE
1991 12 29.86	S	11.6	AC	15.2	L	5	44	3				MOE
1991 12 30.73	S	11.6	AC	15.2	L	5	44	3				MOE
1991 12 30.99	S	10.6	AC	31.7	L	6	68	1.7	5			BOR
1991 12 31.99	S	10.8	AC	31.7	L	6	68	1.4	5			BOR
1992 01 02.77	S	11.6	AC	20.0	L	4	40	2.5	3			MIK
1992 01 05.99	S	10.8	AC	31.7	L	6	68	1.8	4/			BOR

Periodic Comet Metcalf-Brewington (1991a)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 08.41	M	8.6	AC	20	L	6	46	6	6/			NAK01
1991 01 12.40	S	8.4	AA	25	L	5	40	6	6			NAK05
1991 01 13.40	M	8.7	AC	20	L	6	46	6	6			NAK01
1991 01 13.40	S	8.9	AA	12	L	7	44	4.5	5			YAS
1991 01 18.47	M	9.1	AC	20	L	6	46	5	4			NAK01
1991 01 19.41	B	8.6	AA	25	L	5	40	5	3	0.08	70	NAK05
1991 01 19.48	M	9.1	AC	20	L	6	46	5	4			NAK01
1991 02 02.44	S	9.8	AC	20	L	6	58	3.5	3			NAK01
1991 02 03.42	S	9.9	AC	20	L	6	58	3.5	3			NAK01
1991 02 03.45	S	9.8	AC	20	L	6	48	2	2			YAS
1991 02 17.42	S	10.9	AC	20	L	6	106	1.8	2			NAK01
1991 03 03.43	S	11.6	AC	20	L	6	106	2.0	3			NAK01
1991 03 09.44	S	11.8	AC	20	L	6	106	1.8	2			NAK01
1991 03 17.44	S	11.4	AC	20	L	6	106	1.9	2			NAK01

Periodic Comet Shoemaker-Levy 6 (1991b1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 11 13.24	M	10.3	AC	31.8	L	4	48	6	1			KEE
1991 11 27.19	S	11.2	AC	31.8	L	4	63	4	1			KEE
1991 12 03.85	S	12.8	AC	20.0	L	4	50	& 5	1			MIK
1991 12 28.77	S	13.5	AC	35.5	T	11	80	2.5	2			MIK
1991 12 29.18	S[	13.0	AC	31.8	L	4	63	1				KEE
1992 01 06.76	I[	14.5	AC	35.5	T	11	80					MIK

Periodic Comet Chernykh (1991o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 04.62		[13.0		20	L	7	56					CAM03

Periodic Comet Brorsen-Metcalf (1989 X)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 07 30.75	M	8.5	AA	16	L	6	40	7	3			TOM
1989 08 03.68	B	7.0	S	14	R		16					OKA02
1989 08 03.72	B	7.7	S	10.0	B		14		3			ABE01
1989 08 04.68	S	7.1	AA	20	L	6	46	7	4			AKI
1989 08 07.68	B	7.1	S	10.0	B		14		3			ABE01
1989 08 08.71	B	6.7	S	3.5	B		7					OKA02
1989 08 10.69	B	6.9	S	3.5	B		7					OKA02
1989 08 10.70	B	7.1	AC	5.0	B		7	6	4	0.17	270	TOM
1989 08 10.72	B	6.5	S	5.6	B		8	12	4	0.4		ABE01
1989 08 11.78	S	6.1	AA	15	L	5	38	8	5			ONO
1989 08 12.71	S	6.6	S	5.0	B		7					HAY01
1989 08 12.73	B	6.6	S	7.0	B		10	6	5	0.62		NAK06
1989 08 12.79	S	6.4	S	15	L	5	38	8	4			ONO
1989 08 13.76	S	6.5	S	12	L	6	40	6	4	0.17		HAY01
1989 08 20.78	S	6.4	S	12	L	6	40	7	4			HAY01
1989 08 21.76	B	6.4	S	12	L	6	40	7	4			HAY01
1989 08 22.77	S	6.0	S	5.0	B		7					HAY01
1989 08 22.79	B	5.7	S	10.0	B		14	4	4			ABE01
1989 08 23.76	B	6.5	S	12.0	B		20	4	4/			HAS07
1989 08 23.78	B	5.9	S	10.0	B		14		3			ABE01
1989 08 23.78	S	6.0	S	5.0	B		7					HAY01
1989 08 27.78	B	5.9	AC	10.0	B		14		5			ABE01
1989 08 27.78	S	5.8	S	5.0	B		7					HAY01
1989 08 30.81	S	5.8	AA	5.0	B		7	11	5			AKI
1989 08 31.79	B	5.8	AC	5.6	B		8		5			ABE01
1989 08 31.79	S	5.9	S	12	L	6	40	5	5	0.17		HAY01
1989 09 03.79	B	5.7	AA	10.0	B		20	6	7			OKA03
1989 09 09.79	B	5.8	S	10.0	B		20	5	6	1		HAY01
1989 09 09.80	B	6.0	S	3.5	B		7					OKA02
1989 09 10.81	B	5.8	S	3.5	B		7					OKA02

Periodic Comet Schwassmann-Wachmann 1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 03.81		[12.5	AC	20.0	L	4	50					MIK
1991 12 05.78	S	12.6	AC	15.2	L	5	100	& 0.5	8			MOE
1991 12 05.85	S	13.7	AC	35.5	T	11	80	0.8	7/			MIK
1991 12 06.26	M	11.8	AC	31.8	L	4	63	1.7	1			KEE
1991 12 09.83	S	14.0	AC	35.5	T	11	80	1.0	3			MIK
1991 12 09.89	S	12.5	AC	15.2	L	5	100	& 0.5	8			MOE
1991 12 10.88	S	12.8	AC	15.2	L	5	100	& 0.5	8			MOE
1991 12 11.87	S	13.2	AC	35.5	T	11	80	1.0	3			MIK
1991 12 16.12		[14.0	AC	35.5	T	11	80					MIK
1991 12 29.21	S	[13.0	AC	31.8	L	4	63	1				KEE
1992 01 02.75	I	[14.0	AC	35.5	T	11	80					MIK
1992 01 06.76	I	[14.5	AC	35.5	T	11	80					MIK

Periodic Comet Levy (1991q)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 06.94	B	10.3	PL	25.0	T	5	50	& 5.3	1			CHE03
1991 09 08.93	S	10.5	PL	11.0	B	4	20		1			CHE03
1991 09 12.96	S	10.6	PL	11.0	B	4	20		1			CHE03
1991 09 15.97	B	11.0	PL	25.0	T	5	50	& 6.5	1			CHE03
1991 11 16.49	S	[13.3	NP	25.6	L	4	156					MOR
1991 12 31.07	I	[14.5	AC	35.5	T	11	80					MIK

ROMAN NUMERAL DESIGNATIONS OF COMETS IN 1990

The following tabulation is from *Minor Planet Circular* 19357.

Comet	T	Name	Year/letter	Ref.
1990 I	Jan. 20.4	P/Kopff	1988k	IAUC 4647
1990 II	Feb. 8.2	P/Tuttle-Giacobini-Kresák	1989b1	MPC 15520
1990 III	Mar. 17.3	Cernis-Kiuchi-Nakamura	1990b	MPC 16551
1990 IV	Apr. 2.2	P/Sanguin	1989z	MPC 15521
1990 V	Apr. 10.0	Austin	1989c1	MPC 17400
1990 VI	Apr. 11.9	Skorichenko-George	1989e1	MPC 17400
1990 VII	May 17.9	P/Russell 3	1989d	MPC 14154
1990 VIII	May 19.3	P/Schwassmann-Wachmann 3	1989d1	IAUC 4923
1990 IX	June 23.6	P/Peters-Hartley	1990d	MPC 19257
1990 X	July 2.5	P/Wild 4	1990a	MPC 16551
1990 XI	July 6.8	P/Russell 4	1989g1	IAUC 4932
1990 XII	July 14.2	P/Shoemaker-Levy 4	1991f	MPC 18255
1990 XIII	Aug. 1.9	P/Mueller 3	1990l	MPC 19257
1990 XIV	Sept.12.7	P/Honda-Mrkos-Pajdušáková	1990f	IAUC 5035
1990 XV	Sept.18.6	P/Shoemaker-Levy 1	1990o	MPC 19257
1990 XVI	Sept.25.4	P/Shoemaker-Levy 2	1990p	MPC 17595
1990 XVII	Sept.28.7	Tsuchiya-Kiuchi	1990i	MPC 17595
1990 XVIII	Oct. 4.5	P/Holt-Olmstead	1990k	MPC 19257
1990 XIX	Oct. 18.3	McNaught-Russell	1991g	MPC 17940
1990 XX	Oct. 24.7	Levy	1990c	MPC 17596
1990 XXI	Oct. 28.6	P/Encke		IAUC 5085
1990 XXII	Nov. 18.4	McNaught-Russell	1991w	MPC 19257
1990 XXIII	Nov. 19.0	P/Johnson	1990h	IAUC 5038
1990 XXIV	Nov. 19.9	P/Mueller 2	1990j	MPC 19258
1990 XXV	Nov. 22.6	P/Kearns-Kwee	1989u	MPC 15215
1990 XXVI	Dec. 10.9	Arai	1991b	MPC 18081
1990 XXVII	Dec. 12.4	P/Shoemaker-Levy 3	1991e	MPC 18255
1990 XXVIII	Dec. 16.9	P/Wild 2	1989t	MPC 15521
1990 XXIX	Dec. 22.3	P/Spacewatch	1991x	MPC 19258
1990 XXX	Dec. 28.9	P/Taylor	1990n	IAUC 5134

Φ Φ Φ

The Last 10 Comets to Receive Provisional Letter Designations

Listed below, for handy reference, are the last 10 comets which have been given letter designations (1989a is the first comet to be discovered/recovered in 1989, 1989b is the second comet..., etc.). After the "equal sign" is given the name, preceded by a star (⋆) if the comet is a new discovery (compared to a recovery from predictions of a previously-known short-period comet); a 'sharp' sign (#) is used to indicate a 're-discovery' of a comet that had been lost for many years (or one significantly off from the prediction). Also given are such values as the orbital period (in years) for periodic comets, date of perihelion, T (month/date/year), and the perihelion distance (q, in AU). Four-digit numbers in the second-to-last column indicate the *IAU Circular* containing the discovery/recovery announcement. The last column lists the 3-digit code for short-period comets as used internally in archival data (first 3 characters), and which should be used by those observers contributing data in computer-readable form.

Desig.			*Comet*	*P*	*T*	*q*	*IAUC*	P/ code
1991z	=	⋆	P/Shoemaker-Levy 5	8.7	12/13/91	2.0	5359	728
$1991a_1$	=	⋆	Shoemaker-Levy		7/23/92	0.83	5363	
$1991b_1$	=	⋆	P/Shoemaker-Levy 6	7.5	10/13/91	1.13	5382	729
$1991c_1$	=		P/Tsuchinshan 1	6.6	8/30/91	1.5	5383	624
$1991d_1$	=	⋆	Shoemaker-Levy		9/15/91	1.23	5389	
$1991e_1$	=		P/Tsuchinshan 2	6.8	5/20/92	1.8	5403	625
$1991f_1$	=	#	P/Kowal 2	6.4	11/4/91	1.5	5406	717
$1991g_1$	=	⋆	Zanotta-Brewington		1/31/92	0.64	5412	
$1991h_1$	=	⋆	Mueller		3/21/92	0.20	5420	
1992a	=	⋆	Helin-Alu				5432	