

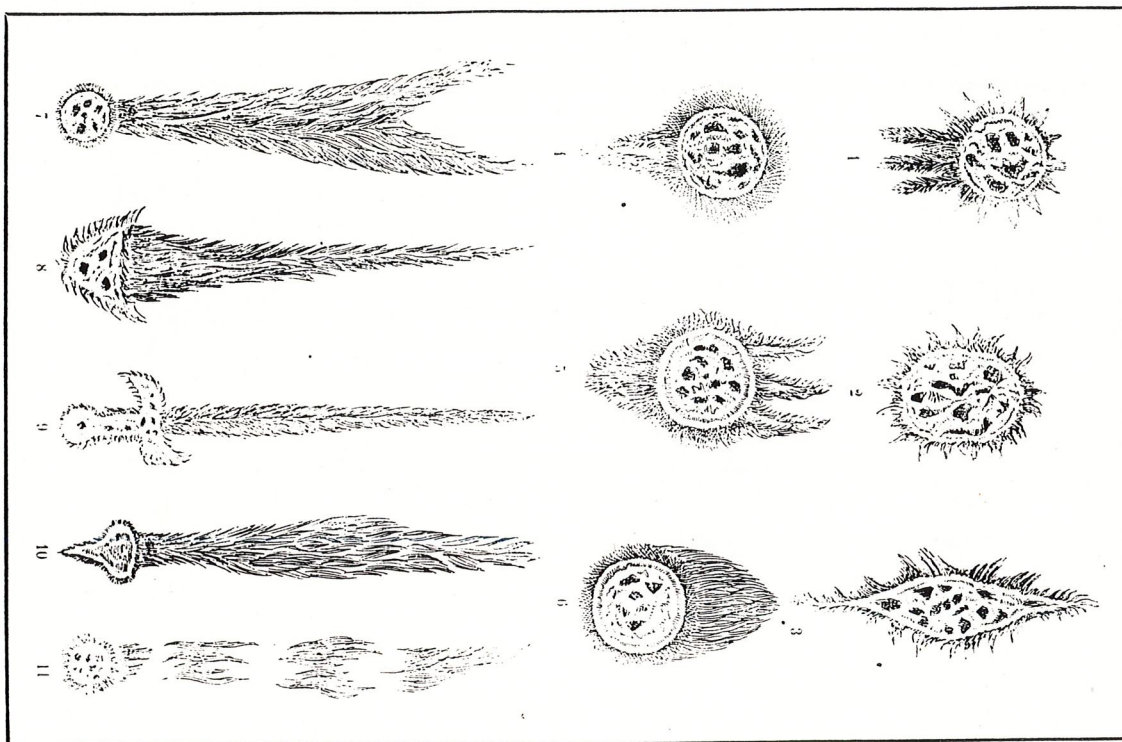
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The different "apparent" forms seen from comet to comet, from the seventeenth-century work by Hevelius (as reproduced by Amédée Guillemin in his book *Les Comètes*, published in Paris in 1875).



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— CORRIGENDA —

- In the July 1987 issue, page 115, 'Comet Sorrells 1986n', fifth line from the bottom (observation by MOR), the date *should read* 1987 05 30.44
- In the October 1990 issue, page 170, second paragraph, line 10, *for* that we was feeling weak *read* that he was feeling weak

LETTERS TO THE EDITOR: Concerning the use of filters for visual observation of comets.

Editor's note: The following correspondence calls attention to the fact that visual observers need to be careful when using filters to enhance the appearance of a comet. Readers may wish to look again at the "Review of the Lumicon Swan Band Filter" by C. S. Morris (1984, ICQ 6, 62) and the response by J. B. Marling (1984, ICQ 6, 90).

Amherst, MA, 1990 Nov. 10

In the "Descriptive Information" section of the *ICQ*, I noticed several observations by Alan Hale in which he refers to using a "C₂ filter". This is a bit vague. Lumicon makes several filters which pass some of the C₂ Swan Band lines. Their Deep-Sky filter passes the 473.7- and 516.5-nm lines (along with the continuum in between). Their "Swan Band" filter passes the 516.5-nm line along with everything down to about 494 nm, thus missing the all-important 473.7-nm line. Both of these filters fail to pass the 563.5-nm C₂ line. [Lumicon] also sell[s] a narrow passband 514-nm filter [that] they call their "C₂ filter", which passes the 516.5-nm line and little else. I don't believe [Hale's] references to using a "C₂ filter" are to this latter, ultra-narrow passband "C₂ filter", but probably to the (equally somewhat misnamed) "Swan Band filter". It might prove helpful if any references to filters is either by passband or by vendor and exact product name. — Michael Rudenko

Las Cruces, NM, 1990 Nov. 16

Mike [Rudenko] does have a valid comment concerning reporting the appropriate nomenclature for the filters used in observations, and perhaps you might want to ask observers to appropriately identify any filters used. For the record, my filter observations are with the Lumicon Swan Band filter, and I will so state in any further observations I submit. Concerning which lines are (not) transmitted by the filters in question, Mike's comments are again valid, but I don't think we should overestimate the amount of science one actually accomplishes with these filters. All the filters can do (scientifically, anyway) is give an *indication* that a given comet has, for example, a high (or low) gas/dust ratio, or that a comet has a high gas emission content. As far as determining actual abundances, one has to perform the appropriate spectrophotometry, which is beyond the capability of those of us doing backyard visual observations. (Concerning doing photometry with the filters, Charles [Morris 1984, *ICQ* 6, 62] has already pointed out that such information is useless, unless one has the brightnesses of the comparison stars in the appropriate passband.) — Alan Hale

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TABULATION OF COMET OBSERVATIONS

Listed below are many observations from the files of Comets Section of the Association of Lunar and Planetary Observers (A.L.P.O.) made during 1957-1967, as part of our on-going program to publish all unpublished photometric data on comets. During the past twelve years, we have published most of the A.L.P.O. data and are slowly but steadily making our way through the last box of such information. As mentioned previously in these pages concerning A.L.P.O. data, we are generally listing only the descriptive information provided by John E. Bortle (BOR), which tended to be the most detailed information available.

A new key to the 'Special Notes Key' is:

i = "ambiguity concerning which instrument was used to make coma diameter, DC, and tail information; the specified instrument was that used for the magnitude estimate". This letter is to be used chiefly for older data, whereby such ambiguity is not possible to rectify. Our policy on current data having such ambiguity is either to withhold publication until the issue can be resolved or to publish only magnitude information.

Descriptive Information (to complement the Tabulated Data):

◊ *Comet Ikeya-Seki 1965 VIII* ⇒ [all observations by BOR] 1965 Sept. 27.39: "no true nuclear cond. present". Sept. 28.40: in 5-inch f/5 R (18×), comet has strong central cond. of dia. ~ 0'.2. Oct. 2.40: in 5-inch f/5 R, $m_2 = 9.1$ (ref: HD, MM: O), "nucleus was stellar at all but the highest magnifications, which showed it as a small disk ~ 6'' in dia.; faint tail; coma seems somewhat smaller and not so condensed". Oct. 4.40: "as stars of a usable magnitude are few, I am using stars several degrees above the comet corrected for atmospheric absorption"; in 5-inch f/5 R (18×, 52×), "the light of the tail has become quite intense just behind the head; its total length must be quite a bit more than measured, as it was seen in deep twilight; tail is much brighter than previously, and about 2'-2.5' wide"; the inner 2' of the coma contains ~ 85 percent of the light. Oct. 5.40: in 5-inch f/5 R (18×, 52×, 70×), $m_2 = 8.1$ (ref: HD; MM: O); the first 5' of the tail was quite bright, its width now equal to the dia. of the coma; the central ~ 0.5' of the coma was very condensed; nuclear cond. visible in low magnification, but not at higher magnification. Oct. 13.43: in 5-inch f/5 R (72×), "at center of coma was a planetary-like disk ~ 7"-10" in dia." Oct. 29.43: tail length ~ 19° with the naked eye, the first 13° or so very easily visible; tail was ~ 1°-1.5° wide at the end; except for the northern side (which seemed slightly brighter), the tail seemed quite uniform in brightness w/ no darkness at its center or unusual brightness at its edges — it simply faded along its length until it blended with the sky background; optical instruments were of no help in extending its length, seeming only to raise the brightness of the sky background and render the tail *less* visible; in 5-inch R, the coma had at its center a very bright, white (w/ a tinge of blue) nuclear cond. ~ 1'-1.5' in dia., perfectly spherical at 70×. (Continued...)

(Continued from previous page) Oct. 30.42: tail length 19° by naked eye and 10×50 B; tail was relatively straight out to $\sim 13^\circ\text{--}14^\circ$, at which point it suddenly bent northward (via a gentle, not a sharp, curve), w/ its southern edge just touching δ Crt — it could be seen to extend a degree or two beyond δ Crt and seemed $2^\circ\text{--}2^\circ.5$ wide; the southern edge of the tail was better defined than the N side; tail was absolutely featureless in B; in 5-inch R, bright nuclear cond. of dia. $1'$ — no starlike cond. seen. Oct. 31.42: the entire tail curves gently to the north, its width at tail's end being $\sim 1^\circ.75$; the southern edge of the tail was both slightly brighter and more sharply defined than the northern edge.

Nov. 1.42: with naked eye, "the surface brightness of the tail $\sim 3^\circ$ from the head must be equal to a star of mag 2.5 or so, while the area 3° from the tip of the tail is mag ~ 4.5 "; with 5-inch R, coma dia. ~ 1.5 , nuclear cond. of dia. $40''\text{--}1'$. Nov. 2.42: with naked eye, width of tail at terminus $\sim 1^\circ.34$; the "bend" is either no longer present or much weaker, the entire tail curving steadily along its length (though much more strongly after $\sim 14^\circ$; using extra-focal method, surface brightness of tail was estimated as follows: 8° from head, mag 3.0-3.5, while at 16° from the head, mag 4.5; tail is much brighter than the head; southern edge of tail still *seems* slightly brighter than the northern edge; in 5-inch R, dia. ~ 1.5 , central cond. $40''\text{--}1'$ in dia., but no stellar cond. visible. Nov. 5.42: to naked eye, tail length at terminus $\sim 1^\circ.34$; at $2^\circ\text{--}3^\circ$ from the head, tail has mag ~ 2.9 , at 9° mag ~ 3.8 , and at 15° mag ~ 4.5 — thus the tail has not faded much more than 0.5 mag since Oct. 28, though the coma has faded almost 2 mag; in 5-inch R, coma dia. ~ 1.5 , "with the inner $\sim 30''$ defined enough to be called a separate area, at least at low power; at higher power, the coma seems to brighten steadily all the way to the center, though no point or very small, bright disk can be noted there; I can see no color to the coma or tail, other than the general gray-white usually associated with comets". Nov. 6.42: with naked eye, $\sim 25^\circ$ tail again seen to curve gently toward the north, the curvature becoming very pronounced in the last 5° or so; tail was quite a bit fainter than when last observed from this more rural site (Oct. 31.42); 10×50 B show only $\sim 10^\circ\text{--}15^\circ$ of the tail; in 5-inch f/5 R, coma dia. ~ 1.5 , the central $1'$ or so forming a nuclear cond.; no stellar cond. noted; the coma now appears brighter than the tail near it, especially in the 10×50 B — the reverse being true a week ago. Nov. 15.43: in 5-inch f/5 R, coma elongated along p.a. $\sim 90^\circ\text{--}270^\circ$ (length ~ 2.5); w/ averted vision, there appeared to be two comae, their centers separated by $\sim 1'$; at the center of the sunward nucleus could be seen a star of mag 8-9 (?) using averted vision; the primary coma was slightly brighter and slightly larger, of dia. $1.5\text{--}1.75$; neither coma was very condensed. Nov. 28.43: in 5-inch f/5 R, coma elongated in p.a. $\sim 75^\circ\text{--}255^\circ$ ($\pm 10^\circ$), coma dia. $\sim 5'\text{--}7'$; coma very diffuse w/ no central cond. Nov. 29.43: in 5-inch f/5 R, coma was elongated along p.a. $75^\circ\text{--}255^\circ$ ($\pm 10^\circ$) and resembled the "Dumbbell nebula", with a central 'squared-off' area surrounded by a spherical area that rounded it off (dia. $\sim 6'$).

◊ Comet Kilston 1966 V $\Rightarrow$ [all observations by BOR] 1966 Aug. 14.11: coma had a very condensed central cond. $\sim 50''$ in dia. surrounded by a coma $\sim 2'$ in dia. that was much more difficult to see; at low power, the central cond. looked like a slightly-out-of-focus star; $\sim 90\%$ of the comet's light was concentrated in the central cond.; there seemed to be a strong indication that the comet was quite bluish (observed from rural Vermont). Aug. 18.06: comet seemed to possess a faint, starlike nucleus ($m_2 = 11.2$, RF: AC), especially at $100\times$; color seems gray-white (observed from more urban NY City area). Aug. 19.05: coma dia. $\sim 50''$; very strong, bright cond. seen. Aug. 21.05: at $100\times$, starlike nucleus of $m_2 = 11.8$ (RF: AC) suspected w/ averted vision. Aug. 24.06: "coma is $50''$ in dia. seems more evenly illuminated w/ its edges better defined; strong central cond. $\sim 10''\text{--}15''$ in dia. at $100\times$; possible odd formations near central cond., but beyond range of instrument (purely suggestive?)." Aug. 26.05: in 55.9-cm f/15 M ($85\times$), the inner $20''\text{--}30''$ of coma was very condensed, and a starlike nucleus of mag 13.0-13.5 was glimpsed several times (but not seen steadily). Aug. 27.06: nuclear cond. of $m_2 \simeq 11.6$ (RF: AC) only glimpsed w/ averted vision. Aug. 28.06: strong moonlight; coma dia. $\sim 40''$.

Sept. 6.03: very pronounced inner coma out to radius $25''$, surrounded by a much fainter coma out to ~ 1.4 dia.; coma boundaries very ill-defined; nuclear cond. of $m_2 \sim 10.5\text{--}11.0$. Sept. 7.03: at $50\times$, a nuclear cond. ($m_2 \simeq 11.0$, RF: AC) w/ dia. $\sim 5''\text{--}10''$ is surrounded by a fairly strong nebulosity which gradually fades into a faint, spherical halo extending out to a radius of $\sim 45''$; at $100\times$, nuclear cond. is very ill-defined. Sept. 11.03: coma boundaries completely ill-defined; evenly-illuminated nuclear cond. possibly $20''$ in dia. at center of coma; at $100\times$, possible very faint stellar nucleus ($m_2 \simeq 12.0$, RF: AC) offset in central cond. toward p.a. 345° . Sept. 17.04: in 15.2-cm f/4 L, very strong central cond. (mag 10.1) $\sim 20''\text{--}30''$ in dia., surrounded by a faint halo extending out to $\sim 1'$ total dia. Sept. 24.06: surface brightness fairly even across coma, though its edges are ill-defined; $m_2 \sim 12$. Sept. 25.01: starlike nucleus ($m_2 = 12.0$, RF: AC) at $100\times$; comet is more condensed than last night. Sept. 27.01: strong central cond. that appeared almost stellar and had dia. $\leq 20''$; nuclear cond. much more pronounced tonight than on Sept. 24.

Oct. 3.00: very strong nuclear cond. (almost stellar) of dia. $\leq 10''$, surrounded by a very faint coma with dia. up to $2'$. Oct. 7.00: coma's total dia. seems $\sim 2'$ or slightly larger, but only w/ averted vision; only the inner $40''\text{--}50''$ are clearly defined; nuclear cond. of dia. $\leq 15''$ — very pronounced at $100\times$ and almost stellar. Oct. 8.00: as seen in 15.2-cm f/4 L ($20\times$, $30\times$), non-stellar nuclear cond., w/ the inner $1'$ of coma very apparent (the inner $30''$ being strongly condensed), all this being surrounded by a very faint disk out to dia. $\sim 3'$; in 55.9-cm M ($85\times$, $132\times$), there is a strong suggestion of a stellar nucleus of mag ~ 13 at the coma's center (total coma dia. $\sim 2'$, though only the central $40''\text{--}50''$ was very strong). Oct. 9.00: almost stellar nuclear cond. Oct. 10.98: nuclear cond. now appears either stellar or very small and is seen steadily at both $50\times$ and $100\times$; coma not quite as condensed tonight. Oct. 13.01: non-stellar nuclear cond. of small dia.; inner 0.8 of coma quite strong; proximity of nearby star (mag 6.2) makes observation difficult. Oct. 15.00: no nuclear cond. visible; central disk of $1'\text{--}1.5$ (w/ outer edges ill-defined) is surrounded by coma of dia. $\sim 4'$. Oct. 16.99: "nuclear cond. strong at $50\times$, difficult at $100\times$; w/ averted vision, coma seems almost uniform in brightness, but this is not true w/ direct vision." Oct. 20.99: nuclear cond. present. Oct. 25.98: strong moonlight; at $100\times$, a small, faint nuclear cond. was noted — if not starlike, its dia. must have been under $5''$. (Continued...)

(Continued from previous page) Oct. 31.02: strong moonlight; in 15.2-cm $f/8$ L ($50\times$, $100\times$), m_1 may not be above 10 ($m_1 = 10.3$ for inner $\sim 30''$ of coma; MM: O; RF: AC for W Aql); comet almost impossible to see because of its proximity to the star DM $-6^\circ 51' 47''$ ($< 30''$ away); the star appears to have remained normal during the transit — no change in brightness, flickering, etc., being noted; coma appeared evenly illuminated, w/o cond., but could be only just seen w/ averted vision; comet's closest approach to star (at separation $\sim 15''$) occurred around Oct. 31.024 UT. Nov. 4.01: suggestion of a starlike nucleus or nuclear cond., but this is not steadily seen; bright sky background due to strong city lights. Nov. 14.05: an apparently stellar nucleus was glimpsed and seemed quite faint (mag ~ 11); it became more difficult to see as the instrument's magnification was increased.

◊ *Comet Rudnicki 1967 II* $\Rightarrow$ [all observations by BOR] 1966 Nov. 14.08: "in 15.2-cm $f/4$ L, coma apparently quite large and completely diffuse, only slightly above sky background; in 55.9-cm $f/15$ M, coma strongly evident out to a dia. of $2\frac{1}{2}'$, which appears surrounded by a halo out to a dia. of $4'$ (though I am not completely sure) — coma is spherical with a strong indication of a nuclear cond. of small dia. at its center (DC = 2-3)." Dec. 4.02: in 15.2-cm $f/4$ L, DC = 0, coma has ill-defined boundaries w/ dia. $\sim 6'$, almost completely diffuse, apparently spherical; in 55.9-cm $f/15$ M, very slightly condensed coma (DC = 1-2) possibly elongated toward p.a. 70° w/ vague indication of short tail in that direction; centrally-located stellar nucleus of mag 12 or fainter seen only w/ averted vision. Dec. 4.04: plate taken w/ 200-mm $f/3.9$ A yields $m_1 \simeq 7.5 \pm 0.5$ (MM: O; RF: AC).

◊ *Comet Okazaki-Levy-Rudenko 1989 XIX* [all observations by JON] $\Rightarrow$ 1989 Nov. 28.64: clear sky, dawn breaking; in 31.7-cm $f/5$ L ($86\times$), coma dia. $2'$, DC = 6. Nov. 29.63: clear sky, dawn breaking; in 31.7-cm $f/5$ L ($86\times$), coma dia. $3\frac{1}{2}'$, DC = 6-7. Dec. 1.63: in 7.8-cm $f/8$ R ($30\times$), coma dia. $5'$. Dec. 4.63: in 7.8-cm $f/8$ R ($30\times$), coma dia. $5'$, DC = 6, tail suspected. Dec. 6.61: in 7.8-cm $f/8$ R ($30\times$), coma dia. $5'$; in 31.7-cm $f/5$ L ($86\times$), coma dia. $4'$, DC = 6. Dec. 12.65: in 31.7-cm $f/5$ L ($86\times$), coma dia. $2'$, DC = 1-2. Dec. 16.43: in 31.7-cm $f/5$ L ($86\times$), coma dia. $3\frac{1}{2}'$, DC = 6. Dec. 20.47: in 7.8-cm $f/8$ R ($30\times$), coma dia. $5'$, DC = 3. Dec. 21.49: in 7.8-cm $f/8$ R ($30\times$), coma dia. $4'$, DC = 1.

◊ *Comet Aarseth-Brewington 1989 XXII* [all observations by JON] $\Rightarrow$ 1990 Jan. 2.63: tail traced $0^\circ 4'$ in 11×80 B — end of tail behind cloud bank. Jan. 4.63: twilight; bright central cond.; tail bright to $0^\circ 25'$, traced to $0^\circ 5'$ in 11×80 B. Jan. 12.41: sky clear; comet low. Jan. 13.42: short tail. Jan. 19.41: hazy sky. Jan. 22.41: fan-shaped tail. Jan. 23.41: trace of tail. Jan. 24.41: comet low.

◊ *Comet Austin 1989c* $\Rightarrow$ 1990 Apr. 27.98: in 7×35 B, $m_1 = 5.2$ (RF: SC); in 12.0-cm R ($20\times$), DC = 5, fan-shaped tail $0^\circ 6'$ long; in 20.3-cm T ($80\times$), coma dia. $4'$ [AND06]. May 2.07: in 8.0-cm $f/5$ R ($18\times$), coma dia. $2\frac{1}{3}'$, DC = 5 [PAR03]. May 2.07: in 4.0-cm L ($25\times$), $0^\circ 3'$ tail [KUI]. May 3.03: in 8.0-cm $f/6$ R ($18\times$), coma dia. $4\frac{1}{3}'$, DC = 5 [PAR03]. May 4.06: tail $0^\circ 45'$ long in p.a. 325° [PLE01]. May 3.03: in 8.0-cm $f/6$ R ($18\times$), coma dia. $4\frac{1}{3}'$, DC = 3 [PAR03]. May 5.03: tail $0^\circ 28'$ long in p.a. 315° [PLE01]. May 12.05: tail $0^\circ 32'$ long in p.a. 306° [PLE01]. May 20.03: in 8.0-cm $f/5$ R ($18\times$), coma dia. $5\frac{1}{6}'$, DC = 3 [PAR03]. May 21.02: in 8.0-cm $f/5$ R ($18\times$), coma dia. $6\frac{1}{8}'$, DC = 3 [PAR03]. May 23.97: in 6.7-cm $f/12$ R ($40\times$), coma dia. $19'$, DC = 3 [BEN04]. May 26.96: in 8.0-cm $f/5$ R ($18\times$), coma dia. $9\frac{1}{6}'$, DC = 3 [PAR03]. May 26.97: in 6.7-cm $f/12$ R ($40\times$), coma dia. $27'$, DC = 4 [BEN04]. June 2.00: in 8.0-cm $f/5$ R ($18\times$), coma dia. $7\frac{1}{8}'$, DC = 2 [PAR03].

◊ *Comet Levy 1990c* $\Rightarrow$ 1990 June 17.33: comet close to α And [MOR]. June 23.42: tail width $\sim 5'$ [MOR]. June 24.98: in 20×80 B, $m_1 = 8.5$: (RF: AA), DC = 1 [SPE01]. June 30.41: in 26-cm L ($156\times$), there was a stellar cond. and hint of a tail [MOR]. July 15.26: tail also seen in 20×80 B; in 26-cm L, asymmetric coma was obvious; stellar cond. seen at $156\times$ [MOR]. July 16.91: in 25×100 B, tail lengths $\sim 0^\circ 26'$ and $0^\circ 24'$ in p.a. 282° and 236° [PLE01]. July 21.92: also tail $\sim 0^\circ 2'$ long in p.a. 284° [PLE01]. July 22.90: in 6.4-cm $f/12$ R ($56\times$), coma dia. $7\frac{1}{8}'$, DC = 2 [MOS01]. July 22.97: in 6.7-cm $f/5$ R ($24\times$), coma dia. $\sim 7\frac{1}{6}'$ [RZE]. July 23.98: in 6.7-cm $f/5$ R ($24\times$), coma dia. $\sim 9\frac{1}{5}'$ [RZE]. July 24.02: oval coma $10' \times 6'$ with slight extension [PAN]. July 27.86: in 6.4-cm $f/12$ R ($56\times$), coma dia. $9\frac{1}{5}'$, DC = 3 [MOS01]. July 27.99: tail lengths $\sim 0^\circ 22'$ and $0^\circ 25'$ in p.a. 270° and 308° [PLE01]. July 28.99, 30.97, Aug. 3.94, and 4.91: in 6.7-cm $f/5$ R ($24\times$), coma dia. $5\frac{1}{1}'$ [RZE]. July 29.06: in 11×80 B, tails of length $0^\circ 4'$, 1° , and $0^\circ 7'$ in p.a. 209° , 228° , and 239° [GAR02]. July 31.91: also tail $\sim 0^\circ 45'$ long in p.a. 288° [SCI].

Aug. 3.97: in 6.4-cm $f/12$ R ($56\times$), coma dia. $9\frac{1}{8}'$, DC = 4 [MOS01]. Aug. 12.22: in 26-cm L ($45\times$), comet was distinctly blue and had a nearly stellar cond. [MOR]. Aug. 12.79: in 20-cm $f/5$ L ($20\times$), coma dia. $\sim 15'$, DC = 6, tail $\sim 1^\circ 0'$ long [SZA]. Aug. 12.80: also tail $\sim 0^\circ 18'$ long in p.a. 335° [PLE01]. Aug. 12.86 and 15.87: in 10×50 B, coma fan-shaped [HAV]. Aug. 13.88 and 23.93: in 6.7-cm $f/5$ R, ($24\times$), coma dia. $3\frac{1}{7}'$ [RZE]. Aug. 15.50: to naked eye, $m_1 \sim 4$, 1° tail in p.a. 90° ; in telescope, the coma had two jets bending away from each other [CAM03]. Aug. 15.91: photo on hypered TP2415 film (15-min exp.) w/ 7.1-cm $f/2.8$ A shows $14'$ coma and tails $> 2^\circ 86'$ and $0^\circ 23'$ long in p.a. 193° and 28° [HAS02]. Aug. 16.61: also $0^\circ 5'$ tail in p.a. 60° [CAM03]. Aug. 16.89: 2-min exp. w/ 200-mm $f/4$ telephoto lens shows $0^\circ 82'$ and $0^\circ 26'$ tails in p.a. $163^\circ 5'$ and 183° ; in 11×80 B, faint tail of length $2^\circ 5'$ to 3° [GAR02]. Aug. 16.93: also $0^\circ 5'$ dust tail in p.a. 59° [LOO01]. Aug. 17.5: comet had at least a 4° tail — possibly traced to 7° — though very faint, and a $0^\circ 5'$ anti-tail; coma had an almost-starlike nucleus surrounded by a diffuse coma [CAM03]. Aug. 18.96: exp. w/ 200-mm $f/4$ telephoto lens shows $1^\circ 45'$ tail in p.a. $171^\circ 4'$, curved at distance of $0^\circ 84'$ toward p.a. 164° [GAR02]. Aug. 19.0: in 11×80 B, $2^\circ 7'$ tail [GAR02]. Aug. 19.01: in 15-cm $f/15$ L ($50\times$), coma dia. $13'$, DC = 4, $25'$ tail [SZA]. Aug. 19.01: also $0^\circ 7'$ tail in p.a. 74° , but spanning p.a. 41° - 107° [HAV]. Aug. 19.91: in 12×50 B, $0^\circ 4'$ and $1^\circ 0'$ tails in p.a. 79° and 149° [TAN02]. Aug. 20.15: fan-shaped tail; also $0^\circ 5'$ tail in p.a. 250° [NOW]. Aug. 20.54: the comet had a sharp but broad gas tail and a short anti-tail, with a fan-shaped extension of the coma between the tails [CAM03]. Aug. 20.84: photo on hypered TP2415 film (3-min exp.) w/ 14.0-cm $f/1.65$ A shows $11'$ coma and tails $2^\circ 54'$ and $0^\circ 51'$ long in p.a. 142° and 44° [HAS02]. Aug. 20.97: also $0^\circ 27'$ tail in p.a. 55° [SCI]. (Continued...)

(Continued from previous page) Aug. 21.85: in 12×50 B, also 1°2 tail in p.a. 57° [TAN02]. Aug. 20.9: comet definitely more diffuse and fainter than yesterday; in 11×80 B, 2°5 tail [GAR02]. Aug. 22.05: also 2° dust tail in p.a. 77° [LOO01]. Aug. 22.82: also 0°57 tail in p.a. 51°, but spanning p.a. 21°-81° [HAV]. Aug. 22.84: in 20×80 B, also 0°27 tail in p.a. 44° [HAS02]. Aug. 22.87: photo on hypered TP2415 film (5-min exp.) w/ 14.0-cm f/1.65 A shows 9'2 coma and tails 2°8 and 0°38 long in p.a. 127° and 44° [HAS02]. Aug. 22.9: in 3.0-cm R (6×), 7° tail toward p.a. 116°5; broad coma w/ parabolic outlines; main tail quite visible w/ 2 streamers (one on each side), w/ following p.a. measured from photos: 130°2, 123°, 119° [GAR02]. Aug. 23.23: also 1° dust tail in p.a. 90° [SPR]. Aug. 23.85: photo on hypered TP2415 film (5-min exp.) w/ 14.0-cm f/1.65 A shows 17' coma and tails 2°8 and 0°76 long in p.a. 108° and 50° [HAS02]. Aug. 23.87: in 12×50 B, also 1°3 tail in p.a. 107° [TAN02]. Aug. 23.87: also 0°4 dust tail in p.a. 40°-120° [SCH04]. Aug. 23.9: exp. w/ 200-mm f/4 telephoto lens shows fan-shaped tail spanning p.a. ~ 97°-114° [GAR02]. Aug. 24.82 and 27.83: in 6.6-cm R, also 1°2 tail in p.a. 50° [GAM]. Aug. 24.86: photo on hypered TP2415 film (5-min exp.) w/ 14.0-cm f/1.65 A shows 18' coma and tails 4°32 and 0°76 long in p.a. 100° and 50°; in 20×80 B, also 0°47 tail in p.a. 50° [HAS02]. Aug. 24.86: in 12×50 B, also 1°1 tail in p.a. 68° [TAN02]. Aug. 24.88: also 1°9 tail in p.a. 97° [KRE]. Aug. 24.90: tail 1° long in p.a. 50° [PAR03]. Aug. 24.90: in 25×100 B, also tail ~ 0°65 long spanning p.a. 45°-63° [PLE01]. Aug. 25.17, 26.16, and 27.16: observed from oil platform — bright lights [MOR]. Aug. 25.59: photos show tail as a wide fan > 3°25 long [PRI]. Aug. 25.82: also 1°73 tail in p.a. 71°, but spanning p.a. 52°-90° [HAV]. Aug. 25.87: in 6.6-cm R, also ~ 1°2 tail in p.a. 50° [GAM]. Aug. 26.85: in 6.7-cm f/5 R (24×), coma dia. 3'7, tail in p.a. 85° [RZE]. Aug. 26.86: in 12×50 B, also 2°3 tail in p.a. 93° [TAN02]. Aug. 26.87: also tail ~ 0°45 long spanning p.a. 35°-66° [PLE01]. Aug. 27.23 and 28.23: tail very broad [SPR]. Aug. 27.4: comet was seen easily under the light of the first quarter moon, looking like a small fuzzy star of mag 3 [CAM03]. Aug. 27.53: fan tail [CAM03]. Aug. 27.67: in 10×50 B, 6° tail [GAR01]. Aug. 27.86: also 0°76 tail in p.a. 78° [SCI]. Aug. 27.88: in 25×100 B, also tail ~ 1°0 long spanning p.a. 55°-72° [PLE01]. Aug. 27.91: in 6.4-cm f/12 R (56×), coma dia. 9'5, DC = 5 [MOS01]. Aug. 28.87: in 6.4-cm f/12 R (56×), coma dia. 4'5, DC = 4 [MOS01]. Aug. 28.88: also 2°5 tail in p.a. 75° [SCI]. Aug. 28.91: in 6.4-cm f/12 R (56×), coma dia. 4'9, DC = 5 [LUK02]. Aug. 30.48 and 31.43: moon 19° away from comet [PRI]. Aug. 30.96: side tails ~ 50° away from central spine, at limit of visibility; coma fanlike [MCK].

Sept. 3.18: comet moving over M8 [MOR]. Sept. 6.39: in 10×50 B, 1°5 tail; in 25-cm f/4 L (80×), coma dia. 8', DC = 7 [GAR01]. Sept. 7.42: photo w/ T-max film and 135-mm f/3.5 lens (3-min exp.) shows 1°08 tail in p.a. 90° [PRI]. Sept. 7.43: in 25-cm f/4 L (80×), coma dia. 12' [GAR01]. Sept. 8.42: in 25-cm f/4 L (80×), coma dia. 10' [GAR01]. Sept. 8.44: photo w/ T-max film and 200-mm f/4 lens (10-min exp.) shows 1° tail in p.a. 50° [PRI]. Sept. 9.40: in 15×80 B, 2°3 and 1° tails in p.a. 88° and 75°; in 25.4-cm L (95×), central cond. estimated as 18" across and at focus of parabolic coma (DC = 8); dust tail curved, which may have been longer, but difficult to measure against Milky Way [SEA]. Sept. 9.42: in 25-cm f/4 L (80×), coma dia. 8' [GAR01]. Sept. 9.46: tail curved to N [CAM03]. Sept. 10.15: parabolic coma [MOR]. Sept. 10.42: in 25.4-cm L (95×), 18" central cond.; in binoculars, fine 3°-3°5 tail, with the first 0°5 very bright [SEA]. Sept. 10.42: tail curved to N [CAM03]. Sept. 10.50: photo w/ T-max film and 135-mm f/3.5 lens (3-min exp.) shows a 1°89 tail in p.a. 90° and a second 0°54 tail in p.a. 40° curving north to the coma [PRI]. Sept. 11.42: broad fan tail with dust and plasma components [SEA]. Sept. 12.39: in 31.7-cm f/5 L (86×), small bright cond./nucleus [JON]. Sept. 12.42: in 15×80 B, 3°5 tail [SEA]. Sept. 13.41: in 15×80 B under poor conditions, tail > 3° [SEA]. Sept. 13.42: in 7×50 B, small bright cond./nucleus [JON]. Sept. 14.45: in 20×80 B, tail is 1°5 long in p.a. 80° [CAM03]. Sept. 15.15: parabolic coma; in 26-cm L (45×-156×), no stellar cond. was present [MOR]. Sept. 15.50: very poor conditions; fleeting observation thru clouds; in 15×80 B, tail > 3° long in p.a. 88° [SEA]. Sept. 15.54: photo w/ T-max film and 135-mm f/3.5 lens (10-min exp.) shows a 2°7 tail in p.a. 100° [PRI]. Sept. 16.38: in 7.8-cm f/8 R (30×), 0°4 tail in p.a. 90° [JON]. Sept. 16.41: tail is 5° long in p.a. 85° [CAM03]. Sept. 16.50: photo w/ T-max film and 135-mm f/3.5 lens (10-min exp.) shows a 1°89 tail streamer in p.a. 100° and a fainter 3°24 tail in p.a. 45° [PRI]. Sept. 17.41: in 10×50 B, tail > 2° long in p.a. 88° [SEA]. Sept. 18.33 and 19.33: very faint to naked eye; tail faint in binoculars [WOL01]. Sept. 18.42: in 10×50 B, 3° tail in p.a. 98° [SEA]. Sept. 19.50: comet seen through breaks in cloud [PRI]. Sept. 22.47: comet next to bright star, could not separate [PRI]. Sept. 22.49: in 20×80 B, tail is 1° long in p.a. 70° [CAM03]. Sept. 23.13: comet was low in haze; hint of a tail [MOR]. Sept. 23.46: comet 20° away from Moon, seen with averted vision [PRI]. Sept. 25.42: in 31.7-cm f/5 L (86×), small strong cond.; broad, diffuse 0°2 tail toward p.a. 105° [JON]. Sept. 26.35: in 4.5-cm f/6 R (13×), coma dia. 5'; in 31.7-cm f/5 L (86×), 0°5 tail in p.a. 115° [JON]. Sept. 27.36: in 31.7-cm f/5 L (86×), small bright cond./nucleus; broad, diffuse 0°3 tail toward p.a. 105°; in 4.5-cm f/6 R (13×), coma dia. 4' [JON]. Sept. 27.44: in 15×80 B, 2° tail in p.a. 110° [SEA].

Oct. 1.39: in 7.8-cm f/8 R (30×), DC = 6-7; in 31.7-cm f/5 L (86×), 0°2 tail in p.a. 110° [JON]. Oct. 5.33: in 31.7-cm f/5 L (86×), 0°2 tail in p.a. 110° [JON]. Oct. 7.37: in 31.7-cm f/5 L (86×), 0°5 tail in p.a. 115° [JON]. Oct. 12.39: in 12×50 B, $m_1 = 6.0$: (MM: S, RF: SC) [D. Wayne Orchiston, Gisborne, New Zealand]. Oct. 19.35: in 31.7-cm f/5 L (86×), DC = 7, 0°4 tail in p.a. 130° [JON]. Oct. 22.34: in 31.7-cm f/5 L (86×), 0°5 tail in p.a. 135° [JON]. Oct. 29.36: comet altitude low; in 31.7-cm f/5 L (86×), coma dia. 2', DC = 5, trace of short tail [JON]. Nov. 13.66: short tail; comet altitude low, strong twilight [JON]. 1991 Jan. 7.51: 3rd quarter moonlight [HAL]. Jan. 11.52: "in 41-cm L, a broad, featureless tail to the NW was strongly suspected; there was even a hint of this tail in 10×50 B" [HAL].

◇ Comet Tsuchiya-Kiuchi 1990i ⇒ 1990 Oct. 16.75: "more clearly visible with Swan Band Filter" [SEA]. Oct. 19.67: comet altitude low [JON]. Oct. 20.39: in 11.5-cm f/8 L (50×, 90×), coma dia. 5', DC = 9, possible 6' tail in p.a. 280° [DID]. Oct. 20.40: tail very faint [BOR]. Oct. 21.38: in 11.5-cm f/8 L (50×, 90×), coma dia. 5', DC = 9, 10' tail in p.a. 270° [DID]. Oct. 23.67: comet altitude low; in 31.7-cm f/5 L (86×), coma dia. 2', DC = 5 [JON]. Oct. 26.66: in 31.7-cm f/5 L (86×), coma dia. 2', DC = 5 [JON]. Oct. 27.37: in 11.5-cm f/8 L (50×, 90×), coma dia. 10', DC = 8, 30" ion tail suspected in p.a. 275° [DID]. Oct. 29.66: in 31.7-cm f/5 L (86×), coma dia. 4', DC = 5 [JON]. (Continued...)

(Continued from previous page) Nov. 5.64: in 31.7-cm $f/5$ L (86 $\times$), coma dia. 2'.5, DC = 4 [JON]. Nov. 7.63: in 31.7-cm $f/5$ L (86 $\times$), coma dia. 3', DC = 5 [JON]. Nov. 9.64: hazy sky [JON]. Nov. 16.03: in 10 $\times$ 50 B, $m_1 \sim 7$, coma dia. $\sim 12'$, DC = 1; on photo taken with Crimean Astrophysical Observatory 0.4-m $f/4$ double astrophotograph, 1.2 tail in p.a. 290° [ZHU]. Nov. 26.80: "comet very close to 9th mag star" [PEA]. Dec. 23.78: "comet very close to 6th mag star; observation difficult" [PEA]. 1991 Jan. 11.22: "low altitude; comet very vague and diffuse" [HAL].

◊ Comet Arai 1991b $\Rightarrow$ 1991 Jan. 16.34: "the central condensation appears more intense than it has during previous observations" [HAL].

◊ Periodic Comet Encke $\Rightarrow$ 1990 Aug. 18.47: "comet suspected, but could not confirm" [MOR]. Oct. 1.15: in 20.3-cm $f/10$ T (80 $\times$), $m_1 = 8.5$ (RF: AA), coma dia. 3', DC = 3, cond. shifted towards the W; coma appeared fan-shaped and more diffuse toward E (no tail) [BRE02]. Oct. 1.19: coma 6' $\times$ 5' [PAN]. Oct. 1.39-21.42: "where necessary, correction for differential extinction has been applied" [BOR]. Oct. 1.39: comet also clearly visible in 10 $\times$ 50 B, but twilight is already in progress; in 20 $\times$ 80 B, coma is circular and dense: well-condensed w/ soft edges; with 31.7-cm L (55 $\times$), coma is perhaps slightly open sunward at p.a. 105° [BOR]. Oct. 1.69: "conditions marginal" [WOL01]. Oct. 4.17: coma 5' $\times$ 4' [PAN]. Oct. 13.53: in 26-cm L (111 $\times$, 156 $\times$), very faint gas tail, a few arcmin long, was glimpsed; comet was very "dense", but did not have a stellar cond.; peak brightness in coma was offset toward the W [MOR]. Oct. 16.41: in 20 $\times$ 80 B, coma tiny and almost starlike; 20 $\times$ 120 B show a minute, intensely condensed, circular coma [BOR].

(Descriptive information continued on next page...)

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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.; 07 = Comet Section, British Astronomical Assn.; 09 = Comet Section, R.A.S. of New Zealand; 11 = Dutch Comet Section; 16 = Yamaneke Group of Comet Observers (c/o Akimasa Nakamura, Aichi, Japan); 18 = Coordinated amateur Polish group, c/o Marek Muciek, Torun, Poland; etc.]. Those with asterisks (*) preceding the 5-character code are new additions to the Observer Key:

CODE	S	OBSERVER, LOCATION	CODE	S	OBSERVER, LOCATION
ABB	07	J. Abbott, England	*MAR07	18	Andrzej Maranda, Poland
*ADA02	18	Jacek Adamik, Poland	*MAT06	18	Lesław Materniak, Poland
AMO		Mauris Amoretti, Italy	MCC03	05	Michael McCants, TX, U.S.A.
AND03		Krasimir Andreev, Bulgaria	MCK	07	Richard McKim, England
BAN	18	Jaroslav Bandurowski, Poland	MEI01	05	David D. Meisel, NY, U.S.A.
BAR04		Antonella Bartolini, Italy	MID01	24	Oernulf Midtskogen, Norway
*BEN04	18	Leszek Benedyktowicz, Poland	MIK		Herman Mikuz, Yugoslavia
*BET01	18	Marcin Betlej, Poland	MIL	05	Dennis Milton, MA, U.S.A.
BOD	18	Robert Bodzon, Poland	MIN	05	R. B. Minton, AZ, U.S.A.
BOE	05	Leo Boethin, The Philippines	MIT	16	Shigeo Mitsuma, Japan
BOR		John E. Bortle, NY, U.S.A.	*MON	05	Robert Monske, PA, U.S.A.
*BOR03	05	Larry Bornhurst, CA, U.S.A.	MOR		Charles S. Morris, U.S.A.
BOT	11	S. J. J. Both, The Netherlands	*MOS01	18	Wacław Moskal, Poland
BUS01	11	E. P. Bus, The Netherlands	*MUL	18	Daniel Mulinski, Poland
CAM03	14	Paul Camilleri, Australia	NAK01	16	Akimasa Nakamura, Japan
CAP	05	Charles F. Capen, AZ, U.S.A.	NOW		Gary T. Nowak, VT, U.S.A.
CHO01	18	Franciszek Chodorowski, Poland	*NOW01	18	Aleksander Nowaczyk, Poland
*CIU	18	Grzegorz Ciura, Poland	*OGA	18	Tomasz Ogaza, Poland
CNO	18	Ryszard Cnota, Poland	OHK	16	Masami Ohkuma, Japan
COM	11	Georg Comello, The Netherlands	OHT	16	Tadao Ohtsuka, Japan
CON	05	Darrell Conger, WV, U.S.A.	*OKA05	16	Takuma Oka, Japan
CUR01	09	David J. Curtis, New Zealand	OLE	18	Arkadiusz Olech, Poland
CWI	18	Robert Cwiertnia, Poland	PAN	07	Roy N. Panther, England
DAH	24	Haakon Dahle, Norway	PAR03	18	Mieczysław Paradowski, Poland
DAL01	18	Grzegorz Dalek, Poland	*PAT01	18	Malgorzata Patyna, Poland
DEA		V. F. de Assis Neto, Brazil	PEA	14	Andrew R. Pearce, Australia
DEL	05	Kenneth J. Delano, MA, U.S.A.	PER01		Alfredo Jose Serra Pereira, Portugal
*DER	18	Oskar Deren, Poland	*PER04	18	Lukasz Percec, Poland
*DID		Richard Robert Didick, MA, U.S.A.	*PER05	18	Piotr Perzek, Poland
DUS	18	Grzegorz Duszynowicz, Sweden	*PIO	18	Tomasz Piotrowski, Poland
FEI	11	Henk Feijth, The Netherlands	PLE01	18	Janusz Pleszka, Poland
*FIL04	18	Marcin Filippek, Poland	*POW	18	Przemysław Powalko, Poland
*FRA01	07	James Fraser, Scotland	PRI	14	Robert T. Price, Australia
GAM	18	Mariusz Gamracki, Poland	RAD01		Veselka Radeva, Bulgaria
GAR01	14	Gordon Garrard, N.S.W., Australia	RAF	18	Jerzy Rafalski, Poland
GAR02		Stephane Garro, France	*REE	05	Elmer J. Reese, U.S.A.
GLE	05	William H. Glenn, NY, U.S.A.	*ROY		Ronald Royer, CA, U.S.A.
GOR02	18	Marcin Gorko, Poland	RZE	18	Zbigniew Rzepka, Poland
*GOZ	18	Miroslaw Gozdziwski, Poland	*RZE01	18	Marcin Rzepka, Poland
GRA03	05	Bill Grady, WV, U.S.A.	*SAN02	18	Artur Sankowski, Poland
GRA04	24	Bjoern Haakon Granslo, Norway	SCH04	11	A. H. Scholten, The Netherlands
GRE		Daniel W. E. Green, U.S.A.	SCI	18	Tomasz Scholz, Poland
GRO03	18	Radosław Grochowski, Poland	SEA	14	David A. J. Seargent, Australia
HAL		Alan Hale, U.S.A.	SEK	05	Tsutomu Seki, Japan
HAS02		Werner Hasubick, West Germany	SHA02	07	Jonathan D. Shanklin, England
HAV		Roberto Haver, Italy	SBA04		Gregory T. Shanos, U.S.A.
*HER03	05	Alika Herring, HI, U.S.A.	SIM	05	Karl Simmons, FL, U.S.A.
HIR02		Satoshi Hirai, Japan	SIW	18	Ryszard Siwiec, Poland
HOU	05	Walter Scott Houston, CT, U.S.A.	*SKA	18	Jaroslav Skalski, Poland
ISH02	16	Akiyoshi Ishikawa, Japan	SMI01	05	Doug Smith, NY, U.S.A.
IWA01	16	Yoshitaka Iwaki, Japan	SMI02	05	J. Russell Smith, TX, U.S.A.
IWA02	18	Mariusz Iwanski, Poland	SOC	18	Krzysztof Socha, Poland
JAR	18	Krzysztof Jaroszewski, Poland	*SOL	05	Gordon Solberg, NM, U.S.A.
*JOH02	05	Craig L. Johnson, CO, U.S.A.	*SOW	16	Toshihide Sowa, Japan
JON	09	Albert F. Jones, New Zealand	SPE01	18	Jerzy Speil, Poland
KAC	18	Grzegorz Kaczmarczyk, Poland	SFR		C. E. Spratt, BC, Canada
*KAM03	16	Toshiyuki Kamijima, Japan	STE01	05	Chris Stephan, OH, U.S.A.
KAN	16	Kiyotaka Kanai, Japan	*SWI	18	Mariusz Swietnicki, Poland
*KAN02	18	Kazimierz Kandefor, Poland	SZA		Sa'ndor Szabo', Hungary
*KIE	18	Grzegorz Kieltyka, Poland	SZA01	18	Robert Szaj, Poland
*KIE01	07	N. S. Kienan, England	SZU	18	Mieczysław Szulc, Poland
KOL02	18	Andrzej Kolasinski, Poland	TAN02	07	Tony Tanti, Malta
*KOL03	18	Szymon Kolodziej, Poland	TAY	07	M. D. Taylor, England
*KOM	18	Artur Komorowski, Poland	URB	18	Piotr Urbanski, Poland
KON01	18	Maciej Konacki, Poland	VAN05		G. van Biesbroeck, Belgium
KOS01	18	Janusz Kosinski, Poland	WES04	18	Tomasz Weselak, Poland
KOS02	18	Witold Kosiek, Poland	WIL02	14	Peter F. Williams, Australia
KOS03	18	Kazimierz Kosz, Poland	*WIL05	18	Janusz Wiland, Poland
KRE	18	Witold Kremienowski, Poland	*WIS02	18	Artur Wisniewski, Poland
KUI	11	G. Kuipers, The Netherlands	WOL01	09	Graham W. Wolf, New Zealand
LAA	11	T. A. van der Laan, The Netherlands	WO001	05	Wayne Wooten, FL, U.S.A.
*LAS	18	Miroslaw Laskowski, Poland	*WOZ	18	Przemysław Wozniak, Poland
*LIN03		Chii-Sheng Lin, Taiwan	YAS	16	Masanori Yasuki, Japan
*LOO01		Frans R. van Loo, Belgium	ZAN01	11	W. T. Zanstra, The Netherlands
*LUB	18	Jozef Lubas, Poland	*ZBR	18	Mariusz Zbrzezniak, Poland
*LUK01	18	Jerzy Lukaszewicz, Poland	*ZER	18	Marek Zeromski, Poland
*LUK02	18	Elzbieta Lukaniuk, Poland	ZHU		Sergey Valentinovich Zhuiko, U.S.S.R.
*LUK03	18	Sabina Lukaniuk, Poland			

(Descriptive information continued from previous page)

Oct. 17.41: "coma so tiny and yet strongly condensed that it can be taken for a star at first glance; early twilight" [BOR].
 Oct. 20.42: "comet situated in the heart of the Zodiacal Light; coma minute, circular, and strongly condensed; comet is clearly much fainter in appearance than the adjacent star of mag 7.6, and only slightly brighter than the star of mag 8.3 — definitely indicating that the comet is fainter than has been reported by some others; early twilight" [BOR].
 Oct. 21.42: "sky is overspread w/ broken cirrus; the comet and comparison stars and never simultaneously free of cloud, so no magnitude determination is possible; however, the comet appears essentially the same as it did yesterday w/ regard to brightness and visibility; significant twilight; comet only a week from perihelion passage" [BOR].

◊ *Periodic Comet Honda-Mrkos-Pajdušáková (1990f)* $\Rightarrow$ 1990 Sept. 1.50: "tail of 30' in p.a. 285° suspected" [MOR].
 Sept. 10.51: in 26-cm L (45 $\times$), comet was "dense", but had no stellar condensation; a 2' tail in p.a. 270° was suspected [MOR].

◊ *Periodic Comet Kearns-Kwee (1989u)* $\Rightarrow$ 1991 Jan. 16.27: "the comet has grown significantly more diffuse than it was earlier in the apparition" [HAL].

◊ *Periodic Comet Klemola (1976j)* [all observations by BOR with 32-m f/5.6 L (88 $\times$)] $\Rightarrow$ 1976 Sept. 23.24: "small, slightly condensed coma w/ a possible nuclear cond. perhaps slightly NW of coma's center". Sept. 25.18: "small, circular coma w/ a fairly strong nuclear cond."

◊ *Periodic Comet Metcalf-Brewington (1991a)* $\Rightarrow$ 1991 Jan. 7.24: "altitude very low, atmosphere very damp; the observation was hurried" [HAL]. Jan. 8.10: "although this may be due in part to better conditions, the comet appears distinctly brighter and larger than it did the previous night" [HAL].

◊ *Periodic Comet Schwassmann-Wachmann 1* $\Rightarrow$ 1990 Sept. 14.93: at 130 $\times$, $m_1 = 12.0$ (RF: V), coma dia. = 1'0, DC = 3 [MID01]. Sept. 15.24: "no stellar cond." [MOR]. Sept. 15.86: at 130 $\times$, $m_1 = 11.9$ (RF: V), coma dia. = 1'1, DC = 3 [MID01]. Dec. 9.13: "comet suspected at $m_1 \simeq 13.6$ " [MOR]. 1991 Jan. 11.19: "comet's position fairly close to star of $m_v \sim 12$ " [HAL].

◊ *Periodic Comet Shoemaker-Levy 1 (1990o)* $\Rightarrow$ 1990 Dec. 9.15: "comet not definitely seen; suspect of $m_1 = 13.6$ -13.8 was in comet's position" [MOR].

◊ *Periodic Comet Swift-Gehrels (1991c)* $\Rightarrow$ 1991 Jan. 14.07: attempted recovery [HAL].

◊ *Periodic Comet Wild 2 (1989t)* $\Rightarrow$ 1990 Oct. 13.52: "comet suspected at limit of vision" [MOR]. Oct. 14.53: "comet was quite small (1'); no central condensation was obvious" [MOR].

◊ *Periodic Comet Wild 4 (1990a)* $\Rightarrow$ 1990 July 14.20 and 15.20: in 26-cm L (156 $\times$), comet suspected at $m_1 = 13.0$: [MOR].

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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 L, U, 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 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). "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 abbreviations used in the *ICQ* is available from the Editor for \$4.00 postpaid.

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Comet Arend-Roland 1957 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 01 02.0	O	9.2:		20.3	L		80			&0.13		MEI01
1957 01 03.08	O	10.5:		20.3	L		80			&0.13		MEI01
1957 01 11.94	O	9.0:		20.3	L		80					MEI01
1957 01 15.0		10.5:		20.3	L		80	2.5		0.11	60	MEI01
1957 01 18.02	O	8.4:		20.3	L		40	2.8			50	MEI01
1957 01 20.01	O	8.5:		20.3	L		40	& 2		0.08	50	MEI01
1957 01 22.0	O	8.4:		20.3	L		40	& 3		0.17	48	MEI01
1957 02 03.06		8.3:		20.3	L		40	4		0.27	30	MEI01
1957 02 14.04		9 :		20.3	L		40	& 1				MEI01
1957 02 18.03		8.1:		20.3	L		40				35	MEI01
1957 02 22.0		8.5:		20.3	L		40	3.5		&0.42	75	MEI01
1957 04 25.04		2 :		5.0	B		7			&2.5		MEI01
1957 04 28.04		1.8:		20.3	L		80					MEI01
1957 04 28.04		2.3:		5.0	B		7	10		1	330	MEI01
1957 04 29.09		2.5:		20.3	L		80					MEI01
1957 04 30.07		2.5:		5.0	B		7	15		8.5	325	MEI01
1957 05 01.07		3.2:		5.0	B		7					MEI01
1957 05 02.08		2.9:		20.3	L		80					MEI01
1957 05 02.08		3.5:		5.0	B		7					MEI01
1957 05 04.1		4.2:		0.0	E		1					DEL
1957 05 04.15		4.5:		5.0	B		7			&5		MEI01
1957 05 05.07		5.5:		5.0	B		7					MEI01
1957 05 07.06		4.0:		0.0	E		1					DEL
1957 05 07.08		4.4:		5.0	B		7					MEI01
1957 05 08.12		5.5:		5.0	B		7			&5		MEI01
1957 05 09.1		5.0:		4.0	R		10					DEL
1957 05 09.10		6.5:		5.0	B		7			&5		MEI01
1957 05 17.12		7.5:		5.0	B		7			&1.5		MEI01
1957 05 17.12		8.5:		20.3	L		80	& 4.5		&0.9	96	MEI01
1957 05 25.22		7.8:		5.0	B		7	& 3		1.5	100	MEI01
1957 05 25.22		8.2:		20.3	L		80					MEI01
1957 05 30.1		3.0:		0.0	E		1					DEL

Comet Ikeya-Seki 1965 VIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1965 09 22.49	O	7.7	AG	17.8	R		40					MIL
1965 09 23.49		7.2	AG	17.8	R							MIL
1965 09 23.50	O	7.0:	S	5.0	B		7					MIN
1965 09 24.48		6.3	Y	15.2	L		70	& 2.5				SOL
1965 09 24.48	O	6.6	Y	5.0	B		7					MIN
1965 09 24.50		6.5	AG	3.5	B		7					MIL
1965 09 25.49		6.3	AG	3.5	B		7					MIL
1965 09 26.47	O	6.6:	Y	5.0	B		7					MIN
1965 09 26.49		6.3	SP	15.2	L		70	& 3.5				SOL
1965 09 26.50		6.2	Y	3.5	B		7					MIL
1965 09 27.48	O	6.1	SP	5.0	B		7					MIN
1965 09 27.49		5.8	SP	3.0	B		8					SOL
1965 09 28.47	O	6.1	SP	5.0	B		7					MIN
1965 09 28.49		5.5	SP	3.0	B		8					SOL
1965 09 28.5		5.8		3.0	B		6					REE
1965 09 30.48		5.2	SP	3.0	B		8					SOL
1965 10 01.48	O	4.6:	Y	5.0	B		7					MIN
1965 10 02.48		5.0	SP	3.0	B		8					SOL
1965 10 02.48	O	5.3	Y	5.0	B		7			0.5	268	MIN
1965 10 04.49		4.9	SP	3.5	B		7			0.75		MIL
1965 10 04.49	O	5.0:	Y	5.0	B		7					MIN
1965 10 05.48	O	5.0:	Y	5.0	B		7			2	260	MIN

Comet Ikeya-Seki 1965 VIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1965 10 05.49		4.9	Y	3.0	B		8					SOL
1965 10 05.49		5.0	SP	3.0	B		8					SOL
1965 10 05.5		4.9		3.0	B		6					REE
1965 10 05.5	P	4.7:			A					>4		CAP
1965 10 06.49		4.6	UX	3.5	B		7			1		MIL
1965 10 06.49		4.6	Y	3.0	B		8					SOL
1965 10 06.49		4.6	Y	5.0	B		7					MIN
1965 10 06.49		4.7	SP	3.0	B		8					SOL
1965 10 06.49		4.7	SP	5.0	B		7			1.5	265	MIN
1965 10 07.49		4.5	AE	3.0	B		8					SOL
1965 10 07.49	O	3.8:	Y	5.0	B		7			1.5	270	MIN
1965 10 07.49	O	4.1:	SP	5.0	B		7					MIN
1965 10 07.5		4.4		3.0	B		6					REE
1965 10 08.44		4.0	Y	5.0	B		7					SIM
1965 10 08.44		4.2	SP	5.0	B		7					SIM
1965 10 08.47		3.9	Y	3.0	B		6					MCC03
1965 10 08.47		4.2	SP	3.0	B		6					MCC03
1965 10 08.49		3.8	Y	3.0	B		8					SOL
1965 10 08.49		4.0	SP	3.0	B		8	1.5		2		SOL
1965 10 08.49	O	3.7	Y	5.0	B		7					MIN
1965 10 08.49	O	3.9	SP	5.0	B		7			1	270	MIN
1965 10 08.50		4.2	UX	3.5	B		7			3		MIL
1965 10 09.43		3.8	SP	5.0	B		7					SIM
1965 10 09.49	O	3.3:	SP	5.0	B		7	& 2	4/	1	270	MIN
1965 10 09.86		3.3:	SP	6.0	B		20		6/	&0.33		BOE
1965 10 10.50		3.3	Y	3.0	B		8					SOL
1965 10 10.50		3.4	Y	3.0	B		8					SOL
1965 10 10.50		3.6	SP	3.0	B		8					SOL
1965 10 12.5		3.4		3.0	B		6					REE
1965 10 12.51		3.0:	Y	3.0	B		8					SOL
1965 10 12.51	O	3.4	Y	5.0	B		7			0.5	270	MIN
1965 10 13.51		3.0:		3.0	B		8					SOL
1965 10 13.51	O	3.2:	Y	5.0	B		7			0.5		MIN
1965 10 14.52		3.5:		5.0	B		7			&0.5	270	MIN
1965 10 17.50		1 :		20.3			40	& 1.5	7/	<0.5		MCC03
1965 10 20.68		-6 :		3.0	B		6			1		REE
1965 10 20.74		-6 :		5.0	B		7			0.33		JOH02
1965 10 20.80		-8 :		3.0	B		6			1		REE
1965 10 20.81		-9.5:		5.0	B		7			1.5		CAP
1965 10 20.82		-6.5:		10.2	L		135	& 0.75		&0.02		JOH02
1965 10 20.9		-6.7		0.0	E		1	& 2		2.25		MEI01
1965 10 20.92		-8 :		5.0	R		8					SOL
1965 10 20.92		-10.5:		0.0	E		1		8	&4		CAP
1965 10 20.93		-7 :		10.2	L		45			&0.04		MIN
1965 10 21.58		-6 :		10.2	L		45			&0.02		MIN
1965 10 21.59		-10 :		15.2	R		40			&1.5		CAP
1965 10 21.60		-4 :		6.4			70	& 0.17	9	&0.04		SOL
1965 10 21.72		-5 :		3.0	B		6			0.5		REE
1965 10 21.88		-5 :		0.0	E		1	8		1		SEK
1965 10 22.87		-3 :		0.0	E		1	8		1		SEK
1965 10 24.46		-0.5:	SP	5.0	B		7		5	1.5	125	SIM
1965 10 25.52		1.0:		0.0	E		1			15		SOL
1965 10 26.5		1.8		3.0	B		6					REE
1965 10 26.51		1.8:	AE	3.0	B		8					SOL
1965 10 26.52		2.5:	Y	5.0	B		7			10	265	MIN
1965 10 26.85		1 :		0.0	E		1			25		SEK
1965 10 27.50		2.3:	AE	3.0	B		8					SOL
1965 10 27.84		2 :		0.0	E		1			25		SEK

Comet Ikeya-Seki 1965 VIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1965 10 28.45		3.5:	Y	0.0	E		1			15		WOO01
1965 10 28.5		2.8		3.0	B		6					REE
1965 10 28.50		3.1	AE	5.0	B		8					SOL
1965 10 29.44		2.7:	SP	5.0	B		7			17.5	90	SIM
1965 10 29.50		3.3	Y	5.0	B		8					SOL
1965 10 29.50		3.4	AE	5.0	B		8					SOL
1965 10 29.83		3 :		0.0	E		1					SEK
1965 10 30.43		4.2		4.0	R		8	& 0.5				MEI01
1965 10 30.43	O	3.6	UX	5.0	B		7	& 2		18		GLE
1965 10 30.46		4.0:	UX	5.1	R			2	7	16	275	MCC03
1965 10 30.49		3.4	AE	5.0	B		8					SOL
1965 10 31.43		4.4		4.0	R		8	& 0.5				MEI01
1965 10 31.43	O	4.0	UX	5.0	B		7	& 1		15		GLE
1965 10 31.50		3.9	AE	5.0	B		8					SOL
1965 11 01.41		4.7	Y	5.0	R		7			20		DEL
1965 11 01.43		4.7		4.0	R		8	& 0.83				MEI01
1965 11 01.50		4.2	AE	5.0	R		8					SOL
1965 11 01.84		3 :		0.0	E		1			20		SEK
1965 11 02.39		4.6	UX	5.0	B		7	& 0.5		15		GLE
1965 11 02.41		4.0	Y	5.0	R		7	& 0.33		20		DEL
1965 11 02.44		4.1	SP	5.0	B		7		7/	18.5	91	SIM
1965 11 02.44	O	3.8	AT	5.0	B		7	& 2.5	7/	22	82	CON
1965 11 02.51		4.4	Y	5.0	R		8					SOL
1965 11 02.84		4 :		0.0	E		1					SEK
1965 11 02.85		3 :	UA	6.0	B		20		7/	24	94	BOE
1965 11 03.43		4.5	SP	5.0	B		7			21.3		SIM
1965 11 03.43	O	4.3	AT	5.0	B		7		7/	24		CON
1965 11 03.83		4 :		0.0	E		1			15		SEK
1965 11 03.85		3 :	UA	6.0	B		20		8	30	69	BOE
1965 11 04.43		4.6	SP	5.0	B		7			23	85	SIM
1965 11 04.50		4.7	SP	5.0	R		8					SOL
1965 11 04.85		3.5:	UA	6.0	B		20		8	25		BOE
1965 11 05.42	O	5.0:	UX	5.0	R		7			22		DEL
1965 11 05.50		5.2	SP	5.0	R		8			23		SOL
1965 11 06.4		4.9	UX	5.0	B		7	& 0.5		21.5		GLE
1965 11 06.50		5.4	Y	5.0	R		8	1.5	4	21		SOL
1965 11 07.50		5.5	Y	5.0	R		8					SOL
1965 11 09.86		6 :		15	R		27	15		>5		SEK
1965 11 15.41	O	6.5:	US	4.4	R		6					DEL
1965 11 16.85		6.5:		15	R		27	15				SEK
1965 11 17.81		7 :		15	R		27	&20		>5		SEK
1965 11 20.44	O	6.5	Y	5.0	B		7		6	12	85	CON
1965 11 20.51		6.8:		3.0	R		8			18		SOL
1965 11 21.85		5.0:	Y	6.0	B		20			23	108	BOE
1965 11 22.81		6.0:	Y	6.0	B		20			38	117	BOE
1965 11 23.77		6.0:	Y	6.0	B		20	& 7	5	30	122	BOE
1965 11 24.69		6.0:	Y	6.0	B		20			30	122	BOE
1965 11 26.51		7.5:		3.0	R		8					SOL
1965 11 27.83		8 :		15	R		27	13				SEK
1965 11 28.45	O	8.5:	S	6.0	R		45	6	6			GRA03
1965 12 03.79		8.5:		6.0	B		20			&5		BOE
1966 01 09.34		10 :		31.8	L		75	2				HER03
1966 01 31.25		11 :		31.8	L		75	1				HER03

Comet Alcock 1965 IX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1965 10 08.02		10 :		31.8	L		48	< 5	7			SIM
1965 10 18.10		10.8	UM	20.3			80	& 2.5	1/			MCC03

Comet Barbon 1966 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 09 08.21		11.0:	AC	15.2	L		48	& 3	3/			SIM
1966 09 15.19		11.5:	AC	15.2	L		48	< 2	0			SIM
1966 09 23.14		12.0	AC	15.2	L		48	2	0			SIM
1966 09 24.18		12.0:	AC	15.2	L		48	& 1.5	2/			SIM
1966 10 12.09		12.5:		15.2	L		48	& 1	2			SIM

Comet Ikeya-Everhart 1966 IV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 09 17.07		9.6	AC	10.2	R	8	50					HOU
1966 09 17.15		9.5:	BD	15.2								MIL

Comet Kilston 1966 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 08 14.12		9.8	AC	25.4		4		30		?1		HOU
1966 08 15.16		9.0:	V	15.2	L		48	& 1	8			SIM
1966 08 19.08		9.7	AC	10.2	R		50	8				HOU
1966 08 19.12		9.6	UM	12.7	B		20	30				HOU
1966 08 21.17		9.9		12.7	R			&20				HOU
1966 08 24.25		10.2	AC	10.2	R		20	20				HOU
1966 09 07.06		9.6	AC	10.2	R		50					HOU
1966 09 12.10		10.4	AC	10.2	R							HOU
1966 09 15.04		9.9	AC	15.2	L		48	1.5	2	0.02	350	SIM
1966 09 16.25		10.5	AC	10.2	R			1				MIL
1966 09 17.03		10.3	AC	15.2	L		48	1.5	2			SIM
1966 09 17.06		9.3	AC	10.2	R		50					HOU
1966 09 18.04		10.0	AC	15.2	L	8	21		8			SMI01
1966 09 18.06		10.3	AC	15.2	L		48	& 1.5	2	0.02	0	SIM
1966 09 18.19		10.4	AC	48								BOR03
1966 09 19.08		10.5	AC	20.3	L		60		6/			SMI02
1966 09 23.04		10.7	AC	15.2	L		48	< 1	2			SIM
1966 09 27.08		10.5	AC	15.2	L		48	< 1	2			SIM
1966 09 30.04		10.0	AC	15.2	L		48	& 0.5	8			SIM
1966 10 01.08		10.0	AC	15.2	L		48	< 1	8			SIM
1966 10 02.04		10.5:	AC	15.2	L	8	21		6/	?		SMI01
1966 10 03.00	N	11.0	AC	15.2	L	8	50					BOR
1966 10 03.00	O	9.5	AC	15.2	L	8	50	& 2	9			BOR
1966 10 03.02		10.3:	AC	15.2	L	8	21		7			SMI01
1966 10 03.02	O	9.8	AC	31.8	L		50	0.67	3			DEL
1966 10 04.01	O	9.7	AC	31.8	L		50	0.5	3			DEL
1966 10 04.01	O	10.0:	AC	15.2	L	8	21		7/			SMI01
1966 10 06.00	O	9.6	AC	15.2	L	8	50	& 2	8/			BOR
1966 10 06.01	O	10.1	AC	15.2	L	8	21		7/			SMI01
1966 10 07.00	O	9.4	AC	15.2	L	8	50	& 2	8/			BOR
1966 10 07.01		10.0	AC	15.2	L	8	21		8			SMI01
1966 10 07.01		10.1	AC	31.8	L		50		5			DEL
1966 10 07.04		10.5:	AC	20.3	L	6	46	& 0.75				MON
1966 10 08.00	O	9.3	AC	15.2	L	4		& 3	8			BOR
1966 10 08.02		10.0	AC	15.2	L	8	21		8			SMI01
1966 10 08.02		10.2	AC	20.3	L	6	46	& 0.67				MON
1966 10 08.02	O	10.1	AC	31.8	L		50					DEL
1966 10 09.00	N	11.0	AC	15.2	L	8	50					BOR
1966 10 09.00	O	9.3	AC	15.2	L	8	50	& 2	8			BOR
1966 10 09.04		10.1	AC	31.8	L		50					DEL
1966 10 10.01	O	9.9	AC	31.8	L		50		5			DEL
1966 10 10.99	N	11.0	AC	15.2	L	8	50					BOR
1966 10 10.99	O	9.3	AC	15.2	L	8	50	& 2	7			BOR
1966 10 12.08		10.5	AC	15.2	L		48	< 0.5	4			SIM

Comet Kilston 1966 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 10 13.01	O	9.2	AC	15.2	L	8	50	& 1.5	7			BOR
1966 10 15.00	O	8.8	AC	15.2	L	4		& 4	8			BOR
1966 10 15.11		10.3	AC	15.2	L		48	< 1	1			SIM
1966 10 16.10		10.0	AC	15.2	L		48	& 1	3			SIM
1966 10 16.12	N	11 :	AC	15.2	L	4						BOR
1966 10 16.12	O	8.8	AC	15.2	L	4		4	7			BOR
1966 10 16.99	N	11 :	AC	15.2	L	8	50					BOR
1966 10 16.99	O	9.1	AC	15.2	L	8	50	& 2	7			BOR
1966 10 17.01		10.0	AC	15.2	L		48	1.5	1			SIM
1966 10 18.04		10.0	AC	15.2	L		48	& 1	4			SIM
1966 10 19.00		10.4	AC	15.2	L		48	< 1	4			SIM
1966 10 20.12		9.2	S	15.2	R							MIL
1966 10 20.99	O	8.7	AC	15.2	L	8	50	& 1				BOR
1966 10 23.99		10.5	AC	15.2	L		48	< 1	0			SIM
1966 10 25.07		10.5	AC	15.2	L		48	< 1	1			SIM
1966 10 25.99	N	11.2:	AC	15.2	L	8	50					BOR
1966 10 25.99	O	9.0	AC	15.2	L	8	50	& 1	5/			BOR
1966 10 27.99		10.3	AC	15.2	L		48	& 0.5	2			SIM
1966 10 29.02		10.3	AC	15.2	L		48	< 1	6			SIM
1966 10 29.98		10.4	AC	15.2	L		48	< 1	5			SIM
1966 11 02.00		10.3	AC	15.2	L		48	< 1	5			SIM
1966 11 03.03		9.8	AC	15.2	L		48	< 1	5	0.05	290	SIM
1966 11 04.00		10.2	AC	15.2	L		48	& 1.5	4			SIM
1966 11 04.01	O	9.2	S	15.2	L	8	50	& 1	3/			BOR
1966 11 06.02		10.4	AC	15.2	L		48	& 3	6			SIM
1966 11 10.01		10.5	AC	15.2	L		48	& 3	1			SIM
1966 11 11.00		10.5	AC	15.2	L		48	< 1	1			SIM
1966 11 14.05	O	9.0	AC	15.2	L	6		& 2.5	2			BOR
1966 11 19.98		10.4	AC	15.2	L		48	< 1	0			SIM
1966 11 26.00		10.8	AC	15.2	L		48	< 1	3			SIM
1966 11 29.12		10.0	AC	15.2	L		48	< 1	3			SIM
1966 11 30.01		10.7	AC	15.2	L		48	< 0.8	5			SIM
1966 12 01.02		11.0	AC	15.2	L		48	< 0.8	4			SIM
1966 12 02.01		11.0	AC	15.2	L		48	< 1	3			SIM
1966 12 09.01		10.8	AC	15.2	L		48	< 0.5	2			SIM

Comet Rudnicki 1967 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 11 04.08		12.5	AC	15.2	L		48	< 1	0			SIM
1966 11 05.24		12.0	AC	15.2	L		48	& 1	0			SIM
1966 11 10.13		12.0	AC	15.2	L		48	& 1.0	0			SIM
1966 11 11.12		11.5	AC	15.2	L		48	& 1	0			SIM
1966 11 18.25		8.5	BD	15.2	R							VAN05
1966 11 24.98		10.7	AC	15.2	L		48	< 1	5			SIM
1966 11 30.02		10.4	AC	15.2	L		48	< 1	4			SIM
1966 12 01.03		9.8	AC	15.2	L		48	& 5	0	?0.29	90	SIM
1966 12 02.00		9.6	AC	15.2	L		48	& 5	0			SIM
1966 12 02.06	O	8.5:	S	15.2	L	8	21		0/			SMI01
1966 12 03.18		9.6	AC	15.2	L		48	& 5	0			SIM
1966 12 03.97		9.0:	S	15.2	L	8	21		0/			SMI01
1966 12 05.05	i O	7.6	AC	5.0	B		7	15	2			CON
1966 12 09.01		8.5	AC	15.2	L		48	& 6	0	0.33	75	SIM
1966 12 10.00		8.5	AC	15.2	L		48	& 6	0			SIM
1966 12 13.02	O	7.7	S	5.0	B		7					CON
1966 12 15.02		7.5	AC	15.2	L		48	& 3	0			SIM
1966 12 15.02		8.7:	S	15.2	L	8	21	& 4	1/			SMI01
1966 12 16.00	O	7.2	S	5.0	B		7			0.5	85	CON
1966 12 16.01	O	7.5	S	15.2	L	8	21	4.5	1/			SMI01

Comet Rudnicki 1967 II [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 12 17.01	O	7.2	S	5.0	B		7					CON
1966 12 20.98		7.0:	AC	15.2	L		48	5.7	0	0.33	70	SIM
1966 12 22.99		6.8	AC	5.0	B		7					SIM
1966 12 22.99		7.0	AC	15.2	L		48	& 4	1			SIM
1966 12 24.99		7.3	AC	5.0	B		7					SIM
1966 12 26.98	O	6.0	Y	5.0	B		7					CON
1966 12 30.99	O	6.0	Y	5.0	B		7			0.25		CON
1967 01 01.99		6.2	SP	15.2	L		48	& 5	3	0.08	115	SIM
1967 01 02.98	O	6.0	Y	5.0	B		7			?0.25		CON
1967 01 03.04	i O	6.1	S	5.0	B		7	& 4.5	4	0.25	90	MCC03
1967 01 04.08		6.8	S	5.0	R		8					MIL
1967 01 04.99		6.0	SP	5.0	B		7					SIM
1967 01 28.48		6.8	AC	5.0	B		7	& 4	0			SIM
1967 02 05.47		8.0	AC	15.2	L		48	& 1.5	2			SIM
1967 02 11.46		8.5	AC	20.3	L		39	< 0.5	8			SIM

Comet Bradfield 1980 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 07.38	S	5.2	S	6	R	12	22	3	7/	0.8	50	NAK01
1981 01 08.37	S	5.3	S	6	R	12	22	3	7	1.1	40	NAK01
1981 01 10.36	S	5.8	S	6	R	12	22	2.5	8	0.8	45	NAK01
1981 01 11.37	S	6.0	S	6	R	12	22	3	8	0.8	45	NAK01
1981 01 13.37	B	4.9	S	6	R	12	22	3	7	0.6	50	NAK01
1981 01 14.37	B	4.9	S	6	R	12	22	3	7	1.0	40	NAK01
1981 01 16.37	B	5.3	S	6	R	12	22	2.5	7	0.3	50	NAK01
1981 01 17.41	S	5.8	S	6	R	12	22	2	6			NAK01
1981 01 20.39	S	7.3	S	6	R	12	22	2	6			NAK01
1981 01 22.38	S	6.8	S	6	R	12	22	3.5	7	0.17	40	NAK01
1981 01 23.38	S	7.0	S	6	R	12	22	3	7			NAK01
1981 01 26.39	S	7.1	S	6	R	12	22	4	6			NAK01
1981 01 27.38	S	7.2	S	6	R	12	22	3	6			NAK01
1981 01 28.38	S	7.3	S	6	R	12	22	3.2	5			NAK01
1981 01 30.38	S	7.7	S	6	R	12	22	2.5	5			NAK01

Comet Terasako 1986 XVIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 01 28.40	S	7.7	AC	20	L	6	69	3	3			ISH02
1987 01 30.40	S	8.0	AC	13	L	6	44	3	3			ISH02
1987 02 02.40	S	7.8	AC	13	L	6	24	4	3			ISH02
1987 02 05.40	S	8.0	AC	13	L	6	44	3	2			ISH02
1987 02 08.40	S	8.6	AC	13	L	6	44	3	2			ISH02
1987 02 14.40	S	8.5	AC	13	L	6	44	3	3			ISH02
1987 02 15.41	S	8.6	AC	13	L	6	44	3	3			ISH02
1987 02 16.42	S	8.4	AC	13	L	6	44	4	3			ISH02
1987 02 26.42	S	8.7	AC	20	L	6	50	5	2			ISH02
1987 02 28.44	S	8.9	AC	20	L	6	69	4	3			ISH02
1987 03 01.43	S	9.0	AC	20	L	6	50	4	2			ISH02
1987 03 02.42	S	9.1	AC	13	L	6	44	4	2			ISH02
1987 03 03.42	S	9.4	AC	13	L	6	44	3.5	2			ISH02

Comet Wilson 1987 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 05 26.07	S	6.8	AA	3.5	B		7					STE01

Comet Yanaka 1988 XX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 05.86	S	10.8	AC	12	L	7	44	2	2			YAS

Comet Yanaka 1988 XXIV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 03.82	S	9.0	S	13	L	6	33	4	5			KAM03
1989 01 03.84	B	9.0	S	30	L	6	55	2	4			OKA05
1989 01 05.86	S	9.2	AA	12	L	7	44	2	4	0.05	280	YAS
1989 01 15.87	S	10.6	AC	12	L	7	44	1.5	2			YAS

Comet Okazaki-Levy-Rudenko 1989 XIX = 1989r

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 09 20.42	M	8.1	AC	20	L	6	46	5.5	4			NAK01
1989 09 20.46	S	9.1	AA	13	L	6	44	3	3			ISH02
1989 09 20.46	S	10.0	AC	20	L	6	82					OHT
1989 09 23.45	S	8.5	AA	12	L	7	44	3	3			YAS
1989 09 23.83	S	8.9	S	21.0	L	5	37	2	4			TAY
1989 09 24.82	S	9.0	S	21.0	L	5	37	2	6			TAY
1989 09 28.80	S	8.7	S	21.0	L	5	37	2	4			TAY
1989 10 01.43	M	7.8	AC	20	L	6	46	5	4			NAK01
1989 10 04.41	M	7.7	AC	20	L	6	46	4.5	5/			NAK01
1989 10 04.44	M	7.8	S	13	L	6	33	5	6			KAM03
1989 10 04.82	B	6.5	S	5.6	B		11		6			OKA05
1989 10 08.40	M	7.8	AC	20	L	6	46	4	6		70	NAK01
1989 10 08.40	S	7.2	AA	10	L	6	24	4	5			YAS
1989 10 08.41	S	7.7	S	10.0	B		14	5	3			IWA01
1989 10 08.42	S	7.5	AA	13	L	6	24	4	4			ISH02
1989 10 08.42	S	8.2	AA	12.0	B		20	4	5			MIT
1989 10 09.40	S	7.3	AA	10	L	6	24	4	5			YAS
1989 10 09.41	S	7.4	AA	13	L	6	24	3	4			ISH02
1989 10 09.42	S	8.0	S	13	L	6	33	5	6			KAM03
1989 10 17.42	S	7.5	AA	13	L	6	24	4	4			ISH02
1989 10 18.40	S	7.6	AA	13	L	6	24	3	3			ISH02
1989 10 18.41	S	6.8	AA	10	L	6	24	3	5			YAS
1989 10 20.39	S	7.1	AA	7.0	B		10	4	4			ISH02
1989 10 20.39	S	7.3	AA	13	L	6	24	4	4			ISH02
1989 10 20.41	M	6.8	AA	20	L	6	46	4	7			NAK01
1989 10 22.39	S	6.7	AA	12	L	7	44	2.5	5			YAS
1989 10 23.38	S	7.0	AA	7.0	B		10	5	5			ISH02
1989 10 23.39	S	7.1	AA	6	R		16	4	5			ISH02
1989 10 26.83	M	6.9	AA	20	L	6	46	3.5	7			NAK01
1989 10 28.83	M	6.9	S	20	L	6	46	5.5	7			NAK01
1989 10 29.37	S	7.2	AA	12.0	B		20	4				MIT
1989 11 01.82	M	6.5	S	20	L	6	46	5	6	0.45	350	NAK01
1989 11 01.84	S	6.0	AC	12.0	B		20	2	6/			KAN
1989 11 02.82	M	6.5	S	12.0	B		20	3.5	7			MIT
1989 11 02.83	M	6.8	AA	6.0	B		10					OHT
1989 11 02.83	S	6.4	AA	13	L	6	24	4	6			ISH02
1989 11 02.84	S	6.1	AA	12.0	B		20	3	6/	0.17	345	KAN
1989 11 04.83	S	6.0	AA	13	L	6	24	4	5			ISH02
1989 11 04.84	S	6.0	AA	7.0	B		10	4	5			ISH02
1989 11 10.82	M	6.1	S	20	L	6	46	4	7	0.8	330	NAK01
1989 11 10.83	B	6.0	AA	5.0	B		7	5	6	1	330	SOW
1989 11 10.84	M	6.6	S	13	L	6	33	5	6	0.5		KAM03
1989 11 10.84	S	6.4	AA	10.0	B		14	4	2	0.5	325	IWA01
1989 11 17.82	S	6.1	AA	7.0	B		10	5	7			YAS
1989 11 18.81	S	5.9	AA	7.0	B		10	5	5			ISH02
1989 11 18.82	M	6.0	S	20	L	6	46	4.5	6/			NAK01

Comet Okazaki-Levy-Rudenko 1989 XIX = 1989r [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 11 18.83	S	6.0	AA	13	L	6	24	4	5	0.08		ISH02
1989 11 18.84	M	6.2	AA	8.0	B		11		5			MIT
1989 11 19.8	B	6.2	AA	6.0	B		10					OHT
1989 11 19.84	B	6.3	AA	12.0	B		20	4	6	0.8	315	KAN
1989 11 20.81	M	5.7	S	20	L	6	46	5.5	6	0.85	305	NAK01
1989 11 20.82	B	6.2	AA	12.0	B		20	5	6	0.8	315	KAN
1989 11 20.82	S	5.9	AA	7.0	B		10	5	5			ISH02
1989 11 20.83	S	6.0	AA	13	L	6	24	4	5	0.17		ISH02
1989 11 20.84	S	5.8	AA	3	R		6		7			ISH02
1989 11 21.82	B	5.8	AA	6.0	B		10					OHT
1989 11 21.83	B	5.9	AA	3.0	B		8	4	7/	0.8		KAN
1989 11 21.83	S	5.8	AA	7.0	B		10	5	7		295	YAS
1989 11 22.84	M	5.9	S	13	L	6	33	8	7			KAM03
1989 11 22.84	S	6.1	AA	7.0	B		10	5	4			ISH02
1989 11 22.84	S	6.3	AA	13	L	6	24	5	4	0.17		ISH02
1989 11 23.82	B	5.9	AA	6.0	B		10					OHT
1989 11 23.82	M	5.8	AA	12.0	B		20	4	6	0.5		MIT
1989 11 23.83	S	6.0	AA	7.0	B		10	5	4			ISH02
1989 11 23.84	B	5.8	AA	12.0	B		20	4	6	0.5	305	KAN
1989 11 23.84	S	6.2	AA	13	L	6	24	4	4	0.17		ISH02
1989 11 24.83	B	6.2	AA	12.0	B		20	4	6	0.25		KAN
1989 11 24.83	S	6.2	AA	7.0	B		10	4	3			ISH02
1989 11 24.84	S	6.3	AA	13	L	6	24	4	3	0.17		ISH02
1989 11 25.81	S	5.9	AA	6.0	B		10					OHT
1989 11 25.82	M	5.5	AA	12.0	B		20	5	6	0.9		MIT
1989 11 25.83	M	5.3	S	20	L	6	46	7	7	0.9	290	NAK01
1989 11 25.83	S	5.4	AA	7.0	B		10	8	7			YAS
1989 11 25.83	S	5.8	AA	7.0	B		10	6	4	0.17		ISH02
1989 11 25.83	S	6.0	AA	3.0	B		8	3	7/	1	300	KAN
1989 11 25.84	S	5.8	AA	13	L	6	24	5	5	0.17		ISH02
1989 11 26.83	S	6.0	AA	12.0	B		20	4	5/	0.42	295	KAN
1989 11 27.82	S	6.0	AA	12.0	B		20	4	6	0.17	320	KAN
1989 11 28.64	S	6.2	SC	4.5	R	6	13					JON
1989 11 28.83	M	6.0	S	20	L	6	46	5	6		275	NAK01
1989 11 28.83	S	6.3	AA	12.0	B		20	4	5/	0.17	310	KAN
1989 11 28.84	S	6.2	AA	7.0	B		10	5	3			ISH02
1989 11 28.84	S	6.3	AA	13	L	6	24	4.5	3			ISH02
1989 11 29.63	S	6.0	SC	4.5	R	6	13					JON
1989 11 29.82	S	6.1	AA	7.0	B		16					OHT
1989 11 29.82	S	6.2	AA	7.0	B		10	6	3			ISH02
1989 11 29.83	S	6.2	AA	13	L	6	24	5	3	0.17		ISH02
1989 11 29.83	S	6.3	AA	12.0	B		20	4	6	0.33	320	KAN
1989 11 30.63	S	6.2	SC	4.5	R	6	13	5.5				JON
1989 11 30.83	M	5.8	AA	12.0	B		20	5	5	0.6		MIT
1989 11 30.83	S	6.3	AA	7.0	B		10	6	3			ISH02
1989 11 30.84	S	6.4	AA	13	L	6	24	5	3	0.13		ISH02
1989 12 01.63	S	6.2	SC	4.5	R	6	13					JON
1989 12 01.82	M	6.2	S	20	L	6	46	7	5/			NAK01
1989 12 01.83	B	7.0	S	10	L	6	24		3			OKA05
1989 12 01.84	S	6.0	AA	12.0	B		20	4	5	5	320	KAN
1989 12 01.84	S	6.3	AA	7.0	B		10	5	3			ISH02
1989 12 01.85	S	6.3	AA	13	L	6	24	5	3			ISH02
1989 12 02.83	M	6.0	S	20	L	6	46	6.5	5/			NAK01
1989 12 02.85	M	6.3	AA	12.0	B		20	5	5			MIT
1989 12 04.63	S	6.3	SC	5.0	B		7					JON
1989 12 06.61	S	6.3	SC	5.0	B		7					JON
1989 12 12.58	S	8.0	C	7.8	R	8	30	4				JON
1989 12 12.65	S	8.0	C	7.8	R	8	30	4	1/			JON
1989 12 13.40	S	7.9	SC	7.8	R	8	30	4				JON

Comet Okazaki-Levy-Rudenko 1989 XIX = 1989r [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 12 13.64	S	7.9	SC	7.8	R	8	30		1			JON
1989 12 16.43	S	7.7	C	8.0	B		11		6			JON
1989 12 18.47	S	7.7	C	8.0	B		11	4				JON
1989 12 20.47	S	8.0	C	8.0	B		11					JON
1989 12 21.49	S	8.6	C	8.0	B		11					JON

Comet Helin-Roman-Alu 1989 XXI = 1989v

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 10 20.51	S	11.2	AA	12	L	7	44	1.5	2			YAS
1989 10 23.60	S	11.0	AC	12	L	7	44	1.5	2			YAS
1989 10 25.50	S	10.8	AC	12	L	7	44	1.5	2			YAS
1989 10 29.45	S	10.8	AC	20	L	6	58	5.5	1			NAK01
1989 10 29.50	S	10.8	AC	12	L	7	44	1.5	2			YAS
1989 11 17.49	S	10.6	AC	12	L	7	44	2.5	2			YAS
1989 11 18.81	S	10.3	AC	15.0	L	5	62	2.5	2			SPE01
1989 11 19.75	S	10.5	AC	15.0	L	5	62	2.4	1			SPE01
1989 11 25.45	S	10.7	AC	20	L	6	58	4	0/			NAK01
1989 11 26.39	S	10.6	AC	20	L	6	58	4	0/			NAK01
1989 11 29.74	S	11.6:	AC	15.0	L	5	62		0			SPE01
1989 11 30.40	S	10.5	AC	20	L	6	58	4.5	0			NAK01
1989 12 02.40	S	10.3	AC	20	L	6	58	4.5	0/			NAK01
1989 12 16.41	S	10.4	AC	20	L	6	58	4	1			NAK01

Comet Aarseth-Brewington 1989 XXII = 1989a1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 11 20.37	S	8.7	AA	13	L	6	44	2	3			ISH02
1989 11 24.38	S	8.3	AA	13	L	6	62	2	3			ISH02
1989 11 30.84	S	7.6	AA	13	L	6	24	3	3	0.1		ISH02
1989 11 30.85	S	7.5	AA	7.0	B		10	3	3			ISH02
1989 12 01.37	S	7.5	AA	13	L	6	62	2	3			ISH02
1989 12 01.84	M	7.4	AC	20	L	6	46	4	7			NAK01
1989 12 01.85	S	7.5	AA	13	L	6	24	3	3			ISH02
1989 12 01.85	S	7.7	AA	12.0	B		20	2	6	0.05	330	KAN
1989 12 02.84	M	7.3	AC	20	L	6	46	4.5	7			NAK01
1989 12 02.84	M	7.4	AA	12.0	B		20	4	6			MIT
1989 12 02.85	S	7.5	AA	12.0	B		20	2	7	0.08	330	KAN
1989 12 03.84	S	7.2	AA	13	L	6	24	3	3			ISH02
1989 12 03.85	S	7.1	AA	7.0	B		10	3	3			ISH02
1989 12 03.86	S	7.2	AA	12.0	B		20	2	6	0.08	330	KAN
1989 12 04.85	M	7.1	S	20	L	6	46	4	6/			NAK01
1989 12 04.85	S	6.6	AA	5.0	B		7	3	6	0.12	345	KAN
1989 12 05.85	S	6.3	AA	5.0	B		7	3	6/	0.12	330	KAN
1989 12 06.85	M	5.7	S	20	L	6	46	4	6		345	NAK01
1989 12 07.86	S	5.8	AA	5.0	B		7	3	7/	0.17	340	KAN
1989 12 08.84	S	5.9	AA	5.0	B		7	3	7/	0.25	345	KAN
1989 12 09.84	S	6.2	AA	13	L	6	24	3	6	0.3		ISH02
1989 12 09.85	M	6.0	S	20	L	6	46	4	7		340	NAK01
1989 12 09.85	S	5.9	AA	5.0	B		7	2	8	0.33	350	KAN
1989 12 09.86	S	6.1	AA	7.0	B		10	3	6			ISH02
1989 12 09.87	P	5.7	S	17.5	L			2	7	0.33	347	SOW
1989 12 10.84	S	5.5	AA	5.0	B		7	& 2.5	7/	0.5	340	KAN
1989 12 10.84	S	6.0	AA	13	L	6	24	3	6	0.25		ISH02
1989 12 10.86	S	5.9	AA	7.0	B		10	3	7	0.25		ISH02
1989 12 11.84	B	5.6	AA	5.0	B		7	& 2.5	8	0.5	335	KAN
1989 12 12.85	S	4.8	AA	5.0	B		7	2	8	0.25	335	KAN
1989 12 12.85	S	4.8	AA	7.0	B		10	3	7			ISH02
1989 12 12.85	S	4.9	AA	13	L	6	24	3	7	0.25		ISH02

Comet Aarseth-Brewington 1989 XXII = 1989a1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 12 12.86	S	4.5	S	5.0	B		7	5	7			SOW
1989 12 12.86	S	4.8	AA	5.0	B		7	& 3	7			ISH02
1989 12 15.85	B	4.5	AA	12.0	B		20	2	8	1.5		MIT
1989 12 15.85	S	5.7	AA	7.0	B		10	2	7			ISH02
1989 12 15.85	S	5.7	AA	13	L	6	24	2	7	0.4		ISH02
1989 12 15.86	B	4.7	AA	5.0	B		7	2	8	1.3	335	KAN
1989 12 16.85	B	3.9	AA	5.0	B		7	2	8	1.1	330	KAN
1989 12 16.85	M	4.2	S	20	L	6	46	2.5	7/	0.7	330	NAK01
1989 12 16.86	S	4.6	AA	7.0	B		10	3	7	0.4		ISH02
1989 12 16.87	S	4.7	AA	5.0	B		7	3	7			ISH02
1989 12 17.85	B	4.2	AA	5.0	B		7	2	8	2.7	325	KAN
1989 12 17.86	S	4.8	AA	8.0	B		15	2.5	7	0.5		ISH02
1989 12 17.87	S	4.8	AA	7.0	B		10	3	7	0.4		ISH02
1989 12 17.87	S	4.9	AA	13	L	6	24	2.5	7	0.2		ISH02
1989 12 18.84	B	4.1	AA	5.0	B		7	2	7/	1.5	320	KAN
1989 12 18.85	B	4.0	AA	8.0	B		11					MIT
1989 12 18.85	M	3.5	S	20	L	6	46	3	7/	1.0	320	NAK01
1989 12 18.86	S	4.4	AA	8.0	B		15	3	7	1		ISH02
1989 12 18.87	S	4.3	AA	7.0	B		10	3	7	0.7		ISH02
1989 12 18.88	S	4.3	AA	13	L	6	24	3	7	0.5		ISH02
1989 12 19.85	B	3.8	AA	5.0	B		7	3	7	2.2	315	KAN
1989 12 19.85	M	3.4	S	20	L	6	46	2.5	8	0.8	310	NAK01
1989 12 19.85	S	4.2	AA	7.0	B		10	3	6	1.5		ISH02
1989 12 19.86	B	3.5	AA	8.0	B		11	2	8	3.5		MIT
1989 12 19.86	S	4.2	AA	8.0	B		15	3	6	1.7		ISH02
1989 12 19.87	S	3.6	AA	7.0	B		10	3	8	>2	310	YAS
1989 12 19.87	S	4.1	AA	13	L	6	24	3	6	1		ISH02
1989 12 20.85	S	3.8	AA	8.0	B		15	2.5	7	1.5		ISH02
1989 12 20.86	B	2.8	AA	5.0	B		7	2	8	2.4	310	KAN
1989 12 20.86	B	3.3	AA	8.0	B		11	2	8	>3		MIT
1989 12 20.86	S	3.8	AA	7.0	B		10	& 2.5	7	1		ISH02
1989 12 20.86	S	3.8	AA	13	L	6	24	3	6	1		ISH02
1989 12 21.87	B	3.2	AA	5.0	B		7	2	7/	1.8	310	KAN
1989 12 22.86	S	4.3	AA	8.0	B		15	2.5	6	0.5		ISH02
1989 12 22.87	B	3.3	AA	8.0	B		11		8	1		MIT
1989 12 22.87	B	3.5	AA	5.0	B		7	& 2.5	7	1.4	300	KAN
1989 12 22.87	S	4.3	AA	7.0	B		10	& 3	6	0.5		ISH02
1989 12 22.87	S	4.3	AA	13	L	6	24	3	6	0.4		ISH02
1990 01 02.63	S	4.5	SC	8.0	B		11			0.4		JON
1990 01 04.63	S	4.5	SC	8.0	B		11			0.5	200	JON
1990 01 12.41	S	7.2	SC	7.8	R	8	30	3		0.16		JON
1990 01 13.42	S	7.1	SC	7.8	R	8	30					JON
1990 01 18.41	S	8.4:	C	31.7	L	5	86	4		0.3	170	JON
1990 01 19.41	S	8.6	C	31.7	L	5	86			0.2	180	JON
1990 01 20.40	S	8.4	C	31.7	L	5	86			0.2		JON
1990 01 21.40	S	8.4	C	31.7	L	5	86	1.5	2	0.2	165	JON
1990 01 22.41	S	8.7	C	31.7	L	5	86	1.5	3	0.25	180	JON
1990 01 23.41	S	8.7	C	31.7	L	5	86	1.25	4			JON
1990 01 24.41	S	9.0	C	31.7	L	5	86	1	1/			JON

Comet Austin 1989c1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 02 17.75	S	7.7	SC	7.0	B		20	8.4	2			TAN02
1990 02 21.70	S	6.5:	S	6.6	B	6	20	7	6/			PLE01
1990 03 31.76	B	5.9:	S	31.0	L	7	80		6			SZA01
1990 04 01.75	B	5.5:	S	6.0	B	5	20		5			PAR03
1990 04 01.76	S	6.5	S	6.4	R	12	40		6			BOD
1990 04 01.77	B	6.0	S	10.0	B	5	25	5	7	0.25	315	PLE01

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 04 01.78	B	5.9:	S	10.0	B		25	& 4	6	&0.2	80	SCI
1990 04 01.78	M	6.3:	S	6.7	R	12	60		5			KOS01
1990 04 01.79	S	5.9	S	5.0	R	10	20					GRO03
1990 04 02.76	B	5.8:	S	15.0	L	9	33		5			PAR03
1990 04 02.77	B	5.5	S	6.7	R	6	40	& 3	7	&0.2	70	SCI
1990 04 02.77	B	5.7	S	6.6	B	6	20	5	8	0.13	320	PLE01
1990 04 02.77	B	5.7	S	10.0	B	5	25	7	7/	0.20	320	PLE01
1990 04 02.77	S	6.0	S	15.0	L	9	33		5			BOD
1990 04 02.79	M	6.0:	S	6.7	R	12	60		5			KOS01
1990 04 04.84	S	5.1	AA	7.0	B		16	5	5			TAY
1990 04 05.76	B	5.4	S	6.3	R	6	20		6			SZA01
1990 04 07.84	B	5.1	S	5.0	B		10	& 0.5				KAC
1990 04 08.77	S	4.1:	AA	7.0	B		16	4	8			TAY
1990 04 08.78	B	5.1	S	6.3	R	6	20		6/			SZA01
1990 04 08.78	B	5.2	S	5.0	B		10		6			WES04
1990 04 08.79	B	5.5:	S	5.0	B		7		9			SPE01
1990 04 09.77	B	5.4	S	6.0	B	5	20		6	&0.5	20	PAR03
1990 04 09.78	B	4.9	S	8.0	R	14	43	3.6	6/			SZA01
1990 04 09.79	B	5.5:	S	5.0	B		7		8			SPE01
1990 04 09.79	M	5.4	S	10	R	10	45		6			KOS01
1990 04 09.79	S	5.5:	S	5.0	R	10	20					GRO03
1990 04 09.80	B	4.1:	S	5.0	B		10	& 6	4			SZU
1990 04 10.77	B	5.3:	S	15.0	L	9	33		7			PAR03
1990 04 10.77	S	5.4	S	15.0	L	9	33		5			BOD
1990 04 10.79	M	5.3	S	10	R	10	45		6			KOS01
1990 04 11.77	B	5.0	S	6.0	B	5	20		6			PAR03
1990 04 11.79	M	5.2	S	10	R	10	45		6			KOS01
1990 04 11.84	S	5.2	AA	7.0	B		16	3	7	0.6	35	TAY
1990 04 12.77	B	5.0:	S	6.0	B	5	20		6			PAR03
1990 04 12.79	M	5.2	S	10	R	10	45		6/			KOS01
1990 04 16.82	M	5.9	S	8.0	B		15		6/	0.45	356	DUS
1990 04 17.08	B	5.9:	S	5.0	B		10		6			WES04
1990 04 17.09	B	5.0	S	15.0	L	15	56		6/			SZA01
1990 04 18.10	B	5.2:	S	5.0	B		7		8			SPE01
1990 04 18.13	M	5.5	AA	7.0	B		20		7/	0.7	0	TAN02
1990 04 18.86	M	5.5	S	8.0	B		15		7	0.20	343	DUS
1990 04 20.09	B	5.2	S	5.0	B	4	7		6			BOD
1990 04 21.08	B	4.8	S	5.0	B	4	7		6			BOD
1990 04 23.04	B	4.0	S	5.0	B		10		5			LUB
1990 04 23.06	B	4.0	S	5.0	B		10					KIE
1990 04 23.88	M	5.9	S	8.0	B		15		4			DUS
1990 04 24.04	B	3.5	S	6.4	R	12	30		5			KIE
1990 04 24.04	B	4.2	S	5.0	B		10		5			LUB
1990 04 24.94	M	5.6	S	8.0	B		15		6	0.20	325	DUS
1990 04 25.94	M	5.5	S	8.0	B		15		5/	0.45	326	DUS
1990 04 27.09	M	5.5	AA	7.0	B		16	4	5	0.6	320	TAY
1990 04 28.11	M	5.0	AA	5.0	B		12	16	6/	2.7	305	TAN02
1990 04 28.94	M	5.3	S	8.0	B		15		5	0.40	309	DUS
1990 04 29.04	B	5.4	S	31.0	L	7	80		6			SZA01
1990 04 29.05	B	5.2	S	4.0	B		11		6			BAN
1990 04 29.05	B	5.5	S	4.0	B		11		7			SOC
1990 04 29.13	M	6.0	S	6.7	R	12	60		7			KOS01
1990 04 30.01	M	5.7	S	8.0	B		15		6	0.25	307	DUS
1990 04 30.06	B	4.8	S	5.0	B		10		5			CIU
1990 04 30.06	B	5.1	S	5.0	B	4	7		5			BOD
1990 04 30.06	B	5.6	S	6.6	B	6	20	9	6	0.62	310	PLE01
1990 04 30.07	B	5.0	S	5.0	B	4	7		5			PAR03
1990 04 30.08	B	4.8	S	6.4	R	6	20		6			CNO
1990 04 30.08	B	5.1	S	6.0	B	5	20		5			PAR03

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 04 30.08	S	4.6	S	5.0	B		10	5	7			LAA
1990 04 30.97	M	5.7	S	8.0	B		15		5	0.25	307	DUS
1990 05 01.02	B	4.7	S	4.0	B		12	4.1	4			PIO
1990 05 01.02	S	5.1	S	5.0	B	4	7		5			WOZ
1990 05 01.03	B	4.6	S	5.0	B		10	& 3	4			KAC
1990 05 01.03	B	5.0	S	31.0	L	7	70		4			SOC
1990 05 01.04	B	5.0	S	4.0	B		11		6			SOC
1990 05 01.04	B	5.0	S	31.0	L	7	80		5/			SZA01
1990 05 01.06	B	4.5	S	7.5	R	3	15		7/			IWA02
1990 05 01.06	B	5.4	S	5.0	B		10	5.5	5/	0.7	315	WES04
1990 05 01.06	B	5.7	S	3.5	B	4	7	10	7	0.50	308	PLE01
1990 05 01.06	B	5.7	S	6.6	B	6	20	12	6	0.75	306	PLE01
1990 05 01.07	B	4.8	AC	35	T	7	122	8	6	0.6	300	AMO
1990 05 01.11	B	4.7	AC	8.0	B		10	6	6	0.4	300	AMO
1990 05 01.90	M	5.6	S	8.0	B		15		4/	0.25	305	DUS
1990 05 01.98	B	5.3	S	11.0	L	7	32		4/			SIW
1990 05 02.01	S	5.4	S	5.0	B	4	7		6			WOZ
1990 05 02.04	B	4.8	S	5.0	B		10		5			LUB
1990 05 02.05	B	4.8	S	5.0	B	4	7		5			PAR03
1990 05 02.05	B	5.3	S	5.0	R	4	7		7			GAM
1990 05 02.05	B	5.3	S	6.6	R	6	22	3.0	6			GAM
1990 05 02.05	B	5.7	S	5.0	B		10	& 7	5	&0.3	315	SCI
1990 05 02.06	B	4.3	S	5.0	B		10		7			SWI
1990 05 02.06	B	4.5	S	5.0	B		10		4			MAT06
1990 05 02.06	B	4.9	S	6.0	B	5	20		5			PAR03
1990 05 02.06	B	4.9	S	6.4	R	6	20		6			CNO
1990 05 02.06	B	5.3	S	6.4	R	13	40		6			BAN
1990 05 02.06	B	5.7	S	6.6	B	6	20	13.5	6/	0.52	297	PLE01
1990 05 02.06	B	6.1:	S	3.5	B	4	7	11	7	0.39	297	PLE01
1990 05 02.06	S	5.0	S	5.0	B		10	4	7	3	15	LAA
1990 05 02.07	S	4.7	S	5.0	B		7	12	1			KUI
1990 05 02.13	B	5.0	S	6.4	R	12	32	&10	5			CHO01
1990 05 02.95	M	6.0	S	8.0	B		15		6/	0.13	305	DUS
1990 05 02.98	B	5.3	S	4.0	B		12		5			SOC
1990 05 03.00	B	4.0	S	6.4	R	12	30		5			KIE
1990 05 03.00	B	5.1	S	15.0	L	7	30		6/			SZA01
1990 05 03.00	S	5.5	S	5.0	B	4	7		6			WOZ
1990 05 03.01	B	4.8	S	4.0	B		12	4.1	4			PIO
1990 05 03.01	B	5.2	S	5.0	B		10	15	2			SZU
1990 05 03.02	B	4.9	S	5.0	B	4	7		5			PAR03
1990 05 03.02	B	4.9	S	6.0	B	5	20		5	1.0	295	PAR03
1990 05 03.02	B	5.4	S	6.4	R	12	25		4/			SIW
1990 05 03.04	B	4.9	S	5.0	B		10		4/			LUB
1990 05 03.04	B	4.9	S	5.0	B		10	& 5	3			KAC
1990 05 03.04	B	5.0	S	5.0	B		10		4			MAT06
1990 05 03.04	B	5.1	S	3.0	B		8		5/			WIS02
1990 05 03.05	B	4.7	S	7.5	R	3	15		7/			IWA02
1990 05 03.05	B	4.9	S	5.0	B		10		5			CIU
1990 05 03.05	B	5.1	S	5.0	B		10		5/			WIS02
1990 05 03.05	B	5.2	S	5.0	B	4	7		5			BOD
1990 05 03.05	B	5.2	S	5.0	B	4	7		6			CNO
1990 05 03.05	B	5.2	S	8.0	B		20	& 7	6	&0.5	300	SPE01
1990 05 03.05	B	5.3	S	5.0	B		7		6			BAN
1990 05 03.06	B	4.3	S	5.0	B		10		7			SWI
1990 05 03.06	B	5.2	S	5.0	B		7	& 8	6	&0.3	300	SPE01
1990 05 03.06	B	5.3	S	10.0	B	5	25	12	5/	0.72	293	PLE01
1990 05 03.06	B	5.4	S	6.6	B	6	20	10.5	6	0.60	293	PLE01
1990 05 03.06	B	5.8	S	5.0	B		10	& 4	6	&0.4	282	SCI

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 03.06	M	4.3	S	6.5	L	8	33		5/			KRE
1990 05 03.07	M	5.3	S	5.0	B		7		5			KOS03
1990 05 03.10	M	5.0	AA	7.0	B		20	12	5	1.2	303	TAN02
1990 05 03.12	B	5.0	S	6.4	R	12	32	& 7	3			CHO01
1990 05 03.13	B	5.0	S	25.0	L	6	54	& 7	3	&0.01	135	CHO01
1990 05 04.00	B	5.3	S	8.0	R	15	38	15	2			SZU
1990 05 04.00	B	5.5	S	6.4	R	12	30		4			KIE
1990 05 04.00	B	5.6	S	5.0	B		10	5.4	5	0.6	302	WES04
1990 05 04.01	B	5.3	S	3.0	B		8		5/			WIS02
1990 05 04.01	S	5.6	S	5.0	B	4	7		5/			WOZ
1990 05 04.02	B	4.9	S	5.0	B	4	7		5			PAR03
1990 05 04.02	B	4.9	S	6.0	B	5	20		5	1.0	290	PAR03
1990 05 04.02	B	5.2	S	6.0	B		20		5			WIS02
1990 05 04.04	B	5.0	S	5.0	B		10		4/			LUB
1990 05 04.04	B	5.3	S	5.0	B		7	& 7	6			SPE01
1990 05 04.05	B	4.8	S	7.5	R	3	15		7			IWA02
1990 05 04.05	B	5.3	S	6.6	R	6	22	3.1	6			GAM
1990 05 04.05	B	5.3	S	8.0	B		20	& 7	5	&0.3	290	SPE01
1990 05 04.05	B	5.4	S	6.4	R	6	20		6			CNO
1990 05 04.05	B	6.3	S	5.0	B		10	& 5	6	&0.4	298	SCI
1990 05 04.05	M	5.3	S	5.0	B		7		5			KOS03
1990 05 04.06	B	5.7	S	6.6	B	6	20	8	6	0.90	286	PLE01
1990 05 04.06	B	5.8	S	5.0	B		10	& 4	5	0.2	305	DER
1990 05 04.06	M	4.4	S	6.5	L	8	33		4/			KRE
1990 05 04.08	B	5.8:	S	7.0	R	6	30		4/			BET01
1990 05 04.93	M	6.2	S	8.0	B		15		4/	0.15	305	DUS
1990 05 05.01	B	4.8	S	5.0	B	4	7		5			PAR03
1990 05 05.01	S	5.5	S	5.0	B	4	7		5/			WOZ
1990 05 05.02	B	4.8	S	6.0	B	5	20		5	1.0	285	PAR03
1990 05 05.02	B	5.0	S	5.0	B		10		4/			LUB
1990 05 05.02	B	5.4	S	5.0	B		10		5			WIS02
1990 05 05.03	B	5.3	S	8.0	R	15	38	15	2			SZU
1990 05 05.03	B	5.4	S	3.0	B		8		5			WIS02
1990 05 05.03	B	5.5	S	6.6	B	6	20	10	6	0.45	283	PLE01
1990 05 05.03	B	5.7	S	5.0	B		10	& 5	4			DER
1990 05 05.03	S	4.9	S	5.0	B		10	5	7			LAA
1990 05 05.04	B	3.5	S	6.7	L	6	25	5.5	6			ADA02
1990 05 05.05	B	4.9	S	7.5	R	3	15		7			IWA02
1990 05 05.05	B	5.5	S	6.4	R	6	20		6			CNO
1990 05 05.05	B	5.5:	S	8.0	B		20	& 6	5	&0.2	300	SPE01
1990 05 05.06	B	5.0	S	5.0	B		10		6			SWI
1990 05 05.06	B	5.4	S	5.0	B		7		6			BAN
1990 05 05.06	B	5.4	S	5.0	B		7	& 5	6			SPE01
1990 05 05.06	B	6.2	S	5.0	B		10	& 5	6	&0.4	285	SCI
1990 05 05.06	M	4.4	S	6.5	L	8	33	7.9	4/			KRE
1990 05 05.07	B	5.7	S	5.0	R	10	20		4/			GRO03
1990 05 05.10	B	5.1	S	6.0	R	5	10	& 7	3			CHO01
1990 05 05.10	M	4.8	AA	7.0	B		20	19	4/	0.9	297	TAN02
1990 05 05.10	S	5.0	S	8.0	B		11	20		1.2	65	BOT
1990 05 05.95	B	5.2	S	15.0	L	7	30		6/			SZA01
1990 05 05.98	B	5.8	S	5.0	B		10	& 6	3			DER
1990 05 05.99	B	5.6	S	4.0	B		12		3			SOC
1990 05 06.00	M	6.2	S	8.0	B		15		4			DUS
1990 05 06.01	B	5.2	S	5.0	B	4	7		4/			BOD
1990 05 06.01	B	5.6	SC	5.0	B		10	5.9	5	0.8	279	WES04
1990 05 06.02	B	4.8	S	5.0	B		10	& 6	3			KAC
1990 05 06.02	B	5.4	S	5.0	B		10	15	2			SZU

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 06.02	S	5.2:	S	5.0	B	4	7		5			WOZ
1990 05 06.03	B	5.2	S	5.0	B		10		4			LUB
1990 05 06.04	B	5.0	S	5.0	B		10		3/			MAT06
1990 05 06.04	B	5.0	S	5.0	B		10		5			SWI
1990 05 06.04	B	5.0	S	7.5	R	3	15		6/			IWA02
1990 05 06.04	B	5.1	S	6.0	B		20		4			MOS01
1990 05 06.04	B	5.4	S	6.4	R	12	30		4			KIE
1990 05 06.05	B	5.8	S	5.0	B		10	& 5	6	&0.4	285	SCI
1990 05 06.06	B	5.5	S	6.6	B	6	20	9.5	6	0.90	288	PLE01
1990 05 06.10	B	5.2	S	6.0	R	5	10	& 7	3			CHO01
1990 05 07.01	M	6.4	S	8.0	B		15		3/			DUS
1990 05 07.03	B	5.3	S	5.0	B		10		4			LUB
1990 05 07.03	B	5.8	S	5.0	B		10	& 6	4			DER
1990 05 07.04	B	3.5	S	6.7	L	6	25	5.5	6			ADA02
1990 05 07.04	B	5.0	S	7.5	R	3	15		6/			IWA02
1990 05 07.04	B	5.5	S	5.0	B		10		3/			MAT06
1990 05 07.04	B	5.5	S	8.0	B		20	& 6	5			SPE01
1990 05 07.04	B	5.7	S	6.4	R	6	20		5			CNO
1990 05 07.04	B	6.0	S	5.0	B		10	& 5	6	&0.4	280	SCI
1990 05 07.05	B	5.4	S	5.0	B		7	& 6	5			SPE01
1990 05 07.06	B	5.6	S	6.6	B	6	20	8.5	6	0.70	286	PLE01
1990 05 07.06	B	5.7	S	3.5	B	4	7	6	6/	0.20	286	PLE01
1990 05 07.10	M	4.8	AA	7.0	B		20	10	4/	0.8	289	TAN02
1990 05 07.11	S	5.9	AA	7.0	B		16	9	3			TAY
1990 05 08.01	B	4.9	S	4.0	B		12	5.0	4			PIO
1990 05 08.02	B	5.7	S	6.4	R	6	20		4			CNO
1990 05 08.03	B	5.4	S	5.0	B		10		2			SZU
1990 05 08.03	B	5.4	S	5.0	B		10		4			LUB
1990 05 08.04	B	6.3	S	5.0	B		10	& 5	6	&0.5	302	SCI
1990 05 08.05	B	5.1	S	7.5	R	3	15		6/			IWA02
1990 05 08.06	B	5.6	S	6.6	B	6	20	10	6	1.0	284	PLE01
1990 05 08.06	B	5.6	SP	5.0	B		7		6			BAN
1990 05 09.01	B	5.5	S	8.0	R	15	38		2/			SZU
1990 05 09.01	S	5.4	S	5.0	B	4	7		6			WOZ
1990 05 09.03	B	5.6	S	5.0	B		10		3/			LUB
1990 05 09.03	S	5.6	S	5.0	B		10	6	4			DER
1990 05 09.04	B	5.7	S	6.4	R	12	30		3			KIE
1990 05 09.04	B	5.8	S	5.0	B		10		3			MAT06
1990 05 09.05	B	5.2	S	7.5	R	3	15		6			IWA02
1990 05 09.05	B	6.0	S	5.0	B		10	& 6	6	&0.4	285	SCI
1990 05 09.06	B	5.7	S	6.6	B	6	20	10.2	6	0.95	283	PLE01
1990 05 09.06	B	5.9:	S	6.4	R	6	20		4			CNO
1990 05 09.06	M	5.5	S	5.0	B		7		5			KOS03
1990 05 10.01	B	5.9	S	5.0	B		10	& 7	5	&0.5		WES04
1990 05 10.01	B	5.9	S	6.4	R	6	20		3			CNO
1990 05 10.02	B	5.7	S	8.0	R	15	38		2/			SZU
1990 05 10.03	B	5.8	S	5.0	B		10		3/			LUB
1990 05 10.04	B	5.3	S	7.5	R	3	15		6			IWA02
1990 05 10.05	B	6.2	S	6.6	B	6	20	7.35	5/	0.60	279	PLE01
1990 05 10.97	B	5.6	S	6.3	R	6	20		6			SZA01
1990 05 11.02	B	6.0:	S	8.0	B		20	& 7	3			SPE01
1990 05 11.03	B	5.8	S	5.0	B		10		3			LUB
1990 05 11.05	B	6.0:	S	6.4	R	6	20		3			CNO
1990 05 11.06	B	5.9:	S	6.6	R	6	19		4/			GAM
1990 05 11.95	S	5.8	S	5.0	B		10	5.5	5			DER
1990 05 12.03	B	5.5	S	7.5	R	3	15		5			IWA02
1990 05 12.03	B	5.8	S	5.0	B		10		3			LUB
1990 05 12.05	B	6.0	S	6.6	B	6	20	8	5/	0.45	277	PLE01

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 13.02	B	6.0	S	8.0	B		20	& 6	4			SPE01
1990 05 13.03	B	5.9	S	5.0	B		7	& 7	4			SPE01
1990 05 13.04	B	5.6	S	7.5	R	3	15		5			IWA02
1990 05 13.05	B	6.1	S	6.6	B	6	20	10	5	0.50	274	PLE01
1990 05 14.01	B	6.4	S	5.0	B		10	9.2	4/	&0.8		WES04
1990 05 14.02	B	5.8	S	5.0	B		10	& 6	5	&0.3	270	SCI
1990 05 14.04	B	6.0	S	5.0	B		10		3			LUB
1990 05 14.04	B	6.0:	S	6.4	R	6	20		3			CNO
1990 05 14.05	B	6.0	S	6.6	B	6	20	11	5	0.96	273	PLE01
1990 05 14.05	B	6.2	S	3.5	B	4	7	9.5	5/	0.35	273	PLE01
1990 05 15.00	B	5.9	S	6.4	R	6	20		3			CNO
1990 05 15.01	S	6.1:	S	3.5	B		7		3/			ZBR
1990 05 15.02	B	6.0	S	5.0	B		10		3			LUB
1990 05 15.88	B	5.5	S	5.0	B	4	8	21	5			GOR02
1990 05 15.97	B	5.9	S	6.4	R	6	20		4			CNO
1990 05 16.01	B	6.0	S	3.5	B		7		3/			ZBR
1990 05 16.01	B	6.0	S	8.0	B		20	& 8.5	4			SPE01
1990 05 16.02	B	5.9	S	5.0	B		7	& 9	4			SPE01
1990 05 16.02	B	5.9	S	6.0	B		20		5			BAN
1990 05 16.02	B	6.1	S	6.0	B		20		3			WIS02
1990 05 16.03	B	6.0	S	5.0	B		10	& 7	4	&0.3	270	SCI
1990 05 16.03	B	6.1	S	5.0	B		10	8	3			DER
1990 05 16.05	B	6.0	S	6.6	B	6	20	11	4/	0.25	272	PLE01
1990 05 16.07	M	5.3	AA	5.0	B		12	16	4			TAN02
1990 05 16.07	S	6.2	S	5.0	R	10	20					GRO03
1990 05 16.99	B	6.2	S	6.0	B		20		3			WIS02
1990 05 17.07	M	5.2	AA	5.0	B		12	23	4			TAN02
1990 05 18.05	B	6.6	S	6.6	B	6	20	12	3/			PLE01
1990 05 18.05	S	6.6:	S	5.0	B		10	& 8	3/			SCI
1990 05 18.06	B	5.6	S	5.0	B		10		5			BET01
1990 05 18.94	B	6.2	S	5.0	B		10		3			ZBR
1990 05 18.96	B	5.7	S	5.0	B	4	8	20	5/			GOR02
1990 05 18.98	B	5.4	S	5.0	B		10	16	3			SZU
1990 05 18.98	S	5.4	S	5.0	B	4	7		4/			WOZ
1990 05 19.01	B	5.7	S	5.0	B		7	&11	4			SPE01
1990 05 19.02	B	5.8:	S	8.0	B		20	&11	5			SPE01
1990 05 19.02	B	6.0	S	5.0	B		10		1			SWI
1990 05 19.02	B	6.1	S	5.0	B		10		3			LUB
1990 05 19.02	B	6.1	S	5.0	B		10	9.5	5			DER
1990 05 19.04	B	5.9	S	5.0	B	4	7		4			CNO
1990 05 19.05	B	5.5	S	5.0	B		10	& 1.5				KAC
1990 05 19.06	B	6.0	S	5.0	B		10		3			KIE
1990 05 19.07	M	5.2	AA	5.0	B		12	28	4			TAN02
1990 05 19.89	B	6.1:	S	5.0	B		10		2/			ZBR
1990 05 19.91	B	6.3	S	5.0	B		10		1			SWI
1990 05 19.92	B	6.4	S	5.0	B		10	13.5	4/			WES04
1990 05 19.94	B	5.8	S	5.0	B	4	7		4			CNO
1990 05 19.94	B	5.9:	S	6.3	R	6	20	13.82	5			SZA01
1990 05 19.95	B	5.9	S	5.0	B	4	8	17.1	5/			GOR02
1990 05 19.96	B	5.8	S	4.0	B		12		3			SOC
1990 05 19.96	B	6.0	S	6.0	B		20		4			BAN
1990 05 19.96	B	6.0	S	6.7	L	12	60		3			PER04
1990 05 19.96	S	6.6	S	5.0	B		10	&10	3			SCI
1990 05 19.98	B	5.7	S	6.7	R	11	60		3			KIE
1990 05 19.98	B	5.8	S	4.0	B		11	&20	4			RAF
1990 05 19.98	B	6.0	S	5.0	B		10		3			WIS02
1990 05 19.98	B	6.1	S	6.0	B		20	& 8.8	3/			OLE
1990 05 19.98	B	6.2	S	6.0	B		20		3/			WIS02

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 19.98	B	6.2	S	6.7	L	12	60		3			MOS01
1990 05 19.98	S	5.4	S	5.0	B	4	7		4			WOZ
1990 05 19.98	S	6.1	S	6.7	M	12	35	& 8.7	3/			OLE
1990 05 19.99	B	5.9	S	4.0	B		11	&20				JAR
1990 05 19.99	B	5.9	S	6.6	R	6	22	7.8	4			GAM
1990 05 19.99	B	6.1	S	6.7	M	12	35		3			WIS02
1990 05 20.00	B	5.7	S	5.0	B		7	&13	4			SPE01
1990 05 20.00	B	5.8	S	5.0	B		10		4			CIU
1990 05 20.00	B	6.2	S	5.0	B		10	9	5			DER
1990 05 20.01	B	4.9	S	5.0	B	4	7		3			PAR03
1990 05 20.01	B	4.9	S	6.0	B	5	20		3			PAR03
1990 05 20.01	B	5.8:	S	8.0	B		20	&13	5			SPE01
1990 05 20.01	B	6.2	S	5.0	B		10		3			LUB
1990 05 20.01	B	6.3	S	7.5	R	3	15		3/			IWA02
1990 05 20.03	B	5.5	S	5.0	B	4	7		3/			BOD
1990 05 20.03	B	5.8	S	4.0	B		12					GAM
1990 05 20.03	B	6.1	S	11.0	L	7	32		3/			SIW
1990 05 20.03	B	6.6	S	6.6	B	6	20	13.5	3			PLE01
1990 05 20.05	B	6.5	S	5.0	R	10	20		3/			GRO03
1990 05 20.05	M	5.0	AA	5.0	B		12	28	4			TAN02
1990 05 20.90	B	6.3	S	5.0	B		10		2/			ZBR
1990 05 20.91	B	6.0	S	6.4	R	12	30		2			KIE
1990 05 20.92	B	6.0	S	6.7	L	6	30	&12.6	6			GOR02
1990 05 20.92	B	7.0	S	6.6	B	6	20	14	2/			PLE01
1990 05 20.95	B	5.8	S	5.0	B		10		2/			OLE
1990 05 20.95	B	5.8	S	5.0	B	4	7		3			CNO
1990 05 20.95	B	6.0	S	6.0	B		20	& 9.6	3/			OLE
1990 05 20.96	B	6.3	SC	5.0	B		10	12.2	4	0.1	240	WES04
1990 05 20.96	S	7.0	S	5.0	B		10	&10	3			SCI
1990 05 20.99	B	4.9	S	5.0	B	4	7		3			PAR03
1990 05 20.99	B	5.5	S	5.0	B		7	&12	4			SPE01
1990 05 20.99	B	5.7	S	5.0	B		10	14	2/			SZU
1990 05 21.00	B	4.9	S	6.0	B	5	20		3			PAR03
1990 05 21.00	B	5.8:	S	8.0	B		20	&13	5			SPE01
1990 05 21.00	B	6.2	S	5.0	B		10	9	4			DER
1990 05 21.00	S	6.5	S	6.8	R	6	19		2			ZBR
1990 05 21.01	B	6.3	S	5.0	B		10		3			LUB
1990 05 21.02	B	5.9	S	4.0	B		12		2			SOC
1990 05 21.03	B	6.6	S	5.0	R	10	20	&10.5	3			GRO03
1990 05 21.95	B	5.7	S	5.0	B		10	14	2/			SZU
1990 05 21.95	B	6.0	S	5.0	B	4	7		3			CNO
1990 05 21.99	B	6.4	S	5.0	B		10	9	5			DER
1990 05 22.01	B	6.5	S	7.5	R	3	15		3/			IWA02
1990 05 22.01	S	5.4	S	5.0	B		10	10	4			LAA
1990 05 22.05	S	5.7	AA	5.0	B		12					TAN02
1990 05 22.93	B	6.4	S	6.6	B	6	20	14.5	2			PLE01
1990 05 22.96	B	5.8	S	5.0	B		10	13	2/			SZU
1990 05 22.97	B	6.5	S	5.0	B		10	13.5	4	0.7	233	WES04
1990 05 22.98	B	6.1	S	5.0	B		10		3			WIS02
1990 05 22.98	B	6.2	S	5.0	B		10		3			OLE
1990 05 22.98	B	6.2	S	6.0	B		20	&10.1	3/			OLE
1990 05 22.99	B	6.2	S	6.0	B		20		3/			WIS02
1990 05 23.00	B	6.4	S	5.0	B		10	10	4			DER
1990 05 23.01	S	5.4	S	5.0	B		10	10	4			LAA
1990 05 23.94	B	6.6:	S	6.4	R	6	20		2			CNO
1990 05 23.97	S	5.6	S	3.0	B		8					BEN04
1990 05 23.99	B	6.7	S	7.5	R	3	15		3			IWA02
1990 05 23.99	S	6.2	AA	7.0	B		16	10	2	0.2		TAY

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 24.04	B	5.0	S	20.0	T	10	60	7.5	3			KAN02
1990 05 24.04	B	6.8	S	6.6	B	6	20	16	2			PLE01
1990 05 24.04	S	6.2:	S	5.0	B		10	&10	2			SCI
1990 05 24.90	M	6.5	S	6.7	L	6	30	10.3	7			GOR02
1990 05 24.95	B	5.9	S	5.0	B		10	18.1	4			OLE
1990 05 24.96	B	5.9	S	6.0	B		20	16.7	3/			OLE
1990 05 24.96	B	6.8	S	7.5	R	3	15		3			IWA02
1990 05 25.01	B	6.2	S	4.0	B		12	5.1	4			PIO
1990 05 25.02	B	6.0	S	5.0	B		10	13	2/			SZU
1990 05 25.90	B	6.3:	S	4.0	B		11	&20	3			RAF
1990 05 25.92	B	5.9	S	15.0	L	7	30		4/			SZA01
1990 05 25.95	B	6.2	S	5.0	B		10	17.4	3			OLE
1990 05 25.96	B	6.1	S	6.0	B		20	17	3/			OLE
1990 05 25.96	B	7.0	S	7.5	R	3	15		3			IWA02
1990 05 25.98		5.0	A	0.0	E		1	16	4			LOO01
1990 05 25.98	S	5.5	S	5.0	B	4	7		2			WOZ
1990 05 25.98	S	5.6	S	5.0	B		10	20	3			LAA
1990 05 26.00	B	5.9	S	8.0	R	15	38	14	2/			SZU
1990 05 26.00	B	6.1	S	3.0	B		8					DER
1990 05 26.00	B	6.3:	S	8.0	B		20	&15	4			SPE01
1990 05 26.00	B	6.4	S	5.0	B		10	13.5	5			DER
1990 05 26.01	B	5.9	S	5.0	B		7	&15	4			SPE01
1990 05 26.05	S	5.3	AA	5.0	B		12	33	3			TAN02
1990 05 26.10	B	5.9	S	8.0	R	15	38	13	3			SZU
1990 05 26.89	S	5.5	S	5.0	B	4	7		2			BOD
1990 05 26.90	B	6.7	S	5.0	R	8	40	15.5	1/			ZBR
1990 05 26.91	B	6.1	S	15.0	L	7	30		4			SZA01
1990 05 26.92	B	6.0	S	6.7	L	12	60					PER04
1990 05 26.92	B	7.1	S	6.6	B	6	20	20.5	2			PLE01
1990 05 26.93	B	4.8	S	5.0	B	4	7		3			PAR03
1990 05 26.93	B	6.5	S	5.0	B	4	7		2			CNO
1990 05 26.94	B	4.8	S	6.0	B	5	20		3			PAR03
1990 05 26.94	B	6.9	S	5.0	B		10	15.3	3/			WES04
1990 05 26.94	S	5.7	S	5.0	B	4	7		1			WOZ
1990 05 26.95	B	6.2	S	5.0	B		10		3			OLE
1990 05 26.95	B	6.3	S	6.0	B		20		4			BAN
1990 05 26.95	B	7.2	S	7.5	R	3	15		3			IWA02
1990 05 26.96	B	6.3	S	5.0	B		10		3			WIS02
1990 05 26.96	B	6.3	S	6.0	B		20	&13.1	3/			OLE
1990 05 26.96	S	5.7	S	3.0	B		8					BEN04
1990 05 26.97	B	6.3	S	4.0	B		12		1			SOC
1990 05 26.97	B	6.3	S	6.0	B		20		3/			WIS02
1990 05 26.98	B	7.0:	S	6.8	R	6	40	16.3	2			ZBR
1990 05 26.99	B	6.3	S	5.0	B		10	18	4			DER
1990 05 26.99	B	6.4	S	3.0	B		8					DER
1990 05 27.01	B	6.5	S	5.0	B		10		3			LUB
1990 05 27.01	S	4.9	A	4.0	R		10	18	4	1.0	298	LOO01
1990 05 27.01	S	6.1	AA	4.0	B		8	8	2	0.3		TAY
1990 05 27.03	S	5.2	S	4.0	B		12		3			GAM
1990 05 27.05	S	6.9	S	5.0	R	10	20		2/			GRO03
1990 05 27.10	B	5.9	S	8.0	R	15	38	13	3			SZU
1990 05 27.91	B	6.3	S	5.0	B		10		2			OLE
1990 05 27.92	B	6.4	S	6.0	B		20	&13	2/			OLE
1990 05 27.94	B	7.3	S	7.5	R	3	15		2/			IWA02
1990 05 27.98	B	6.8	S	5.0	B		10	18	4			DER
1990 05 27.99	B	6.4:	S	8.0	B		20	&13	3			SPE01
1990 05 27.99	B	6.6	S	5.0	B		10		3			CIU
1990 05 28.00	B	6.3	S	5.0	B		7	&11	3			SPE01

Comet Austin 1989c1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 28.00	B	6.3	S	8.0	R	15	38		3			SZU
1990 05 28.02	B	6.5	S	5.0	B		10		2			BET01
1990 05 28.03	B	7.0	S	5.0	R	10	20		2/			GRO03
1990 05 28.04	B	7.2	S	6.6	B	6	20	20	2			PLE01
1990 05 28.91	B	6.6	S	5.0	B	4	7		2			CNO
1990 05 28.92	S	5.8	S	5.0	B	4	7		2			WOZ
1990 05 28.94	B	7.5	S	7.5	R	3	15		2/			IWA02
1990 05 28.96	S	6.1	S	3.0	B		8					BEN04
1990 05 28.98	B	6.8	S	5.0	B		10	18	4			DER
1990 05 28.98	B	7.0	S	5.0	R	10	20	&12	2			GRO03
1990 05 28.98	S	7.4	S	5.0	B		10	&20	2			SCI
1990 05 28.99	B	6.7:	S	5.0	B		7	&13	3			SPE01
1990 05 29.00	B	6.7:	S	8.0	B		20	&13	4			SPE01
1990 05 29.00	S	6.5	S	5.0	B		10	10	1			LAA
1990 05 29.03	B	7.1	S	6.6	B	6	20	18.5	2			PLE01
1990 05 29.05	S	6.0	A	4.0	R		10	14.5	4	1.0	320	LOO01
1990 05 29.83	B	6.0	S	20.0	T	10	60	7.5	3			KAN02
1990 05 29.94	B	7.1	S	5.0	B		10		1			KOS02
1990 05 29.94	M	6.8:	S	6.7	L	6	30	& 7.6	8/			GRO02
1990 05 29.96	B	6.7	S	5.0	B		10	15	4			DER
1990 05 29.97	B	7.6	S	7.5	R	3	15		2/			IWA02
1990 05 29.98	B	6.6	S	8.0	R	15	38		3			SZU
1990 05 29.99	B	6.2:	S	8.0	B		20	&13	3			SPE01
1990 05 30.00	B	6.2	S	5.0	B		7	&14	2			SPE01
1990 05 30.01	B	6.7	S	5.0	B		10	&10	2			SCI
1990 05 30.04	B	6.7	S	6.6	B	6	20	21	2			PLE01
1990 05 30.95	B	7.3:	S	5.0	R	8	26		1/			ZBR
1990 05 30.96	B	6.8	S	8.0	R	15	38		3			SZU
1990 05 30.96	S	6.9	S	5.0	B		10	&15	3			DER
1990 05 30.98	B	6.3	S	5.0	B		7	&11	2			SPE01
1990 05 31.01	M	6.9	S	6.5	L	8	33		3			KRE
1990 05 31.02	M	7.1	S	5.0	R	10	20		2			GRO03
1990 05 31.04	B	7.1	S	6.6	B	6	20	20	2			PLE01
1990 05 31.94	B	7.0	S	20.0	T	10	60	4.5	2			KAN02
1990 05 31.99	S	5.6	S	5.0	B	4	7		2/			BOD
1990 06 01.00	B	6.6	S	6.6	B	6	20	24	2			PLE01
1990 06 01.01	S	6.7	S	5.0	B		10	&10	2			SCI
1990 06 01.03	S	5.8	AA	5.0	B		12	21	1			TAN02
1990 06 01.93	B	6.9	S	6.6	B	6	20	31	2			PLE01
1990 06 01.95	S	6.2	AA	5.0	B		12	17	2			TAN02
1990 06 01.97	B	5.8	S	5.0	B	4	7		2			PAR03
1990 06 01.98	S	5.9	S	5.0	B	4	7		2			BOD
1990 06 02.02	B	7.5	S	20.0	T	10	60	4.0	2			KAN02
1990 06 02.02	S	6.7:	S	5.0	B		10	&10	2			SCI
1990 06 02.97	S	6.1	S	5.0	B	4	7		2			BOD
1990 06 03.01	S	6.2	AA	5.0	B		12	19	2	2.0	328	TAN02
1990 06 04.93	S	6.7	S	6.6	B	6	20	28	2			PLE01
1990 06 05.94	S	7.1	S	6.6	B	6	20	30	2			PLE01
1990 06 12.94	S	7.5	S	6.6	B	6	20	23	2			PLE01
1990 06 15.92	B	8.0:	SC	8.0	R	5	22		1			PAR03
1990 06 16.31	S	7.4	AA	8.0	B		20	8.5	1	1.25	343	MOR
1990 06 17.31	S	7.4	AA	8.0	B		20	8.5	1	1.25	350	MOR
1990 06 23.25	S	9.2	AA	8.0	B		20	5.9	1			MOR
1990 06 24.27	S	9.1	AA	8.0	B		20	7.4	0/			MOR
1990 07 14.26	S	11.6	AC	25.6	L	4	111	1.2	1			MOR
1990 07 15.22	S	11.8	AC	25.6	L	4	111	1.3	0/			MOR
1990 07 22.22	S	13.3	AC	50.8	L	4	120	0.5	0			MOR

Comet Skorichenko-George 1989e1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 12 29.73	S	10.4	VB	33.3	L	4	55	1.8	3/			TAN02
1990 01 17.74	S	10.1	AA	33.3	L	4	55	1.8	1			TAN02
1990 03 18.77	S	9.5	AA	33.3	L	4	55	2.1	1/			TAN02

Comet Cernis-Kiuchi-Nakamura 1990b

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 03 22.77	M	8.1	AA	20.3	T	10	50	3.2	4			TAN02
1990 03 23.77	M	8.2	AA	20.3	T	10	50	4.7	4			TAN02
1990 03 29.78	S	9.1	AA	5.0	B		12	4.3	4/			TAN02

Comet Levy 1990c

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 23.08	S	10.5	A	20.0	T	10	80	1.5	3			COM
1990 05 28.07	S	10.4	A	20.0	T	10	80	2	3			COM
1990 05 29.08	S	10.2	A	20.0	T	10	80	3	2/			COM
1990 05 30.06	S	9.6	AA	8.0	B		15	3	4			HAV
1990 05 31.07	S	10.3	A	20.0	T	10	80	3	2/			COM
1990 06 01.05	S	10.1	A	20.0	T	10	80					COM
1990 06 01.27	B	9.0	AA	10.0	B	4	20	2.0	2			NOW
1990 06 02.06	S	9.9	AA	33.3	L	4	55	1.8	4			TAN02
1990 06 03.05	S	9.8	AA	33.3	L	4	55	1.9	4/			TAN02
1990 06 16.99	S	8.6	AA	8.0	B		15	3	4			HAV
1990 06 17.33	! S	9.0	AA	8.0	B		20					MOR
1990 06 23.42	M	8.4	AA	8.0	B		20	5	6	0.67	278	MOR
1990 06 24.01	S	8.3	AA	8.0	B		15	4.5	5	0.4	275	HAV
1990 06 24.34	M	8.4	AA	8.0	B		20	5	6	0.67	278	MOR
1990 06 25.06	M	8.7	AA	20.3	T	10	50	4.1	5			TAN02
1990 06 25.99	S	8.5	A	11.0	L	7	32	& 3	6/			SCH04
1990 06 26.28	B	8.5	AA	10.0	B	4	20	3.25	4			NOW
1990 06 26.98	S	8.8:	AA	15.0	L	5	44	1.9	2			SPE01
1990 06 27.06	S	8.4	AA	20.3	T	10	50	4.0	4			TAN02
1990 06 28.04	M	8.5	AA	20.3	T	10	80	2.9	4/			TAN02
1990 06 28.99	S	8.7	S	10	R	16	40	4	3			KIE01
1990 06 29.04	M	8.4	AA	20.3	T	10	50	3.3	5			TAN02
1990 06 29.06	S	8.7	AA	8.0	B		15	3	2			PAN
1990 06 29.43	M	8.1	AA	8.0	B		20	6.5	5/			MOR
1990 06 30.02	S	8.0	AA	8.0	B		15	5	5	0.4	280	HAV
1990 06 30.41	M	8.1	AA	8.0	B		20	6.5	6			MOR
1990 07 01.05	S	8.3	AA	20.3	T	10	50	2.5	4			TAN02
1990 07 01.98	S	8.6:	AA	15.0	L	5	44	3.2	4/			SPE01
1990 07 02.03	S	8.8	AA	25	L	4	42	3	3			PAN
1990 07 02.99	S	8.5	A	11.0	L	7	32	& 2	4/			SCH04
1990 07 04.06	S	8.0	AA	20.3	T	10	50	4.1	4/			TAN02
1990 07 04.43	M	7.9	AA	8.0	B		20	7	5			MOR
1990 07 04.99	S	8.5:	AA	8.0	B		20	& 4.2	2			SPE01
1990 07 05.05	S	7.6	AA	8.0	B		15	5.5	5	0.45	275	HAV
1990 07 06.03	S	8.2	AA	8.0	B		15	5	3			PAN
1990 07 06.07	M	8.0	AA	20.3	T	10	50	3.7	5			TAN02
1990 07 07.07	S	8.0	AA	20.3	T	10	80		5			TAN02
1990 07 08.92	B	8.5	S	6.6	B	6	20	& 4	4			PLE01
1990 07 09.91	B	7.9	S	7.5	R	3	15		3			IWA02
1990 07 10.90	B	7.8	S	7.5	R	3	15		3			IWA02
1990 07 10.91	B	7.9:	S	31.0	L	6	80		3			SZA01

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 11.03	S	8.0	AA	8.0	B		15	4	3			PAN
1990 07 11.89	S	7.8	S	6.6	R	6	19		2			GAM
1990 07 11.92	B	7.9	S	31.0	L	6	80		3			SZA01
1990 07 11.95	S	8.3	AA	15.0	L	5	44	& 2.0	3			SPE01
1990 07 11.98	B	8.0:	S	6.4	R	6	20		2			CNO
1990 07 12.35	S	8.5:	AC	45.7	L	7	100					ROY
1990 07 12.92	B	8.5	S	6.6	B	6	20	& 4.5	4			PLE01
1990 07 12.93	B	8.0	S	31.0	L	6	80		3/			SZA01
1990 07 12.99	B	8.2	S	5.0	B		10	& 2	5			WES04
1990 07 12.99	M	7.2	S	31.0	L	8	70					KOS01
1990 07 13.04	S	7.7	AA	8.0	B		15	4	2			PAN
1990 07 13.91	B	7.6	S	7.5	R	3	15		3			IWA02
1990 07 13.93	S	8.1	SC	5.0	B		10	3.1	5/			WES04
1990 07 14.06	S	7.7	AA	25	L	4	42	4	3			PAN
1990 07 14.34	M	7.5	AA	8.0	B		20	5	5			MOR
1990 07 14.88	B	8.3	S	6.6	B	6	20	& 5	4/			PLE01
1990 07 14.89	B	7.7	S	6.4	R	6	20		2			CNO
1990 07 14.90	B	7.5	S	6.0	B		20		0			SOC
1990 07 14.90	S	7.6	S	5.0	B		7	& 9	3			WOZ
1990 07 14.91	B	7.5	S	6.0	B	5	20		2			PAR03
1990 07 14.91	B	7.6	S	7.5	R	3	15		3			IWA02
1990 07 14.94	B	8.2:	S	15.0	L	5	44	3.1	4			SPE01
1990 07 14.95	S	8.0	A	12.5	L		21					BOT
1990 07 14.96	B	8.0	S	6.7	L	6	30	5	3			DER
1990 07 14.99	B	7.9	S	8.0	B		20	& 4.2	3			SPE01
1990 07 15.00	S	7.7	S	5.0	R	10	20					GRO03
1990 07 15.26				25.6	L	4	45			0.58	270	MOR
1990 07 15.26	M	7.0	AA	8.0	B		20	9	6			MOR
1990 07 15.86	S	7.6:	S	6.0	R		12		4			PER04
1990 07 15.91	B	7.5	S	7.5	R	3	15		3			IWA02
1990 07 15.92	S	7.1	S	6.6	R	6	25		3			GAM
1990 07 15.92	S	7.4	S	5.0	B		7	9.0	3/			WOZ
1990 07 15.93	B	7.8	S	8.0	B		20	& 4.2	3			SPE01
1990 07 15.94	S	8.4	S	6.0	B		20	& 6	4			SCI
1990 07 16.01	S	6.3	S	5.0	B		10	10	5			ZAN01
1990 07 16.88	B	7.0	S	20.0	T	10	80	3	4			KAN02
1990 07 16.88	B	7.5:	S	20.0	C	12	60		2			PAR03
1990 07 16.91	B	7.4	S	7.5	R	3	15		3			IWA02
1990 07 16.91	B	7.9	S	6.0	B		20	8.2	4/	&0.3	245	PLE01
1990 07 16.91	B	7.9	S	6.6	B	6	20	8.25	4/	&0.33	245	PLE01
1990 07 16.91	B	7.9	S	10.0	B		25	8.5	4/	&0.45	245	PLE01
1990 07 16.92	B	7.2	S	5.0	B		7		7			BAN
1990 07 16.92	B	7.6	S	3.5	B		7					CIU
1990 07 16.93	B	7.5	S	6.4	R	6	20		3			CNO
1990 07 16.93	S	8.4	S	6.0	B		20	& 5	4			SCI
1990 07 16.94	B	8.4	S	10.0	B		25		4		239	FIL04
1990 07 16.94	S	6.8	AA	8.0	B		15	7.5	5/	0.87	265	HAV
1990 07 16.95	S	6.7	AA	5.0	B		10	8	5			HAV
1990 07 16.96	S	7.6:	S	6.7	L	6	30					PER05
1990 07 16.96	S	8.0:	S	6.6	R	6	13					WIL05
1990 07 17.26	M	7.0	AA	8.0	B		20	9	6	0.33	280	MOR
1990 07 17.88	B	7.0	S	20.0	T	10	80	3	4			KAN02
1990 07 17.91	B	7.4:	S	6.8	R	6	20		3			PAR03
1990 07 17.91	B	7.9	S	10.0	B		25	& 8.5	4/	&0.32	274	PLE01
1990 07 17.91	S	7.6	S	6.7	L	6	30					PER05
1990 07 17.91	S	7.8	SC	5.0	B		10	5.4	5/			WES04
1990 07 17.97	S	6.8	SC	7.0	B		20	10.4	3/			TAN02
1990 07 18.01	B	7.5	S	5.0	B		10		3			LUB

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 18.93	S	7.4	S	8.0	B		11	10	4	0.4	110	BOT
1990 07 18.95	S	6.3	S	5.0	B		10	10	5			ZAN01
1990 07 18.97	S	6.8	SC	7.0	B		20	9.2	4			TAN02
1990 07 19.25	M	6.7	AA	8.0	B		20	10	6	0.67		MOR
1990 07 19.26	S	7.2	AA	8.0	B		11	6	5			SPR
1990 07 19.90	B	7.2	S	7.5	R	3	15		3/			IWA02
1990 07 19.92	B	7.9	S	6.7	L	6	30	1.5	4/			GOR02
1990 07 19.93	S	6.4	S	5.0	B		10	8	6			LOO01
1990 07 19.99	S	6.3	S	5.0	B		10	10	5			ZAN01
1990 07 20.06	S	7.5	AA	8.0	B		15	8	3			PAN
1990 07 20.25	S	7.1	AA	8.0	B		11	6	5			SPR
1990 07 20.91	B	7.2	S	7.5	R	3	15		3/			IWA02
1990 07 20.91	B	7.5	S	6.0	B		20	5	3			MUL
1990 07 20.91	B	8.0	S	6.0	B	5	20		4		284	FIL04
1990 07 20.91	S	6.2	S	5.0	B		10	10	5			ZAN01
1990 07 20.91	S	8.4:	S	6.7	R	6	40	& 3	4			SCI
1990 07 20.95	B	7.4	S	5.0	B		10	6	4			DER
1990 07 20.98	S	6.8	SC	7.0	B		20	12	4			TAN02
1990 07 20.99	B	7.7	S	10.0	B		25	10.5	4	&0.3	289	PLE01
1990 07 21.00	S	7.0	AA	5.0	B		10	9	4	0.15	300	ABB
1990 07 21.25	S	7.1	AA	8.0	B		11	6	5			SPR
1990 07 21.35	M	6.5	AA	8.0	B		20	9	6/	1.17	255	MOR
1990 07 21.88	B	7.1	S	6.8	R	6	20		3			PAR03
1990 07 21.90	B	7.1	S	7.5	R	3	15		4			IWA02
1990 07 21.90	B	7.3	S	5.0	B		10		3			LUB
1990 07 21.90	S	9.0:	S	6.7	R	6	40	& 3	4			SCI
1990 07 21.91	S	7.5	SC	5.0	B		10	7.4	6			WES04
1990 07 21.92	B	7.6	S	10.0	B		25	& 9	4	&0.3	235	PLE01
1990 07 21.93	M	7.0	S	15.0	L	10	75					KOS01
1990 07 21.93	S	7.5:	S	6.0	B		20		3/			POW
1990 07 21.94	B	6.8:	S	6.8	R	12	11		3			RAF
1990 07 21.94	B	7.3	S	4.0	B		12		4			PIO
1990 07 21.94	B	7.4	S	4.0	B		12		1			SAN02
1990 07 21.95	S	6.2	S	5.0	B		10	10	5			ZAN01
1990 07 21.95	S	6.6	SC	7.0	B		20	12.5	4	0.7	241	TAN02
1990 07 21.97	B	7.8	S	6.7	L	6	30	2.0	4/			GOR02
1990 07 21.99	B	7.4	S	3.5	B		7		3			CIU
1990 07 22.00	B	7.3	S	5.0	B		10	8	3			DER
1990 07 22.04	B	7.5	S	6.7	L	6	30					DER
1990 07 22.24	S	6.9	AA	8.0	B		11	5	6	0.25	230	SPR
1990 07 22.32	M	6.7	AA	8.0	B		20	8	6/	1.0	255	MOR
1990 07 22.84	B	6.4	S	20.0	T	10	80	4	4			KAN02
1990 07 22.88	B	7.4	S	6.0	B		20	10	5			MUL
1990 07 22.88	S	7.0	S	5.0	B	4	7					BOD
1990 07 22.89	B	6.9	S	4.0	B		11		4			RAF
1990 07 22.90	B	6.8	S	6.8	R	12	30	& 4	5			RAF
1990 07 22.90	B	7.0	S	7.5	R	3	15		4			IWA02
1990 07 22.90	B	7.1	S	6.4	R	6	20		3			CNO
1990 07 22.90	B	7.2	S	5.0	B		10		3			LUB
1990 07 22.90	B	7.4	S	6.0	B		20					MOS01
1990 07 22.90	S	7.8:	S	6.6	R	6	13					WIL05
1990 07 22.91	B	7.0	S	6.0	B	5	20		3			PAR03
1990 07 22.91	B	7.2	S	3.5	B		7		3			CIU
1990 07 22.91	B	7.4	S	6.4	R	6	20		3/			SZA01
1990 07 22.92	B	7.0	S	8.0	R	5	18	6.5	3			PAR03
1990 07 22.92	B	7.6	S	6.0	B		20	& 4	4	&0.22	284	SCI
1990 07 22.92	S	7.7:	S	6.0	B		20		4			POW
1990 07 22.93	M	6.6	AA	5.0	B		12	16	4/	1.2	236	TAN02
1990 07 22.93	S	7.5:	S	6.7	L	6	30		2			PER05

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 22.94	B	7.0	S	5.0	B		7		7			BAN
1990 07 22.94	B	7.4	SC	5.0	B		10	9.0	6	0.08	13	WES04
1990 07 22.94	S	7.5:	S	6.7	L	6	30					KOM
1990 07 22.95	B	7.4	S	5.0	B		10	12	3			DER
1990 07 22.95	B	7.5	S	15.0	L	7	30	7.0	4		85	SZA01
1990 07 22.96	B	7.6	S	6.7	L	6	30					DER
1990 07 22.97	S	6.9	S	3.5	B	4	7		2			RZE
1990 07 22.98	B	7.4	S	10.0	B		25	11.7	4	&0.47	235	PLE01
1990 07 22.98	M	7.0	S	5.0	R	10	20		3			GRO03
1990 07 22.98	S	6.2	S	5.0	B		10	14	5			ZAN01
1990 07 23.00	S	6.0	AA	0.0	E		1					HAV
1990 07 23.00	S	6.5	AA	8.0	B		15	10.5	6	2.0	241	HAV
1990 07 23.01	S	6.2	AA	5.0	B		10	11	5/	2.0	241	HAV
1990 07 23.23	M	6.6	AA	8.0	B		20	9	7	0.75	265	MOR
1990 07 23.87	B	7.0:	S	20.0	C	12	60		3			PAR03
1990 07 23.88	B	7.4	S	6.0	B		20	12	5			MUL
1990 07 23.90	S	7.5	S	6.4	R	12	20	4	4			URB
1990 07 23.90	S	7.8:	S	6.6	R	6	13					WIL05
1990 07 23.91	B	6.9	S	6.6	R	6	25		3/			GAM
1990 07 23.91	M	6.9	S	5.0	R	9	20					KRE
1990 07 23.92	B	7.0	S	6.4	R	6	20		4			CNO
1990 07 23.92	B	7.6	S	6.0	B		20	5	4	&0.22	284	SCI
1990 07 23.93	B	6.9	S	6.6	R	6	40	6.6	3			GAM
1990 07 23.93	M	7.0	S	15.0	L	10	75					KOS01
1990 07 23.93	S	6.9	S	6.7	L	6	30					KOM
1990 07 23.93	S	6.9	S	6.7	L	6	30					PER05
1990 07 23.94	B	6.9	S	4.0	B	4	12		3/			GAM
1990 07 23.94	B	7.0	S	4.0	B		12		4			PIO
1990 07 23.94	S	7.6:	S	6.0	B		20		4			POW
1990 07 23.95	B	7.3	S	5.0	B		10	14	4			DER
1990 07 23.95	B	7.5	S	6.7	L	6	30	14	3			DER
1990 07 23.96	M	6.4	AA	5.0	B		12	11	4			TAN02
1990 07 23.97	B	7.4	S	4.0	B		12		2			SAN02
1990 07 23.98	M	7.0	S	5.0	R	10	20		2/			GRO03
1990 07 23.98	S	6.9	S	3.5	B	4	7		2			RZE
1990 07 23.99	B	7.2	S	10.0	B		25	12.5	4	&0.4	233	PLE01
1990 07 24.02	S	7.0	AA	8.0	B		11	10	4		260	PAN
1990 07 24.90	B	6.9	S	7.5	R	3	15		4			IWA02
1990 07 24.90	S	7.8:	S	6.6	R	6	13					WIL05
1990 07 24.91	M	7.0	S	15.0	L	10	75					KOS01
1990 07 24.96	M	6.3	AA	5.0	B		12	15	4	1.1	229	TAN02
1990 07 24.96	S	6.1	S	5.0	B		10	14	7			ZAN01
1990 07 24.96	S	7.0	AA	5.0	B		10	8	5			ABB
1990 07 24.98	B	7.2	S	6.6	B	6	20	&11	4	&0.37	236	PLE01
1990 07 24.98	B	7.2	S	10.0	B		25	&12.5	4	&0.42	236	PLE01
1990 07 25.00	S	6.7	AA	8.0	B		15	8	4	0.7	250	PAN
1990 07 25.88	S	7.5	S	6.4	R	12	20	4	5			URB
1990 07 25.89	B	7.3:	S	20.0	C	12	60		3			PAR03
1990 07 25.89	S	7.5:	S	6.0	B		20		4			POW
1990 07 25.90	B	6.9	S	6.6	R	6	22	8.3	3			GAM
1990 07 25.90	B	7.6:	S	6.0	B		20	& 4	4			SCI
1990 07 25.92	B	7.1	S	6.4	R	6	20		3/			SZA01
1990 07 25.92	M	6.9	S	15.0	L	10	75					KOS01
1990 07 25.93	B	7.1	S	6.4	R	6	20		3			CNO
1990 07 25.94	B	7.1	S	6.7	L	6	30	10.7	4/			GOR02
1990 07 25.94	B	7.5	S	5.0	B		7					KON01
1990 07 25.94	S	6.8	S	4.0	B	4	12		3			GAM
1990 07 25.95	B	7.1	S	4.0	B		11					KOL02
1990 07 25.95	B	7.2	S	5.0	B		10	9.7	6			WES04

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 25.96	M	6.4	SC	5.0	B		12	12	4	0.9	224	TAN02
1990 07 25.96	S	6.9	S	6.7	L	6	30					KOM
1990 07 25.96	S	6.9	S	6.7	L	6	30					PER05
1990 07 25.96	S	7.1	AA	5.0	B		10	4	3			ABB
1990 07 25.97	S	6.2	S	5.0	B		10	10	7			ZAN01
1990 07 25.97	S	6.7	S	8.0	B		11	6	3/	0.7	110	BOT
1990 07 25.98	S	7.2	S	3.5	B	4	7		3			RZE
1990 07 25.99	B	6.8	S	7.5	R	3	15		4/			IWA02
1990 07 25.99	B	7.0	S	10.0	B		25	&10	4	&0.43	231	PLE01
1990 07 26.06	S	7.4	SC	10	R	16	80	8	3	0.13	290	KIE01
1990 07 26.86	B	6.4	S	20.0	T	10	80	4	3			KAN02
1990 07 26.87	B	6.9	S	5.0	B		10		4			CIU
1990 07 26.87	M	6.9	S	15.0	L	10	75					KOS01
1990 07 26.88	B	7.2	S	5.0	B		7					KON01
1990 07 26.88	B	7.2	S	6.0	B		20	12	3			MUL
1990 07 26.89	B	7.2	S	4.0	B		12		3			SAN02
1990 07 26.89	S	7.0	S	6.4	R	12	20	4.5	5			URB
1990 07 26.90	B	6.9	S	6.4	R	6	20		4			CNO
1990 07 26.90	B	7.6:	S	6.0	B		20	& 5	4			SCI
1990 07 26.91	B	7.0	S	10.0	B		25	&10	4	&0.5	230	PLE01
1990 07 26.91	M	6.4	AA	5.0	B		12		4			TAN02
1990 07 26.91	S	6.1	S	5.0	B		10	13	7			ZAN01
1990 07 26.92	B	6.0:	S	5.0	B		10		5			PAT01
1990 07 26.92	B	6.8	S	5.0	B		10		4			MAT06
1990 07 26.92	B	6.8	S	7.5	R	3	15		5			IWA02
1990 07 26.93	B	7.1	S	5.0	B		10	10.2	6/	0.3	40	WES04
1990 07 26.93	S	7.5:	S	6.0	B		20		4			POW
1990 07 26.94	B	6.8	S	4.0	B		12		4			PIO
1990 07 26.94	S	6.6	S	6.7	L	6	30					KOM
1990 07 26.94	S	6.7	S	8.0	B		11	6	3	1.0	110	BOT
1990 07 26.95	B	7.0	S	6.7	L	6	30	12.3	4/			GOR02
1990 07 26.95	B	7.4	S	5.0	B		10	15	3			DER
1990 07 26.95	B	7.5	S	6.7	L	6	30	10	2			DER
1990 07 26.97	S	5.8	AA	0.0	E		1					HAV
1990 07 26.97	S	6.2	AA	8.0	B		15	12	6	1.33	243	HAV
1990 07 27.00	S	6.0	AA	5.0	B		10	12	6	1.33	243	HAV
1990 07 27.00	S	6.6	S	5.0	B		10	5	7			LAA
1990 07 27.24	S	6.4	AA	8.0	B		11	8	5			SPR
1990 07 27.86	B	7.5	S	6.0	B		20					MOS01
1990 07 27.87	B	7.2	S	6.0	B		20	13	5			MUL
1990 07 27.88	B	6.3	S	20.0	T	10	80	4	3			KAN02
1990 07 27.88	B	7.0	S	6.0	B		20		2			SOC
1990 07 27.89	B	5.9:	S	5.0	B		10		5			PAT01
1990 07 27.89	B	6.5	S	6.0	B	5	20	15.2	5	0.08	220	GOR02
1990 07 27.89	B	7.0	S	5.0	B		10	10.0	6/	0.5	43	WES04
1990 07 27.89	M	6.7	S	5.0	R	9	20					KRE
1990 07 27.90	B	6.7	S	5.0	B		10		3			LUB
1990 07 27.90	B	6.7	S	7.5	R	3	15		4/			IWA02
1990 07 27.90	B	6.9	S	4.0	B		11		5			BAN
1990 07 27.90	B	6.9	S	15.0	M	15	56		4	&0.5	220	KOL02
1990 07 27.90	B	7.2	S	6.0	B		20	& 6	4			SCI
1990 07 27.90	S	7.6:	S	6.0	B		20		4			POW
1990 07 27.91	B	7.0:	S	20.0	C	12	60	5.7	4			PAR03
1990 07 27.92	B	6.8	S	5.0	B		10		4			MAT06
1990 07 27.92	B	6.8	S	5.0	B		10		5	1.5	115	SZU
1990 07 27.94	B	7.0	S	4.0	B		12		3			SAN02
1990 07 27.94	M	6.2	SC	5.0	B		12	17	4/	1.2	233	TAN02
1990 07 27.95	B	7.3	S	5.0	B		10	14	4			DER
1990 07 27.95	B	7.3	S	6.7	L	6	30		5			DER

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 27.95	S	6.5	S	6.7	L	6	30					KOM
1990 07 27.95	S	6.5	S	6.7	L	6	30					PER05
1990 07 27.96	B	6.9	S	6.4	R	6	20	9.9	4/			SZA01
1990 07 27.99	B	6.8	S	15.0	L	7	30		4/		81	SZA01
1990 07 27.99	B	6.9	S	10.0	B		25	12.5	4	&0.32	228	PLE01
1990 07 28.00	S	6.1	S	5.0	B		10	13	7			ZAN01
1990 07 28.01	B	6.3	S	5.0	B		10		5			KAC
1990 07 28.06	B	7.2	SA	5.0	B	2	10	4	4			AND03
1990 07 28.24	S	6.2	AA	8.0	B		11	10	6	0.5	230	SPR
1990 07 28.84	B	6.8	S	3.5	B		7		5			BET01
1990 07 28.87	M	6.8	S	6.7	R	12	60					KOS01
1990 07 28.88	B	6.3	S	20.0	T	10	80	4.5	3			KAN02
1990 07 28.88	B	6.9	S	5.0	B		10		6	1.6	115	SZU
1990 07 28.88	B	7.2	S	6.0	B		20	13	5			MUL
1990 07 28.89	B	6.6	S	6.6	R	6	19	10.1	5	0.77	220	GAM
1990 07 28.89	B	6.7:	S	6.6	R	12	50	& 7	5			KOL03
1990 07 28.90	B	6.1	S	5.0	B		10	12	4			OLE
1990 07 28.90	B	6.3	S	6.0	B	5	20	15.9	6	0.13	254	GOR02
1990 07 28.90	B	6.4	S	5.0	B	4	7		4			CNO
1990 07 28.90	B	6.5	S	6.0	B	5	20		4			PAR03
1990 07 28.90	B	6.6	S	5.0	B		10		3/			LUB
1990 07 28.90	M	6.5	S	6.4	R	6	40	2.5	5/			LAS
1990 07 28.90	M	6.6	S	5.0	R	9	20					KRE
1990 07 28.90	S	6.5	S	5.0	B		7	16.4	5			WOZ
1990 07 28.90	S	6.7	S	5.0	B	4	7					BOD
1990 07 28.90	S	7.6:	S	6.0	B		20		3/			POW
1990 07 28.91	B	6.0	S	6.0	B		20	12	4/			OLE
1990 07 28.91	B	6.3	S	7.0	B		30	12	5			OLE
1990 07 28.91	B	6.5	S	5.0	B	4	7		4			PAR03
1990 07 28.91	B	6.5	S	8.0	R	14	43		4			SZA01
1990 07 28.91	B	7.6	S	6.0	B		20	& 5	4	&0.17	285	SCI
1990 07 28.92	B	6.3:	S	5.0	B		10		5			PAT01
1990 07 28.92	B	6.5	S	8.0	R	5	18	7.5	4	0.4	225	PAR03
1990 07 28.92	B	6.8	S	5.0	B		10		4			MAT06
1990 07 28.92	B	7.0	S	5.0	B		10	12.7	6/	0.25	37	WES04
1990 07 28.93	B	6.8	S	10.0	R	10	25					KOL02
1990 07 28.93	M	6.6	S	4.0	B	4	12		5	0.9	220	GAM
1990 07 28.93	S	6.4	S	6.7	L	6	30					PER05
1990 07 28.94	S	6.4	S	6.7	L	6	30					KOM
1990 07 28.95	B	6.7	S	8.0	R	14	43		4/			SZA01
1990 07 28.95	B	7.0	S	5.0	B		10	15	5			DER
1990 07 28.95	B	7.2	S	6.7	L	6	30	15	6			DER
1990 07 28.95	S	6.7	S	6.4	R	12	20	7	6			URB
1990 07 28.96	B	6.8	S	5.0	R	10	20		3			GRO03
1990 07 28.97	B	6.5	S	6.8	R	6	20		4			PAR03
1990 07 28.97	B	6.8:	S	5.0	B	4	10					MAR07
1990 07 28.97	S	7.2	S	6.0	B		20		4			POW
1990 07 28.99	B	6.4	S	3.5	B	4	7		4			RZE
1990 07 28.99	B	6.7	S	6.6	B	6	20	&13	4	&0.43	225	PLE01
1990 07 29.02	B	6.8	S	6.0	B	5	20		4	&0.27	295	FIL04
1990 07 29.03	B	7.0	SA	5.0	B	2	10		4			AND03
1990 07 29.04	B	6.4	S	5	R		8	11	6			GAR02
1990 07 29.08	S	6.1	AA	8.0	B		15	12	4	0.7	245	PAN
1990 07 29.23	S	6.3	AA	8.0	B		11	9	4			SPR
1990 07 29.27	M	6.2	AA	8.0	B		20	10	7	1.58	240	MOR
1990 07 29.28	S	6.0	AA	0.7	E		1					MOR
1990 07 29.86	B	6.4	S	6.0	B	5	20		4	0.5	225	PAR03
1990 07 29.87	B	6.4	S	5.0	B	4	7		4			PAR03
1990 07 29.88	B	6.7	S	5.0	B		10		4			MAT06

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 29.88	B	6.7	S	6.4	R	6	20		4			SZA01
1990 07 29.88	B	6.8	S	5.0	B		10					KIE
1990 07 29.88	B	7.3	S	6.0	B		20	& 5	4	&0.20	280	SCI
1990 07 29.89	B	6.6	S	7.5	R	3	15		4/			IWA02
1990 07 29.89	S	6.6	S	5.0	B	4	7					BOD
1990 07 29.90	B	6.2	S	20.0	T	10	80	4.5	3			KAN02
1990 07 29.90	B	6.5	S	5.0	B		10		3/			LUB
1990 07 29.90	B	6.8	S	5.0	B		7					KON01
1990 07 29.92	B	6.4	S	6.6	B	6	20	&14	4	&0.33	238	PLE01
1990 07 29.92	B	6.7:	S	6.6	R	12	50	& 7	5			KOL03
1990 07 29.93	S	6.9	AA	5.0	B		10	11	4			ABB
1990 07 29.94	M	5.8	AA	5.0	B		12	15	4			TAN02
1990 07 29.95	S	5.5	AA	0.0	E		1	12				HAV
1990 07 29.95	S	5.9	AA	8.0	B		15	13	6	1.47	242	HAV
1990 07 29.96	B	6.9	S	10.0	R	10	25		3			SOC
1990 07 29.97	B	6.3	S	10.0	B		25		4	&0.3	275	FIL04
1990 07 29.98	S	5.6	AA	5.0	B		10	14	6	1.47	242	HAV
1990 07 30.03	B	7.0	SA	5.0	B	2	10		5			AND03
1990 07 30.24	S	6.1	AA	8.0	B		11	10	4			SPR
1990 07 30.86	B	5.9	S	3.5	B		7					BET01
1990 07 30.87	M	6.0	S	6.4	R	6	40	2.5	5/			LAS
1990 07 30.88	B	6.2	S	5.0	B		10		4			OLE
1990 07 30.88	B	6.3	S	5.0	B	4	7		4			CNO
1990 07 30.88	B	6.4	S	6.0	B		20		4			WIS02
1990 07 30.88	B	6.5	S	6.0	B		20		3/			OLE
1990 07 30.88	B	6.7:	S	6.6	R	12	50	& 7	5/			KOL03
1990 07 30.88	B	6.8	S	5.0	B		10		5	1.3	130	SZU
1990 07 30.89	B	6.5	S	7.0	B		30		3/			OLE
1990 07 30.89	B	6.5	S	7.0	B		30		4			WIS02
1990 07 30.89	B	6.8	S	10.0	R	10	25		5		215	KOL02
1990 07 30.89	B	7.1	S	5.0	B		10	15	4/			DER
1990 07 30.89	B	7.2	S	6.7	L	6	30	10	5			DER
1990 07 30.89	B	7.3	S	6.8	R	12	30	& 3	5			RAF
1990 07 30.89	S	6.7	S	6.4	R	12	20		5			URB
1990 07 30.90	B	6.5	S	5.0	B		10		4/			WIS02
1990 07 30.90	B	7.0	S	4.0	B		11	& 5	4			RAF
1990 07 30.90	M	6.8	S	6.7	R	12	60					KOS01
1990 07 30.91	B	6.3	S	5.0	B		10		5			PAT01
1990 07 30.91	B	6.6	S	7.5	R	3	15		4/			IWA02
1990 07 30.92	B	6.4	S	5.0	B		7					KON01
1990 07 30.92	B	6.6	S	6.4	R	6	20		4			SZA01
1990 07 30.92	S	7.1	S	6.0	B		20		4			POW
1990 07 30.93	B	6.0	S	6.0	B	5	20	18.3	6/	0.15	230	GOR02
1990 07 30.93	B	6.7	S	4.0	B		12		2			SAN02
1990 07 30.93	M	6.4	S	5.0	R	9	20					KRE
1990 07 30.93	S	6.3:	S	6.7	L	6	30		4			PER05
1990 07 30.94	B	6.3	S	3.5	B		7		4			CIU
1990 07 30.94	B	6.8	S	4.0	B		12		4/			PIO
1990 07 30.95	B	6.6	S	15.0	L	7	30		4/			SZA01
1990 07 30.96	B	6.7	S	5.0	B		10	11.4	6	0.3	46	WES04
1990 07 30.96	B	6.7	S	15.0	M	15	40		5			BAN
1990 07 30.96	S	5.6	AA	5.0	B		12	12	4	0.6	245	PAN
1990 07 30.96	S	6.5	AA	7.0	B		16	12	2			TAY
1990 07 30.97	B	6.4	S	3.5	B	4	7		4			RZE
1990 07 30.97	M	6.0	SC	5.0	B		12	14	4			TAN02
1990 07 30.98	S	6.3:	S	6.7	L	6	30					KOM
1990 07 31.00	B	6.4	S	5.0	B		7	& 9	5			SPE01
1990 07 31.02	B	6.5	S	8.0	B		20	& 8	5/			SPE01
1990 07 31.03	B	6.9	SA	5.0	B	2	10		5			AND03

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 31.09	S	5.7	S	3.0	B		8		5			LOO01
1990 07 31.24	S	6.0	AA	8.0	B		11	9	3	0.5	220	SPR
1990 07 31.80	B	6.9	S	6.0	B		20					MOS01
1990 07 31.84	B	6.3:	S	3.5	B		7		4/			BET01
1990 07 31.84	B	6.6	S	5.0	B		10					KIE
1990 07 31.84	B	6.8	S	5.0	B		10		3			MAT06
1990 07 31.87	B	6.3	S	6.0	B	5	20		4	&0.20	240	FIL04
1990 07 31.87	B	6.7	S	6.4	R	6	20		4/			SZA01
1990 07 31.87	B	6.9	S	6.0	B		20					LUK03
1990 07 31.88	B	6.1	S	20.0	T	10	80	5	3			KAN02
1990 07 31.88	B	6.2	S	5.0	B	4	7		4			CNO
1990 07 31.88	M	6.0	S	6.4	R	6	40	3	5			LAS
1990 07 31.88	S	6.3	S	6.4	R	12	30		4			DAL01
1990 07 31.88	S	6.4	S	8.0	B		11	6	3	0.7	120	BOT
1990 07 31.89	B	6.6	S	5.0	B		10	&11	6			WES04
1990 07 31.89	S	6.3:	S	6.7	L	6	30					PER05
1990 07 31.90	B	6.0	S	6.0	B	5	20	18.6	6/	0.18	230	GOR02
1990 07 31.90	B	6.2	S	6.0	B	5	20		4	0.5	225	PAR03
1990 07 31.90	B	6.3	S	5.0	B		10		3/			LUB
1990 07 31.90	B	6.4	S	6.6	B	6	20	& 9.5	4	&0.17	266	PLE01
1990 07 31.90	B	6.5	S	5.0	B		10		4/			OLE
1990 07 31.90	B	6.5	S	6.0	B		20		4			OLE
1990 07 31.90	M	6.4	S	5.0	R	9	20		4/			KRE
1990 07 31.90	S	6.3:	S	6.7	L	6	30					KOM
1990 07 31.91	B	6.2	S	5.0	B	4	7		4			PAR03
1990 07 31.91	B	6.3	S	5.0	B		7					KON01
1990 07 31.91	B	6.5	S	7.5	R	3	15		4/			IWA02
1990 07 31.91	B	6.7	S	31.0	L	7	70		5			SOC
1990 07 31.91	B	7.0	S	6.0	B		20	& 7	4	&0.17	258	SCI
1990 07 31.91	S	7.0	S	6.0	B		20		4			POW
1990 07 31.92	B	6.2	S	8.0	R	5	18	8	4			PAR03
1990 07 31.92	B	6.4	S	3.5	B	4	7		4			RZE
1990 07 31.92	B	6.5	S	5.0	R	10	20		3/			GRO03
1990 07 31.92	B	6.6	S	10.0	R	10	25		5			BAN
1990 07 31.92	B	6.8	S	6.4	R	6	40		4			BEN04
1990 07 31.92	S	6.4	S	5.0	B		7	13.1	5/			WOZ
1990 07 31.93	B	6.7	S	5.0	B		10		5			SZU
1990 07 31.93	B	6.7	S	6.6	R	12	50	&10	6			KOL03
1990 07 31.95	B	6.6	S	6.4	R	6	20		4/			SZA01
1990 07 31.95	B	6.7:	S	5.0	B		10					PAT01
1990 07 31.95	B	6.8	S	4.0	B		12		5			PIO
1990 07 31.95	S	6.1	S	8.0	B		15	15	2/			SCH04 ✓
1990 07 31.96	B	6.7	S	5.0	B		10	15	6			DER
1990 07 31.96	B	6.9	S	6.7	L	6	30	11	4/			DER
1990 07 31.99	B	6.4	S	8.0	B		20	& 9.6	5/			SPE01
1990 07 31.99	M	6.0	AA	5.0	B		12	15	4	0.8	228	TAN02
1990 08 01.02	B	6.4	S	5.0	B		7	& 9.6	5			SPE01
1990 08 01.03	S	6.2	S	3.5	B		7	6	6			FEI
1990 08 01.24	S	5.4	AA	8.0	B		11	12	3			SPR
1990 08 01.83	M	6.0	S	6.4	R	6	40	2.5	5/			LAS
1990 08 01.84	B	6.6	S	5.0	B		10					KIE
1990 08 01.86	B	6.1	S	6.0	B	5	20		4			PAR03
1990 08 01.87	B	6.1	S	5.0	B	4	7		4			PAR03
1990 08 01.88	B	6.3	S	5.0	B	4	10					MAR07
1990 08 01.88	B	6.5	S	5.0	B		10	11.1	6/	0.5	51	WES04
1990 08 01.88	B	6.5	S	6.4	R	6	20		4			SZA01
1990 08 01.88	B	7.3	S	6.0	B		20	& 6	4	&0.17	296	SCI
1990 08 01.89	B	6.2	S	5.0	B		7					KON01
1990 08 01.89	B	6.4	S	7.5	R	3	15		5			IWA02

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 01.89	B	6.5	S	5.0	B		10		5			SZU
1990 08 01.89	M	6.3	S	5.0	R	9	20		4/			KRE
1990 08 01.89	S	6.2	S	6.7	L	6	30					PER05
1990 08 01.90	B	6.4	S	4.0	B		11	& 7	6			RAF
1990 08 01.90	B	6.4	S	6.6	B	6	20	& 8.5	4			PLE01
1990 08 01.90	B	6.6	S	5.0	B		10					PAT01
1990 08 01.90	S	6.3	S	6.4	R	12	30		4			DAL01
1990 08 01.91	B	6.5	S	31.0	L	7	70		5			SOC
1990 08 01.92	B	6.6	S	4.0	B		12		2			SAN02
1990 08 01.92	B	6.7	S	5.0	B		10		4			MAT06
1990 08 01.92	B	6.7	SA	5.0	B	2	10		5			AND03
1990 08 01.92	S	5.6	AA	8.0	B		10	8	5			SHA02
1990 08 01.93	S	7.1	S	6.0	B		20		4			POW
1990 08 01.94	B	6.3	S	3.5	B	4	7		4/			RZE
1990 08 01.94	B	6.6	S	5.0	B		10	17.5	6			DER
1990 08 01.94	S	6.0	S	5.0	B		10	10	4			LAA
1990 08 01.95	B	6.9	S	6.7	L	6	30	12	6/			DER
1990 08 01.95	S	5.8	S	5.0	B		10	13	5			ZAN01
1990 08 01.96	B	6.6	S	6.6	R	12	50	&11	6			KOL03
1990 08 01.96	M	6.7	S	6.7	R	12	60					KOS01
1990 08 01.96	S	6.5	S	14.5	L	8	30	10	6			LAA
1990 08 01.97	S	6.3	S	8.0	B		11		3			BOT
1990 08 01.98	B	6.4	S	5.0	B		7	& 9	5			SPE01
1990 08 01.99	B	5.9	S	5.0	B	4	7	20.0	7	0.18	230	GOR02
1990 08 01.99	B	6.4	S	8.0	B		20	& 9.2	6			SPE01
1990 08 01.99	M	5.8	AA	5.0	B		12	14	5		239	TAN02
1990 08 02.04	B	6.2	S	3.0	B		8		4			BEN04
1990 08 02.24	S	5.9	AA	8.0	B		11	11	3			SPR
1990 08 02.43	M	5.7	AA	5.0	B		10	14	6	2.75	228	MOR
1990 08 02.87	B	6.5	S	5.0	B		10		5			SZU
1990 08 02.88	B	6.3	S	6.0	B	5	20	& 8	4			FIL04
1990 08 02.88	B	6.5	S	5.0	B		10		5			PAT01
1990 08 02.88	B	6.6	S	5.0	B		10					KIE
1990 08 02.88	B	6.6	S	5.0	B		10		4			MAT06
1990 08 02.89	B	6.0	S	5.0	B		7					KON01
1990 08 02.89	B	6.2	S	6.0	B		20	& 7	4	&0.27	280	SCI
1990 08 02.89	B	6.3	S	4.0	B		11	& 5	6			RAF
1990 08 02.90	B	6.1	S	5.0	B		10		4			LUB
1990 08 02.90	B	6.6	S	5.0	B		10	14	7			DER
1990 08 02.90	B	6.6	S	6.6	R	12	50	&10	6			KOL03
1990 08 02.90	B	6.7	S	6.7	L	6	30	10	7/			DER
1990 08 02.90	M	6.0	S	6.4	R	6	40	2.5	5	0.25	120	LAS
1990 08 02.90	M	6.5	S	5.0	B		7		3			KOS03
1990 08 02.91	B	6.4	S	6.0	B		20		4			OLE
1990 08 02.91	B	6.4	S	6.6	B	6	20	& 9	4			PLE01
1990 08 02.91	B	6.5	S	31.0	L	7	70		5			SOC
1990 08 02.91	S	6.2	S	6.0	B		20		5			WOZ
1990 08 02.91	S	6.2	S	6.4	R	12	30		4			DAL01
1990 08 02.91	S	6.5	SC	5.0	B		10	8.5	6/	0.3	68	WES04
1990 08 02.92	B	6.5	S	4.0	B		12		4			SAN02
1990 08 02.92	S	7.1	S	6.0	B		20		3/			POW
1990 08 02.93	S	6.5	S	5.0	B		10	7.5	4			LAA
1990 08 02.94	B	6.3	S	7.5	R	3	15		5			IWA02
1990 08 02.94	B	6.4	S	10.0	R	10	25		5			BAN
1990 08 02.94	B	6.5:	S	6.4	R	6	20		4			SZA01
1990 08 02.94	B	6.6	S	4.0	B		12		5			PIO
1990 08 02.95	B	6.4	SA	5.0	B	2	10		5			AND03
1990 08 02.95	S	6.4	S	14.5	L	8	30		6			LAA
1990 08 02.96	S	5.9	S	6.7	L	6	30					KOM

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 02.96	S	5.9	S	6.7	L	6	30					PER05
1990 08 02.99	S	5.7	S	3.5	B		7	8	6			FEI
1990 08 03.00	B	6.2	S	3.0	B		8		4			BEN04
1990 08 03.01	B	6.4	S	8.0	B		20	& 9.1	5			SPE01
1990 08 03.01	S	5.8	S	5.0	B		10	13	7	0.5	210	ZAN01
1990 08 03.02	B	5.7	S	5.0	B	4	7		4	0.5	225	PAR03
1990 08 03.02	B	5.9	S	5.0	B	4	7	25.1	7	0.25	250	GOR02
1990 08 03.03	B	5.8	S	6.0	B	5	20		4	1.0	225	PAR03
1990 08 03.03	B	6.2	S	5.0	B		7	&10	5			SPE01
1990 08 03.20	S	5.6	AA	5.0	B		7	12	5			SHA02
1990 08 03.24	S	6.0	AA	8.0	B		11	12	3			SPR
1990 08 03.82	B	6.3	SA	5.0	B	2	10		5			AND03
1990 08 03.88	B	6.1	S	6.4	R	6	20		4			CNO
1990 08 03.88	B	6.2	S	6.0	B		20	& 7	4	&0.27	283	SCI
1990 08 03.88	B	6.3	S	6.0	B	5	20	& 8	4			FIL04
1990 08 03.88	B	6.5	S	5.0	B		10		5			SZU
1990 08 03.88	B	6.5	S	6.4	R	6	20		4			SZA01
1990 08 03.88	S	6.1	S	6.4	R	12	30		4			DAL01
1990 08 03.89	B	6.1	S	5.0	B		7					KON01
1990 08 03.89	B	6.3	S	5.0	B		10	14	6			DER
1990 08 03.89	B	6.6	S	6.7	L	6	30	10	6/			DER
1990 08 03.90	B	6.1	S	7.5	R	3	15		5			IWA02
1990 08 03.90	B	6.4	S	6.0	B		20		5			OLE
1990 08 03.90	M	6.4	S	5.0	B		7		4			KOS03
1990 08 03.90	M	6.4	S	15.0	L	8	48		4			KOS03
1990 08 03.90	S	6.3	S	6.0	B		20		5/			WOZ
1990 08 03.91	B	6.2	S	4.0	B		11		5			RAF
1990 08 03.91	B	6.4	S	5.0	B		10		5			PAT01
1990 08 03.92	B	6.3	S	6.6	B	6	20	& 8	4			PLE01
1990 08 03.93	S	6.9	S	6.0	B		20		4/			POW
1990 08 03.94	B	6.1	S	3.5	B	4	7		5			RZE
1990 08 03.94	B	6.4	S	4.0	B	4	12		5			GAM
1990 08 03.94	B	6.4	S	10.0	R	10	25		5			BAN
1990 08 03.94	B	6.4	SC	5.0	B		10	8.1	6/	0.2	67	WES04
1990 08 03.94	M	6.6	S	31.0	L	8	70					KOS01
1990 08 03.94	S	5.9	S	4.0	R	9	12					KOM
1990 08 03.95	B	5.9	S	5.0	B		10	& 8	5			KAC
1990 08 03.96	B	6.0	S	5.0	B		10		4			LUB
1990 08 03.96	S	5.8	S	5.0	B		10	7	4			LAA
1990 08 03.97	B	6.7	S	6.0	B		20					MOS01
1990 08 03.98	B	6.5	S	4.0	B		12		4			SAN02
1990 08 03.98	B	6.5	S	15.0	L	7	30		4			SZA01
1990 08 03.98	M	6.1	SA	5.0	B	2	10		4			AND03
1990 08 04.00	B	5.5	S	5.0	B	4	7		4	0.5	225	PAR03
1990 08 04.00	B	5.9	S	5.0	B	4	7	25.4	7	0.25	250	GOR02
1990 08 04.00	B	6.4	SC	5.0	B		10	11	5			FRA01
1990 08 04.02	B	5.6	S	6.0	B	5	20		4	1.0	225	PAR03
1990 08 04.03	B	6.2	S	5.0	B		7	&10.5	5			SPE01
1990 08 04.03	S	6.1	AA	7.0	B		16	8	2			TAY
1990 08 04.04	B	6.2	S	8.0	B		20	&12.2	5			SPE01
1990 08 04.06	S	5.1	AA	0.0	E		1	12				HAV
1990 08 04.06	S	5.2	AA	5.0	B		10	15	5/	1.47	235	HAV
1990 08 04.08	S	5.4	S	3.0	B		8		5			LOO01
1990 08 04.24	S	5.8	AA	8.0	B		11	14	5	0.5	215	SPR
1990 08 04.80	S	6.3	S	6.6	B	6	20	& 9	4			PLE01
1990 08 04.85	B	7.3	S	15.0	L	9	70		4			LUK01
1990 08 04.87	B	6.6	S	6.0	B		20	18	5			MUL
1990 08 04.87	S	5.7	S	3.5	B		7					PER05
1990 08 04.88	B	6.0	S	20.0	T	10	80	5	3			KAN02

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 04.88	B	6.3	S	4.0	B		11		5			BAN
1990 08 04.88	B	6.3	S	6.4	R	6	20		4			CNO
1990 08 04.88	B	6.5	S	5.0	B		10	15	6/			DER
1990 08 04.88	B	6.7	S	6.0	B		20	& 6	4	&0.27	270	SCI
1990 08 04.88	B	6.8	S	6.7	L	6	30	11	6			DER
1990 08 04.88	S	6.1	S	6.4	R	12	30		3			DAL01
1990 08 04.88	S	7.2:	S	6.6	R	6	13					WIL05
1990 08 04.89	B	6.3	S	15.0	L	7	30		4/			SZA01
1990 08 04.90	B	5.6	S	6.0	B	5	20		4			PAR03
1990 08 04.90	B	6.3	S	4.0	B	4	12		5			GAM
1990 08 04.90	M	6.0	S	6.4	R	6	40	3	6			LAS
1990 08 04.90	M	6.4	S	5.0	B		7		3			KOS03
1990 08 04.91	B	5.6	S	5.0	B	4	7		4			PAR03
1990 08 04.91	B	6.2	S	3.5	B	4	7		5			RZE
1990 08 04.91	B	6.4	S	5.0	B		10					PAT01
1990 08 04.92	B	6.1	S	5.0	B		7					KON01
1990 08 04.92	B	6.3	S	5.0	B		10		4			MAT06
1990 08 04.92	B	6.4	S	4.0	B		12		4			SAN02
1990 08 04.92	M	6.5	S	5.0	B		10					KOS01
1990 08 04.93	B	5.9	S	5.0	B		10		5			KAC
1990 08 04.94	S	6.9	S	6.0	B		20		4			POW
1990 08 04.95	S	5.9	S	4.0	R	9	12					KOM
1990 08 04.96	S	5.7	S	5.0	B		10	10	7			ZAN01
1990 08 04.97	B	6.3	S	31.0	L	7	70		6			SOC
1990 08 04.98	B	6.2	SC	5.0	B		10	10	5			FRA01
1990 08 04.98	B	6.3	S	5.0	B		10	9.8	6/	0.3	60	WES04
1990 08 04.98	B	6.4	S	6.0	B		20		5/			WOZ
1990 08 04.99	B	6.2	S	15.0	L	7	30		4/			SZA01
1990 08 04.99	B	6.4	S	6.0	B		20		5/			OLE
1990 08 04.99	B	6.5:	S	6.6	R	12	50	&12	6			KOL03
1990 08 05.00	M	6.0	SA	5.0	B	2	10		4			AND03
1990 08 05.01	B	6.4	S	8.0	B		20	& 9.0	5			SPE01
1990 08 05.02	B	5.8	S	5.0	B		10		4			LUB
1990 08 05.02	B	6.5	S	5.0	B		10					KIE
1990 08 05.03	B	6.2	S	5.0	B		7	& 7.3	5			SPE01
1990 08 05.04	B	6.1	S	3.5	B		7		4			CIU
1990 08 05.06	B	6.3	S	6.0	B	5	20	&12	4			FIL04
1990 08 05.24	S	5.8	AA	8.0	B		11	12	4	0.5	210	SPR
1990 08 05.81	B	6.0	S	6.6	B	6	20	& 9	4	&0.33	270	PLE01
1990 08 05.84	B	6.5	S	5.0	B		10					KIE
1990 08 05.85	B	5.6:	S	5.0	B	4	7		4			PAR03
1990 08 05.85	S	5.5	S	3.5	B		7					PER05
1990 08 05.86	B	5.7:	S	6.0	B	5	20		4			PAR03
1990 08 05.86	B	5.9	S	7.5	R	3	15		5			IWA02
1990 08 05.88	B	6.7	S	6.0	B		20	& 5	4	&0.27	270	SCI
1990 08 05.88	M	6.0:	S	5.0	R	9	20					KRE
1990 08 05.92	M	6.4	S	5.0	B		10					KOS01
1990 08 05.92	S	6.1	S	8.0	B		11		4			BOT
1990 08 05.94	S	5.6	AA	5.0	B		12	10	4			PAN
1990 08 05.96	S	4.8	S	5.0	B		10	15	5			COM
1990 08 06.06	B	5.7	S	5.0	B		10		4			LUB
1990 08 06.25	S	5.7	AA	8.0	B		11	12	4	0.5	210	SPR
1990 08 06.56	S	5.2	U	8.0	B		20	10	7	0.5	165	CAM03
1990 08 06.84	S	5.2	S	3.5	B		7		4			PER05
1990 08 06.86	B	5.8	S	7.5	R	3	15		5			IWA02
1990 08 06.88	B	5.8	S	6.4	R	6	20		4/			SZA01
1990 08 06.91	B	6.0	S	15.0	L	7	30		4/			SZA01
1990 08 06.96	B	6	: SC	5.0	B		10		4			FRA01
1990 08 06.96	S	5.6	AA	8.0	B		11	10	4			PAN

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 07.06	S	6.0	S	3.5	B		7	6	6			FEI
1990 08 07.24	S	5.7	AA	8.0	B		11	10	3			SPR
1990 08 07.85	B	5.7	S	7.5	R	3	15		5/			IWA02
1990 08 07.92	S	5.7	S	8.0	B		11	10	4			BOT
1990 08 07.94	B	6.6	S	4.0	B		12		5			PIO
1990 08 07.94	S	5.6	AA	8.0	B		15	12	3			PAN
1990 08 08.10	S	4.8	AA	3.5	B		7	9	5			SHA02
1990 08 08.23	S	5.6	AA	8.0	B		11	10	4	1.5	205	SPR
1990 08 08.85	B	6.3	S	5.0	B		10		6			SZU
1990 08 08.85	S	5.5:	AA	3.0	B		8					HAS02
1990 08 08.89	B	5.8	S	4.0	B		11		6			BAN
1990 08 08.89	B	6.1	SC	5.0	B		10		7			WES04
1990 08 08.89	B	6.1:	S	31.0	L	7	70		6			SOC
1990 08 08.90	B	6.2	S	4.0	B		12		4			SAN02
1990 08 08.93	M	6.1	S	6.7	R	12	60					KOS01
1990 08 09.23	S	5.6	AA	8.0	B		11	10	3	1		SPR
1990 08 09.85	B	6.4	S	6.6	R	12	50		6			KOL03
1990 08 09.90	M	6.7	S	5.0	B		7		3			KOS03
1990 08 09.93	B	5.5	S	7.5	R	3	15		5/			IWA02
1990 08 10.76	S	5.0	AA	5.0	B		7					SZA
1990 08 10.80	B	5.8	S	6.7	B		20		4			LUK01
1990 08 10.82	B	6.0:	S	5.0	B		10					KIE
1990 08 10.84	B	5.3	S	5.0	B		10		4/			LUB
1990 08 10.84	M	5.4	AA	5.0	B		12	25	4			TAN02
1990 08 10.84	S	5.0	S	3.5	B		7					PER05
1990 08 10.85	B	5.5	S	7.5	R	3	15		5/			IWA02
1990 08 11.20	M	4.5	AA	5.0	B		10	18	6	2.67	215	MOR
1990 08 11.23	S	5.3	AA	8.0	B		11	12	5	1.5		SPR
1990 08 11.82	M	5.0	SA	5.0	B	2	10		5			AND03
1990 08 11.83				20	L	5	20	&10	3			SZA
1990 08 11.83	B	6.0	S	6.0	B		20	&25	6			MUL
1990 08 11.84	B	4.6	S	3.5	B	4	7		6			RZE
1990 08 11.84	B	4.8	S	5.0	B	4	7		5	&1	210	PAR03
1990 08 11.84	B	5.2	S	3.5	B		7		4			CIU
1990 08 11.84	B	5.2	S	5.0	B		10					KIE
1990 08 11.84	B	5.2	S	5.0	B		10		4/			LUB
1990 08 11.84	B	5.2	S	5.0	B		10		5			MAT06
1990 08 11.84	B	5.5	S	5.0	B		10		6			OLE
1990 08 11.84	M	5.7:	S	5.0	R	9	20		5/			KRE
1990 08 11.84	S	4.9	S	3.5	B		7		5			PER05
1990 08 11.84	S	5.8	S	5.0	B		10	15.2	6/	0.2	151	WES04
1990 08 11.85	B	4.8	S	6.0	B	5	20	8	4	1.5	210	PAR03
1990 08 11.85	B	5.2	S	6.6	R	6	19	& 8.1	6	&1.25		GAM
1990 08 11.85	B	5.3	S	5.0	B		7	&11	5			SPE01
1990 08 11.85	B	5.4	S	3.0	B		8		5/			OLE
1990 08 11.85	B	5.4	S	4.0	B		12		4			SAN02
1990 08 11.85	B	5.4	S	6.0	B	5	20	&15	4	&0.33	205	FIL04
1990 08 11.85	B	5.4	S	7.0	L	11	60		4			SAN02
1990 08 11.85	B	5.4	S	7.5	R	3	15		6			IWA02
1990 08 11.85	B	5.5	S	5.0	B		7	&12	5/			WOZ
1990 08 11.85	B	5.5	S	5.0	B		10		5/			WIS02
1990 08 11.85	B	5.6	S	3.0	B		8		5			WIS02
1990 08 11.85	M	4.8	AA	5.0	B		12	27	4			TAN02
1990 08 11.86	B	5.7	S	5.0	B		10	20	6/			DER
1990 08 11.86	B	6.1	S	6.7	L	6	30	15	5/	0.2	225	DER
1990 08 11.87	M	5.0	S	4.0	R	9	12					KOM
1990 08 11.89	B	5.0	S	5.0	B	4	7	29.2	7/	0.27	250	GOR02
1990 08 11.89	B	5.5	S	4.0	B		11		5			SZA01
1990 08 11.90	B	5.0	S	5.0	B	4	7		4			CNO

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 11.90	S	4.8	S	6.4	R	12	30		5			DAL01
1990 08 11.91	B	5.3	S	5.0	B		10		4/			KAC
1990 08 11.91	S	6.0	S	6.4	R	12	20		6			URB
1990 08 11.93	B	5.4	S	3.5	B		7		4			GRO03
1990 08 11.93	M	5.6	S	31.0	L	8	70					KOS01
1990 08 11.94	B	5.2	S	3.0	B		8		5			BEN04
1990 08 11.94	B	5.8:	S	31.0	L	7	70		6			SOC
1990 08 11.94	B	5.9:	S	10.0	R	10	25		6			KOL02
1990 08 11.95	B	5.6	S	31.0	L	6	80		4/			SZA01
1990 08 11.96	B	5.9	S	4.0	B		12		5			PIO
1990 08 12.22	M	4.4	AA	5.0	B		10	18	7	3.5	200	MOR
1990 08 12.22	S	4.5	AA	0.7	E		1		7			MOR
1990 08 12.24	S	5.1	AA	8.0	B		11	14	6	2		SPR
1990 08 12.79	S	5.0	AA	5.0	B		7					SZA
1990 08 12.80	B	5.1	S	6.6	B	6	20	&11	4	&0.3	274	PLE01
1990 08 12.80	B	5.2	S	3.5	B	4	7	&10	5			PLE01
1990 08 12.80	M	4.9	SA	5.0	B	2	10		3			AND03
1990 08 12.83	B	5.0	S	6.6	R	6	19	10.1	6	1.3	190	GAM
1990 08 12.83	B	5.5	AA	10.0	B		14	16	5	2.0	200	HAS02
1990 08 12.84	B	4.8	S	5.0	B	4	7		4	&1	210	PAR03
1990 08 12.84	B	5.1	S	5.0	B		10		4/			LUB
1990 08 12.84	B	5.2	S	5.0	B		10		5			MAT06
1990 08 12.84	B	5.8	S	5.0	B		10	18	8			DER
1990 08 12.84	B	5.9	S	6.7	L	6	30		7			DER
1990 08 12.84	B	6.1	S	6.6	R	12	50		6/			KOL03
1990 08 12.84	M	4.8	AA	5.0	B		12	23	4			TAN02
1990 08 12.85	B	5.2:	S	5.0	B		7	&14.5	5			SPE01
1990 08 12.85	M	5.0:	S	4.0	R	9	12					KOM
1990 08 12.85	M	6.0	S	6.4	R	6	40	3	5/	0.25	125	LAS
1990 08 12.85	S	4.1	AA	0.0	E		1	18				HAV
1990 08 12.85	S	4.6	S	6.4	R	12	30		5			DAL01
1990 08 12.86				7.1	A	3		20.4		2.12	193	HAS02
1990 08 12.86	B	5.1	S	4.0	B		12		4			SAN02
1990 08 12.86	S	4.2	AA	5.0	B		10	19	5/	2.33	201	HAV
1990 08 12.87	B	5.0	S	4.0	B	4	12		6	1.3	195	GAM
1990 08 12.87	I	5.4	AA	0.8	E		1					HAS02
1990 08 12.87	S	6.0:	S	6.0	B		20		4/			POW
1990 08 12.88	B	5.3	S	5.0	B		10		6			OLE
1990 08 12.89	B	5.3	S	6.0	B		20		5/			OLE
1990 08 12.89	M	5.2	S	5.0	B		7		4			KOS03
1990 08 12.90	B	5.3	S	6.0	B	5	20	&15	4	&0.33	195	FIL04
1990 08 12.90	B	5.6	S	6.0	B		20					MOS01
1990 08 12.90	B	5.6	S	7.0	B		30		5/			OLE
1990 08 12.90	B	6.0	S	6.0	B		20	&10	4/	&0.07	270	SCI
1990 08 12.91	B	5.2	S	7.5	R	3	15	6.5	6			IWA02
1990 08 12.91	S	5.6	AA	4.0	B		8	9	2			TAY
1990 08 12.94	B	4.9	S	3.0	B		8		5			BEN04
1990 08 12.94	S	4.9	AA	5.0	B		12	14	5	0.9	230	PAN
1990 08 12.95	B	5.8	S	4.0	B		12		5			PIO
1990 08 13.00	B	5.5	S	20.0	T	10	80	5	3			KAN02
1990 08 13.14	S	4.3	AA	0.0	E		1	17	7	3.0	190	SHA02
1990 08 13.23	S	5.1	AA	8.0	B		11	14	6	2.25		SPR
1990 08 13.80	B	5.0	S	3.5	B	4	7	&11	5			PLE01
1990 08 13.80	B	5.0	S	5.0	B		10		5			MAT06
1990 08 13.80	B	5.2	S	6.6	B	6	20	&12	4	&0.18	280	PLE01
1990 08 13.80	S	4.6	AA	5.0	B		7					SZA
1990 08 13.82	B	4.9	S	4.0	B		12		5			SAN02
1990 08 13.82	M	5.1	S	10.0	R	10	45					KOS01
1990 08 13.83	M	5.0	SA	5.0	B	2	10		5			AND03

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 13.83	S	4.7	S	3.5	B		7					PER05
1990 08 13.84	B	4.5	S	5.0	R	4	7		7			GAM
1990 08 13.84	B	5.0	S	5.0	B		10					KIE
1990 08 13.85	B	4.6	S	5.0	B	4	7	&10	5	1.0	210	PAR03
1990 08 13.85	B	4.7	S	3.5	B		7		5			CIU
1990 08 13.85	B	4.8	S	5.0	B	4	7		5			CNO
1990 08 13.85	M	5.0	AA	5.0	B		12	22	4			TAN02
1990 08 13.85	M	5.0:	S	4.0	R	9	12					KOM
1990 08 13.86	B	4.7	S	6.0	B	5	20	&10	4	1.5	210	PAR03
1990 08 13.86	B	5.0	S	5.0	B		10		4/			LUB
1990 08 13.86	B	5.0	S	6.0	B	5	20	&15	4/	&0.33	190	FIL04
1990 08 13.86	M	5.3	S	5.0	B		7		4			KOS03
1990 08 13.87	B	4.8	S	5.0	B		7		5			BAN
1990 08 13.87	B	4.8	S	5.0	B	4	7	30.3	7/	0.27	250	GOR02
1990 08 13.88	B	4.3	S	3.5	B	4	7		6			RZE
1990 08 13.88	B	5.2	S	4.0	B		11		5/			SZA01
1990 08 13.88	B	5.2	S	6.0	B		20	& 8	4/	&0.07	270	SCI
1990 08 13.90	S	4.5	S	4.0	R		10	18	5/			LOO01
1990 08 13.91	S	4.7	S	4.0	B		8	12	6	0.2	200	SCH04 ✓
1990 08 13.92	B	5.4	S	5.0	B		10	24	8/			DER
1990 08 13.92	B	5.7	S	6.7	L	6	30	18	7/			DER
1990 08 13.92	S	4.7	S	0.0	E		1	&20	6/			COM
1990 08 13.93	S	4.9	S	5.0	B		10	20	7			ZAN01
1990 08 13.95	B	4.9	S	3.0	B		8		5			BEN04
1990 08 13.95	B	5.7	S	4.0	B		12		5			PIO
1990 08 13.96	S	4.9	AA	0.0	E		1	11	6	1.2	200	ABB
1990 08 13.98	B	6.0	S	6.6	R	12	50	&14	6/			KOL03
1990 08 14.02	B	4.9	SC	3.0	B		8	14	6			FRA01
1990 08 14.06	B	5.2	S	20.0	T	10	80	5	3			KAN02
1990 08 14.08	B	5.2	S	6.0	B		20					MOS01
1990 08 14.13	S	4.0	AA	0.0	E		1	17	7	3.0	190	SHA02
1990 08 14.23	S	4.6	AA	0.0	E		1	7	6			SPR
1990 08 14.23	S	4.7	AA	8.0	B		11	15	6	2		SPR
1990 08 14.81	B	4.7:	S	5.0	B	4	7		4			PAR03
1990 08 14.83	B	5.3	S	5.0	B		10		7/			DER
1990 08 14.83	B	5.6	S	6.7	L	6	30		7			DER
1990 08 14.86	B	5.0	S	3.5	B		7		3			GRO03
1990 08 14.86	M	4.8	AA	5.0	B		12	22	4			TAN02
1990 08 14.86	S	4.5	S	6.4	R	12	30		5			DAL01
1990 08 14.87	B	4.8	S	4.0	B		11		6			SZA01
1990 08 14.87	B	5.3	S	5.0	B		10		6			OLE
1990 08 14.87	B	5.3	S	6.0	B		20	12.7	5/			OLE
1990 08 14.87	B	5.3	S	7.0	B		30	11.5	5/			OLE
1990 08 14.87	B	5.4	S	3.0	B		8		5/			WIS02
1990 08 14.88	B	4.9	S	5.0	B		10		5			LUB
1990 08 14.88	B	4.9:	S	31.0	L	7	70		7			SOC
1990 08 14.88	B	5.0	S	3.5	B	4	7	&10	5			PLE01
1990 08 14.88	B	5.0	S	6.0	B	5	20	&12	4/			FIL04
1990 08 14.88	B	5.0	S	7.5	R	3	15		6			IWA02
1990 08 14.88	B	5.1	S	5.0	B		10					KIE
1990 08 14.88	B	5.2	S	6.6	B	6	20	&11	4			PLE01
1990 08 14.88	B	5.3	S	6.0	B		20		5/			WIS02
1990 08 14.88	B	5.6:	S	6.0	B		20		5			POW
1990 08 14.88	M	5.3	S	5.0	B		10	15	4			SKA
1990 08 14.89	B	4.7	S	4.0	B		12		6			SAN02
1990 08 14.89	B	4.7	S	5.0	B	4	7	35.8	7/	0.29	220	GOR02
1990 08 14.89	B	4.7	S	7.0	L	11	60		6			SAN02
1990 08 14.89	B	5.4	S	7.0	B		30		5/			WIS02
1990 08 14.90	B	5.2	S	6.0	B		20	& 9	4/	&0.07	270	SCI

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 14.90	M	4.8	S	3.0	B		8					KOS01
1990 08 14.90	S	4.5	S	6.4	R	12	20		7			URB
1990 08 14.91	S	4.3	S	3.5	B		7	10	7			FEI
1990 08 14.92	B	4.6	S	4.0	B		11		5			KOL02
1990 08 14.92	M	4.9	S	4.0	R	9	12					KOM
1990 08 14.92	M	5.0	SA	5.0	B	2	10		5			AND03
1990 08 14.93	S	4.9	S	0.0	E		1	&15	6			COM
1990 08 14.96	B	4.8	SC	3.0	B		8	19	6			FRA01
1990 08 14.96	B	5.6	S	4.0	B		12		5/			PIO
1990 08 14.96	S	5.0	AA	5.0	B		10	10	7	0.53	215	ABB
1990 08 15.04	B	4.9	S	5.0	B		10		5			MAT06
1990 08 15.19	S	3.8	AA	0.0	E		1	18	6			SHA02
1990 08 15.23	S	4.3	AA	0.0	E		1	7	6			SPR
1990 08 15.23	S	4.6	AA	8.0	B		11	16	6	1		SPR
1990 08 15.50	S	4.5	SC	8.0	B		20		8	1		CAM03
1990 08 15.83	B	5.0	S	5.0	B		7	&15	6			WOZ
1990 08 15.83	B	5.8	S	6.6	R	12	50		6			KOL03
1990 08 15.83	S	5.0	S	5.0	B		7	&25	7			ZER
1990 08 15.84	B	4.8	S	5.0	B		10					KIE
1990 08 15.84	M	5.0	SA	5.0	B	2	10		5			AND03
1990 08 15.85	S	3.9	AA	0.0	E		1	24				HAV
1990 08 15.85	S	4.4	AA	5.0	B		7				220	SZA
1990 08 15.87	B	6.2:	S	6.7	L	6	30	& 9.7	4			NOW01
1990 08 15.87	M	4.8	AA	5.0	B		12	26	4/			TAN02
1990 08 15.87	M	5.3	S	5.0	B		7		3			KOS03
1990 08 15.87	S	4.0	AA	5.0	B		10	24	5/	3.70	195	HAV
1990 08 15.88	B	4.8	S	5.0	B		10		5			LUB
1990 08 15.89	I	4.8	AA	0.8	E		1					HAS02
1990 08 15.89	S	4.9	AA	3.0	B		8					HAS02
1990 08 15.91	B	4.5	S	5.0	B	4	7	&12	5	&1	210	PAR03
1990 08 15.91	B	4.8	S	3.0	B		8		9			DER
1990 08 15.91	B	4.9	S	5.0	B		10	25	8/			DER
1990 08 15.91	B	5.0	S	3.0	B		8		6			OLE
1990 08 15.91	B	5.0	S	3.5	B		7	13.1	3/	&1.3	195	GRO03
1990 08 15.91	B	5.0	S	5.0	B		10		6			OLE
1990 08 15.92	B	4.6	S	3.0	B		8		5			BEN04
1990 08 15.92	B	5.0	S	4.0	B		11		6/			SZA01
1990 08 15.92	S	5.2	S	5.0	B		10	18.6	5/	0.5	175	WES04
1990 08 15.93	M	4.9	S	5.0	R	9	20		6			KRE
1990 08 15.94	B	4.6	S	6.0	B	5	20	&12	5	1.5	210	PAR03
1990 08 15.95	B	4.5	S	5.0	B	4	7	40.4	7/	0.33	210	GOR02
1990 08 15.95	B	5.0	S	6.0	B		20	16	7			MUL
1990 08 15.95	B	5.5	S	4.0	B		12		5/			PIO
1990 08 15.96	S	4.1	AA	0.0	E		1	12	7	2.7	200	ABB
1990 08 15.98	B	5.0	SA	5.0	B	2	10		6			AND03
1990 08 15.98	S	4.5	S	5.0	B	4	7					BOD
1990 08 15.99	B	4.9	S	6.0	B	5	20	&12	4/			FIL04
1990 08 15.99	B	5.0	SA	5.0	B	2	10		5			RAD01
1990 08 15.99	M	4.8	S	3.0	B		8					KOS01
1990 08 15.99	M	5.1	S	5.0	B		10	15	4			SKA
1990 08 16.03	S	4.3	AA	0.0	E		1	16	6	0.5	200	PAN
1990 08 16.04	B	4.9	S	5.0	B		10		5			MAT06
1990 08 16.06	B	5.1	S	6.0	B		20					MOS01
1990 08 16.5	S	4.3	SC	8.0	B		20		7			CAM03
1990 08 16.61	S	4.3	SC	8.0	B		20	15	8	2	160	CAM03
1990 08 16.82	B	4.7	S	5.0	B		10					KIE
1990 08 16.82	B	4.8	SA	5.0	B	2	10	5	5			AND03
1990 08 16.82	M	5.2	S	5.0	B		7		3			KOS03
1990 08 16.83	B	4.6	S	4.0	B		12		6			SAN02

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 16.83	M	4.6	S	3.0	B		8					KOS01
1990 08 16.83	S	5.0:	S	5.0	B		7	&25	7			ZER
1990 08 16.84	B	4.7	S	6.0	B	5	20	&18	4/	&0.58	160	FIL04
1990 08 16.84	B	4.8	S	6.6	R	6	56		6			IWA02
1990 08 16.84	S	4.5	S	3.5	B		7					PER05
1990 08 16.85		4.2	S	0.0	E		1	10				GAR02
1990 08 16.85	B	4.7	S	3.5	B	4	7	&10	5			PLE01
1990 08 16.85	B	4.8	S	6.6	B	6	20	&12	4			PLE01
1990 08 16.86	B	4.7	S	4.0	B		11		6/			SZA01
1990 08 16.86	S	4.4	S	6.4	R	12	30		6			DAL01
1990 08 16.87	B	4.3	S	3.5	B		7		5			CIU
1990 08 16.87	B	4.7	S	5.0	B		10		5			LUB
1990 08 16.88	B	4.9	S	6.0	B		20	& 7	4	&0.20	300	SCI
1990 08 16.88	B	5.0	S	5.0	B		10	16.7	6	0.5	200	WES04
1990 08 16.89	S	4.5	S	6.4	R	12	20		7			URB
1990 08 16.90	B	4.2	S	20.0	T	10	80	8	3			KAN02
1990 08 16.90	B	5.0	S	5.0	B		7					KON01
1990 08 16.90	B	5.5:	S	6.0	B		20		5			POW
1990 08 16.90	M	4.9	S	4.0	R	9	12					KOM
1990 08 16.90	S	4.2	S	4.0	B		8	&20	5	1.2	165	SCH04 ✓
1990 08 16.91	B	5.1:	S	6.7	L	6	30					OGA
1990 08 16.92	S	4.3	AA	5.0	B		7			1.5		SZA
1990 08 16.93	S	3.6	S	4.0	R		10	21	6	1.5	185	LOO01
1990 08 16.93	S	4.2	SP	5.0	B		10		5			KIE01
1990 08 16.94	B	4.6	S	31.0	L	7	70		7			SOC
1990 08 16.94	B	6.0	S	6.7	L	6	30	& 9.8	4			NOW01
1990 08 16.97	S	3.6	S	0.0	E		1	35	5			FEI
1990 08 16.97	S	4.5	S	5.0	B		10	25	7			ZAN01
1990 08 16.98	B	4.7	S	4.0	B		11		5			KOL02
1990 08 17.00	B	4.7	S	5.0	B		10		5			MAT06
1990 08 17.02	B	4.3	S	5.0	R	4	7		7			GAM
1990 08 17.02	B	4.7	SA	5.0	B	2	10		5			RAD01
1990 08 17.02	S	4.1	AA	0.0	E		1	16	7	1.3	170	PAN
1990 08 17.04	B	4.5	S	6.6	R	6	19		6			GAM
1990 08 17.06	B	5.1	S	6.0	B		20					LUK03
1990 08 17.06	B	5.1	S	6.0	B		20					MOS01
1990 08 17.24	M	4.0	AA	5.0	B		10	19	7	1.67	180	MOR
1990 08 17.25	S	3.9	AA	0.7	E		1	34	6			MOR
1990 08 17.83	B	4.9	S	5.0	B		10					DER
1990 08 17.83	S	4.3	S	5.0	B		7	&30	7			ZER
1990 08 17.83	S	4.5	S	3.5	B		7					PER05
1990 08 17.87	I	4.5	AA	0.8	E		1					HAS02
1990 08 17.88	B	4.6	S	5.0	B		10		5			PAT01
1990 08 17.88	B	4.9	S	5.0	B		7	13.5	5/			WOZ
1990 08 17.89	B	4.8	S	5.0	B		7					KON01
1990 08 17.89	S	5.7	AA	8.0	B		11	20	3	0.5	220	TAY
1990 08 17.90	B	4.7	S	4.0	B		11		7			RAF
1990 08 17.90	B	4.9	S	5.0	B		10		5/			OLE
1990 08 17.90	M	4.3	AA	5.0	B		12	40	5	0.8	85	TAN02
1990 08 17.91	B	4.9	S	6.0	B		20		5			OLE
1990 08 17.91	B	4.9	S	6.0	B		20	&12	7			MUL
1990 08 17.92	B	4.7	S	3.0	B		8					DER
1990 08 17.92	B	5.2	S	6.0	B		20		5/			POW
1990 08 17.93	B	5.8	S	6.7	L	6	30	&10.0	4			NOW01
1990 08 17.93	M	4.4	S	3.0	B		8		5			BEN04
1990 08 17.94	B	4.4	S	0.0	E		1					SPE01
1990 08 17.94	B	4.5	S	5.0	B		7	&17	5			SPE01
1990 08 17.94	B	4.6	S	4.0	B		11					KOL02
1990 08 17.94	S	4.9	S	7.0	L	11	60	8.0	6			GOZ

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 17.95	B	4.5:	S	8.0	B		20	&18	5/			SPE01
1990 08 17.95	B	5.4	S	4.0	B		12	&40	5/			PIO
1990 08 17.95	S	4.2	S	6.4	R	12	20		7			URB
1990 08 17.97	B	4.4	S	5.0	B		10		5			SZU
1990 08 17.97	B	4.4	S	6.3	R	9	35		5			SZU
1990 08 18.02	B	4.7	SA	5.0	B	2	10		5			AND03
1990 08 18.02	B	4.9	S	5.0	B		10	16.9	5/			WES04
1990 08 18.24	S	3.7	AA	0.7	E		1	51	6			MOR
1990 08 18.25	M	3.8	AA	5.0	B		10	19	7			MOR
1990 08 18.47	S	3.7	AA	0.0	E		1					WIL02
1990 08 18.60		3.8		0.7	E		1					CAM03
1990 08 18.80	B	5.5:	S	6.6	R	12	50		6			KOL03
1990 08 18.82	S	4.5	S	6.8	R	6	20		6			DAL01
1990 08 18.83	B	4.4:	S	5.0	B	4	7		5			CNO
1990 08 18.83	B	4.9	S	5.0	B		10	25	8/			DER
1990 08 18.83	M	4.4	S	3.0	B		8					KOS01
1990 08 18.84	B	4.5	S	4.0	B		11		7			SOC
1990 08 18.84	B	4.8	S	3.5	B		7					GRO03
1990 08 18.84	B	4.9	S	5.0	B		10					BET01
1990 08 18.84	B	5.1	S	3.0	B		8	25	9			DER
1990 08 18.87	B	4.3	S	0.0	E		1					SPE01
1990 08 18.87	B	4.3	S	4.0	B		11		7			SZA01
1990 08 18.87	B	4.4	S	5.0	B		7	&22	6			SPE01
1990 08 18.87	B	4.5	S	3.5	B	4	7	&12	5			PLE01
1990 08 18.87	B	4.5	S	10.0	B		25	&15.5	4/	&0.2	128	PLE01
1990 08 18.87	B	4.6	S	5.0	B		7					KON01
1990 08 18.87	S	4.3	SC	5.0	B		10	12	5			MCK
1990 08 18.88	B	4.4	S	31.0	L	6	80		6/			SZA01
1990 08 18.88	B	5.1	S	6.0	B		20	16	4			SCI
1990 08 18.88	S	4.2	S	4.0	B		8	15	5			SCH04
1990 08 18.89		3.8	S	0.0	E		1	40	5			GAR02
1990 08 18.89	B	4.1	S	3.5	B		7		5			CIU
1990 08 18.89	B	5.2	S	5.0	B	4	10					MAR07
1990 08 18.89	M	4.8	S	4.0	R	9	12					KOM
1990 08 18.90	B	4.4	S	4.0	B		12		6			SAN02
1990 08 18.90	B	4.4	S	7.0	L	11	60		6			SAN02
1990 08 18.90	B	5.7	S	6.7	L	6	30	&12.0	4/			NOW01
1990 08 18.90	S	4.0	S	0.0	E		1	&20	6	&0.5	175	COM
1990 08 18.90	S	4.0	S	6.4	R	12	20		7			URB
1990 08 18.91				5.0	B		12	27	4/	0.4	111	TAN02
1990 08 18.91	B	4.2	S	5.0	B		7		5			BAN
1990 08 18.91	B	4.7	S	6.0	B	5	20	&15	4/			FIL04
1990 08 18.91	M	4.0	AA	3	R	7	6					TAN02
1990 08 18.92	B	4.3:	S	5.0	B	4	7	&12	5			PAR03
1990 08 18.92	S	4.2	S	5.0	B	4	7					BOD
1990 08 18.94	B	4.3:	S	6.0	B	5	20	&15	5			PAR03
1990 08 18.94	B	5.4	S	4.0	B		12	&44	5/			PIO
1990 08 18.95	S	3.7	AA	0.0	E		1	18	6			SHA02
1990 08 18.95	S	4.9	S	3.0	B		8		3			BOT
1990 08 18.96	B	4.3:	S	8.0	R	5	18	14.9	5			PAR03
1990 08 18.99	B	4.8	SA	5.0	B	2	10		5			RAD01
1990 08 18.99	S	4.2	AA	5.0	B		7		5	0.5		SZA
1990 08 19.01	S	3.6	AA	0.0	E		1	24				HAV
1990 08 19.01	S	3.8	AA	5.0	B		10	22	6	&2.4	152	HAV
1990 08 19.02	B	4.5	S	6.0	B		20		5			KIE
1990 08 19.02	B	4.6	SA	5.0	B	2	10		5			AND03
1990 08 19.02	B	4.6	SA	5.0	B	2	10		5			RAD01
1990 08 19.04	B	4.5	S	5.0	B		10		5			LUB
1990 08 19.05	S	4.4	S	5.0	B		10	25	7			ZAN01

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Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 19.22	S	3.6	AA	0.7	E		1		7			MOR
1990 08 19.23	S	3.8	AA	0.0	E		1	8	5			SPR
1990 08 19.23	S	4.0	AA	8.0	B		11	20	7	1		SPR
1990 08 19.51	S	3.8	AA	0.0	E		1					WIL02
1990 08 19.83	B	4.2	S	5.0	B	4	7	&12	5			PAR03
1990 08 19.83	B	4.5	S	5.0	B		10	22	8			DER
1990 08 19.84	B	4.4	S	3.0	B		8	22	9			DER
1990 08 19.84	B	4.8	S	5.0	B		7	16.2	6			WOZ
1990 08 19.85	B	4.5	S	3.5	B	4	7	& 8	5			PLE01
1990 08 19.85	B	4.6	S	5.0	B		7					KON01
1990 08 19.85	B	4.6	S	7.5	R	3	15		6			IWA02
1990 08 19.85	M	4.1	S	3.0	B		8					KOS01
1990 08 19.86	B	4.3	S	5.0	B		7	&20	5			SPE01
1990 08 19.86	S	4.2	S	3.4	B		6	&30	7			ZER
1990 08 19.87	B	4.1	S	4.0	B		11		7			SZA01
1990 08 19.87	B	4.5	S	3.5	B		7		3/			GRO03
1990 08 19.87	B	5.3:	S	6.0	B		20		5			POW
1990 08 19.88	B	4.3	S	0.0	E		1					SPE01
1990 08 19.88	B	4.7	S	4.0	B		11		5			RAF
1990 08 19.88	B	4.8	S	5.0	B		10	18.5	6			OLE
1990 08 19.89	B	4.0	S	10.0	R	10	40	14.5	7			SZA01
1990 08 19.89	B	4.6	S	5.0	B		10		6			WIS02
1990 08 19.89	B	4.6:	S	4.0	B		12		6			SAN02
1990 08 19.89	M	4.3	S	3.0	B		8		5			BEN04
1990 08 19.90	B	4.2	S	6.0	B	5	20	&15	5			PAR03
1990 08 19.90	B	4.8	S	6.0	B		20		6			WIS02
1990 08 19.90	B	4.8	S	6.0	B		20	20	7			MUL
1990 08 19.90	B	4.9	S	6.0	B		20	16.6	5/			OLE
1990 08 19.91	B	4.8	S	7.0	B		30		6			WIS02
1990 08 19.91	B	4.9	S	7.0	B		30	16.8	5/			OLE
1990 08 19.91	M	3.9	AA	3	R	7	6	25	5			TAN02
1990 08 19.92	B	4.5	S	4.5	R	6	13		5			SZU
1990 08 19.92	B	4.5	S	5.0	B		10		5			SZU
1990 08 19.92	B	4.5	S	8.0	R	15	55		5			SZU
1990 08 19.92	B	5.1	S	6.6	R	12	50		6			KOL03
1990 08 19.92	M	4.8	S	4.0	R	9	12					KOM
1990 08 19.93	B	5.1	S	6.0	B		20	16	4/	1.0	156	SCI
1990 08 19.93	S	4.1	S	5.0	B	4	7					BOD
1990 08 19.94	B	4.5	S	6.0	B	5	20	&15	4/			FIL04
1990 08 19.97	I	4.0	AA	0.8	E		1					HAS02
1990 08 19.99		3.7	S	0.0	E		1	40	5			GAR02
1990 08 20.00	B	4.4	S	4.0	B		11					KOL02
1990 08 20.00	B	4.6	SA	5.0	B	2	10		5			AND03
1990 08 20.08	B	4.3	S	7.0	L	8	40		4			RZE01
1990 08 20.15	B	5.8	AC	10.0	B	4	20	15	8	2.5	190	NOW
1990 08 20.20	M	3.7	AA	5.0	B		10	18.5	7			MOR
1990 08 20.54	S	3.9	SC	8.0	B		20	20	8	4	150	CAM03
1990 08 20.55	S	3.9	SC	20	L	7	35	10	8	1.5	150	CAM03
1990 08 20.83	B	4.4	S	5.0	B		10					DER
1990 08 20.83	B	5.0	S	5.0	B		10	20.1	5	0.6	213	WES04
1990 08 20.84	B	5.0	S	5.0	B	4	10					MAR07
1990 08 20.84	I	3.9	AA	0.8	E		1					HAS02
1990 08 20.84	S	4.2	S	6.4	R	12	30		6			DAL01
1990 08 20.85	B	4.2	S	4.0	B		11		7			SZA01
1990 08 20.85	B	4.5	S	6.6	R	6	56		6/			IWA02
1990 08 20.85	B	4.7	S	5.0	B		10	23.9	6			OLE
1990 08 20.85	B	4.8	S	5.0	B		10	13	5/			WIS02
1990 08 20.86	B	4.5	S	5.0	B		7	&15	6/			WOZ
1990 08 20.86	B	4.7	S	6.0	B		20	20	7			MUL

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 20.86	B	4.8	S	6.0	B		20		5/			WIS02
1990 08 20.86	B	4.8	S	6.0	B		20	25.0	5/			OLE
1990 08 20.86	M	4.1	S	3.0	B		8		5			BEN04
1990 08 20.86	S	4.9	AA	4.0	B		8	14	3			TAY
1990 08 20.87		4.7	S	0.0	E		1					OLE
1990 08 20.87	B	4.3	S	4.0	B		12		7			SAN02
1990 08 20.87	B	5.1:	S	6.0	B		20		5			POW
1990 08 20.87	S	3.9	S	0.0	E		1	20	6	&0.75	180	COM
1990 08 20.87	S	4.0	S	6.4	R	12	20		7			URB
1990 08 20.87	S	4.4	S	5.0	B		10	21	8			ZAN01
1990 08 20.88	B	4.7:	S	6.8	R	12	30	&10				RAF
1990 08 20.88	B	4.8	S	5.0	B		10		4			BET01
1990 08 20.89	B	3.8	S	5.0	B		10					PAT01
1990 08 20.89	B	3.8	S	10.0	R	10	40		7/			SZA01
1990 08 20.89	B	4.2	S	4.0	B		7					BUS01
1990 08 20.89	B	4.3	S	2.4	B		9					BUS01
1990 08 20.89	B	4.5	S	4.0	B		11		6			RAF
1990 08 20.89	M	4.0	S	5.0	R	9	20		7			KRE
1990 08 20.89	S	3.9	S	4.0	B		7	20	6/	0.5	45	BUS01
1990 08 20.89	S	4.1	S	0.0	E		1					BUS01
1990 08 20.89	S	4.1	S	2.4	B		9					BUS01
1990 08 20.90				5.0	B		12	32	5	0.65	105	TAN02
1990 08 20.90	B	4.8	S	5.0	B		7					KON01
1990 08 20.90	M	3.8	AA	3	R	7	6					TAN02
1990 08 20.91	B	4.2	S	0.0	E		1					SPE01
1990 08 20.92	B	4.3	S	5.0	B		7	&19	6			SPE01
1990 08 20.92	B	4.4	S	5.0	B		10		5	1.8	270	SZU
1990 08 20.92	B	4.5	S	3.5	B		7		4/			GRO03
1990 08 20.92	B	4.5	S	8.0	R	15	55		5	1.8	270	SZU
1990 08 20.92	B	4.6	S	3.0	B		8	18	8			DER
1990 08 20.92	B	5.4	S	4.0	B		12	&45	6			PIO
1990 08 20.92	M	4.6	S	4.0	R	9	16					KOM
1990 08 20.94	B	4.4	S	6.0	B	5	20	&15	4/			FIL04
1990 08 20.94	M	4.1	S	3.0	B		8					KOS01
1990 08 20.97		3.9	S	0.0	E		1	35	3			GAR02
1990 08 20.97	B	5.1	S	6.0	B		20	14	4/	0.97	142	SCI
1990 08 20.98	B	4.4	S	5.0	B		10		5			LUB
1990 08 20.99	B	4.3	SC	3.0	B		8	19	7			FRA01
1990 08 21.03	B	4.5	SA	5.0	B	2	10		5			AND03
1990 08 21.20	M	3.9	AA	5.0	B		10	16	7	2.5	52	MOR
1990 08 21.20	S	3.9	AA	0.7	E		1					MOR
1990 08 21.83	B	4.4	S	6.6	R	6	56		6/			IWA02
1990 08 21.83	S	4.4	S	3.5	B		7					PER05
1990 08 21.85				5.0	B		12	32	5	2.0	135	TAN02
1990 08 21.85	B	4.0:	S	5.0	B	4	7		5			PAR03
1990 08 21.85	B	4.4	S	5.0	B		7	13.5	6			WOZ
1990 08 21.85	M	3.7	AA	3	R	7	6					TAN02
1990 08 21.87	B	3.9:	S	5.0	B		10					PAT01
1990 08 21.88	S	4.0	S	5.0	B	4	7					BOD
1990 08 21.90	S	3.9	SP	5.0	B		10		5			KIE01
1990 08 21.92	M	4.4	SA	5.0	B	2	10		5			AND03
1990 08 21.94	B	4.5	S	5.0	B		10		5			SZU
1990 08 21.95	B	4.2	SC	3.0	B		8	20	7			FRA01
1990 08 21.96	S	4.0	SC	0.0	E		1					FRA01
1990 08 22.03	S	4.0	AA	4.0	B		8	18	7	0.75	60	PAN
1990 08 22.05	S	3.7	S	4.0	R		10	15	5	1.0	142	LOO01
1990 08 22.20	M	3.8	AA	5.0	B		10	16	7			MOR
1990 08 22.20	S	3.8	AA	0.7	E		1					MOR
1990 08 22.23	S	3.7	AA	0.0	E		1	8	6			SPR

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 22.23	S	3.7	AA	8.0	B		11	18	7	2	90	SPR
1990 08 22.53	B	4	: AH	5.0	B		7	24	6	0.75	80	PRI
1990 08 22.78	B	4.4	S	3.0	B		8		4/			RZE01
1990 08 22.78	B	4.4	S	3.0	B		8		4/			RZE01
1990 08 22.80	B	4.3	S	6.0	B		20		5			KIE
1990 08 22.81		4.6:	S	0.0	E		1					KOL03
1990 08 22.81	B	4.4:	S	5.0	B		7		5/			WOZ
1990 08 22.81	S	3.6	AC	8.0	B		20	30	3			BAR04
1990 08 22.82	M	4.6	S	5.0	B		7		4/			KOS03
1990 08 22.82	S	3.5	AA	0.0	E		1	24				HAV
1990 08 22.82	S	3.6	AA	5.0	B		10	20	6	&2.1	121	HAV
1990 08 22.83	B	4.4	S	6.0	B		20					MOS01
1990 08 22.83	M	3.8	S	3.0	B		8					KOS01
1990 08 22.84				8.0	B		20	20.5	5	0.93	127	HAS02
1990 08 22.84	B	3.9	S	5.0	B	4	7	&15	5	&1	80	PAR03
1990 08 22.84	B	4.2	S	5.0	B		10		5/			LUB
1990 08 22.85	B	4.1	S	3.5	B	4	7	&14	4/			PLE01
1990 08 22.85	B	4.1	S	5.0	B	4	7		7			CNO
1990 08 22.85	B	4.2	S	6.6	R	6	56	8.5	7		63	IWA02
1990 08 22.85	B	4.2	S	10.0	B		25	&17	4	0.3	94	PLE01
1990 08 22.85	B	4.8	S	5.0	B	4	10					MAR07
1990 08 22.85	B	5.0	S	4.5	B		12		4			LUK01
1990 08 22.85	S	4.1	S	6.4	R	12	30		6			DAL01
1990 08 22.86	S	4.0	S	5.0	B	4	7					BOD
1990 08 22.87	B	4.3	S	4.0	B		12		7			SAN02
1990 08 22.88	B	3.8	S	20.0	T	10	80	8	3			KAN02
1990 08 22.88	B	4.0:	S	5.0	B	4	7					WIL05
1990 08 22.89		3.6	S	0.0	E		1	50	5			GAR02
1990 08 22.89	B	4.4	S	6.6	R	6	19	12.0	7		90	GAM
1990 08 22.89	M	4.7	S	4.0	R	9	16					KOM
1990 08 22.90	B	3.9	S	6.0	B	5	20	&15	5	&1	80	PAR03
1990 08 22.90	B	4.6	S	5.0	B		10		6			OLE
1990 08 22.93	B	4.2	S	3.5	B	4	7		5			RZE
1990 08 22.93	B	5.0	S	4.0	B		12		6			PIO
1990 08 22.93	S	3.8	SC	5.0	B		10	25	6/	0.3		MCK
1990 08 22.94	S	3.8	S	0.0	E		1	&25	6	&0.75	140	COM
1990 08 22.94	S	4.7	S	7.0	L	11	60	8.5	6			GOZ
1990 08 22.97	B	4.1	SC	3.0	B		8	15	6			FRA01
1990 08 22.98	S	3.9	SC	0.0	E		1					FRA01
1990 08 23.23	S	3.8	AA	8.0	B		11	17	6	2	60	SPR
1990 08 23.51	S	3.0	AA	0.0	E		1					WIL02
1990 08 23.75	B	4.3	S	3.0	B		8		4/			RZE01
1990 08 23.79	S	4.1	S	3.4	B		6	&25	7/			ZER
1990 08 23.80	B	4.3	S	5.0	B		10					KIE
1990 08 23.80	B	5.1:	S	6.0	B		20	8	4/	&0.30	115	SCI
1990 08 23.83	B	4.3	S	5.0	B		7	& 8	6/	0.4	75	WOZ
1990 08 23.83	S	4.4	S	3.5	B		7		5			PER05
1990 08 23.84	M	3.8	S	3.0	B		8					KOS01
1990 08 23.85	B	4.1	S	5.0	B	4	7		7			CNO
1990 08 23.85	B	4.1	S	6.6	R	6	56	8.5	7		66	IWA02
1990 08 23.85	B	4.7	S	6.7	L	6	30		4			NOW01
1990 08 23.85	M	3.9	S	5.0	R	9	20		7		54	KRE
1990 08 23.85	S	4.0	S	6.4	R	12	30		6			DAL01
1990 08 23.86	B	3.8	S	5.0	B	4	7	&15	5	&1	80	PAR03
1990 08 23.86	B	4.2	S	5.0	B		10		5/			LUB
1990 08 23.86	B	4.2	S	5.0	B		10	20	8			DER
1990 08 23.86	B	4.3	S	4.0	B		12		7			SAN02
1990 08 23.86	B	4.4	S	3.0	B		8		6			WIS02
1990 08 23.86	B	4.4	S	5.0	B		10		5			SZU

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 23.86	B	4.4	S	5.0	B		10		6/			OLE
1990 08 23.86	B	4.4	S	6.3	R	9	35	18	5	2.5	273	SZU
1990 08 23.86	B	5.1	S	5.0	B		10	14.0	5	0.7	316	WES04
1990 08 23.86	B	5.2:	S	6.0	B		20	&20				POW
1990 08 23.87				5.0	B		12	30	4/	1.1	49	TAN02
1990 08 23.87	B	3.5	S	5.0	B		10					PAT01
1990 08 23.87	B	4.2	S	3.0	B		8		6/			OLE
1990 08 23.87	B	4.3	S	5.0	B		10		6			WIS02
1990 08 23.87	M	3.7	AA	3	R	7	6					TAN02
1990 08 23.87	S	4.0	S	4.0	B		8	20	5	0.9	120	SCH04 ✓
1990 08 23.88		4.2	S	0.0	E		1					RAF
1990 08 23.88		4.3	S	0.0	E		1					JAR
1990 08 23.88	B	3.8	S	4.0	B		11		7/			SZA01
1990 08 23.88	B	4.1	S	3.5	B	4	7	&12	4/			PLE01
1990 08 23.88	B	4.1	S	6.6	B	6	20	&16	4			PLE01
1990 08 23.88	B	4.4	S	3.0	B		8					DER
1990 08 23.88	B	4.5	S	6.0	B		20	20	7			MUL
1990 08 23.88	I	3.9	AA	0.8	E		1					HAS02
1990 08 23.88	M	4.2	SA	5.0	B	2	10		5			AND03
1990 08 23.89				8.0	B		20	16	5	0.8	50	HAS02
1990 08 23.89	S	4.8	S	5.0	B		10	20	8	0.5	100	LAA
1990 08 23.90	M	4.6	S	5.0	B		7		4/			KOS03
1990 08 23.90	S	3.8	S	6.4	R	12	20		8			URB
1990 08 23.92	B	5.0	S	4.0	B		12		6			PIO
1990 08 23.92	M	4.5	S	4.0	R	9	12					KOM
1990 08 23.93		3.6	S	0.0	E		1	45	5			GAR02
1990 08 23.93	B	4.2	S	3.5	B	4	7		5			RZE
1990 08 23.93	B	4.4	S	3.5	B		7		4			GRO03
1990 08 23.94	S	4.6	S	7.0	L	11	60	8.9	6			GOZ
1990 08 23.97	S	4.2	S	5.0	B		10	17	7			ZAN01
1990 08 24.02	B	3.8	S	6.0	B	5	20	&15	5	&1	80	PAR03
1990 08 24.23	S	3.5	AA	0.0	E		1	6	4			SPR
1990 08 24.23	S	3.6	AA	8.0	B		11	16	6	2.5	85	SPR
1990 08 24.51	B	3.8	AH	5.0	B		7	25	6	1.5	85	PRI
1990 08 24.80		4.3	S	0.0	E		1					KOL03
1990 08 24.80	B	4.1	S	6.0	B		20		8			SOC
1990 08 24.80	B	4.3	S	5.0	B		10	18	5	2.6	274	SZU
1990 08 24.80	B	4.4	S	5.0	B		10		5			MAT06
1990 08 24.80	B	4.5	S	6.0	B		20					MOS01
1990 08 24.81	B	4.3	S	7.0	L	8	80		5			RZE01
1990 08 24.82	B	4.3	S	6.6	R	6	19	12.5	7	1.4	90	GAM
1990 08 24.83	B	3.7	S	5.0	B	4	7	&15	5	&1.5	80	PAR03
1990 08 24.83	B	4.1	S	5.0	B		10	20	8/			DER
1990 08 24.83	B	4.2	S	4.0	B		12		7			SAN02
1990 08 24.83	B	4.4	S	6.0	B	5	20	&18	5	&0.7	70	FIL04
1990 08 24.83	M	4.6	S	5.0	B		7		4/			KOS03
1990 08 24.83	S	4.3	S	3.5	B		7					PER05
1990 08 24.84	B	3.7	S	20.0	T	10	80	9.5	3			KAN02
1990 08 24.84	B	4.1	S	6.0	B		20		5			KIE
1990 08 24.84	B	4.2	S	4.0	B		11	19.9	6/		95	OLE
1990 08 24.84	M	3.6	S	3.0	B		8					KOS01
1990 08 24.85	B	3.9	S	5.0	B		7		5			BAN
1990 08 24.85	B	4.0	S	7.5	R	3	15	9	7		68	IWA02
1990 08 24.85	B	4.2	S	5.0	B		7	&10	6/	0.5	84	WOZ
1990 08 24.85	B	4.3	S	4.0	B		11		6			WIS02
1990 08 24.85	B	4.3	S	5.0	B	4	7		6			CNO
1990 08 24.85	S	3.9	S	5.0	B	4	7					BOD
1990 08 24.85	S	4.3	S	5.0	B		10	15	7	0.5	90	ZAN01
1990 08 24.86				5.0	B		12	24	4	2.4	92	TAN02

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 24.86				8.0	B		20	22	5	1.8	100	HAS02
1990 08 24.86	B	4.1	S	0.0	E		1					SPE01
1990 08 24.86	B	4.2	S	5.0	B		7	&14	6	&0.45	85	SPE01
1990 08 24.86	B	4.5	S	6.0	B		20					LUK03
1990 08 24.86	B	4.5	S	6.0	B		20	21	7	0.3	50	MUL
1990 08 24.86	B	5.0	S	5.0	B		10	14.6	5	0.95	272	WES04
1990 08 24.86	B	5.0	S	6.0	B		20	14	4	1.0	96	SCI
1990 08 24.86	I	3.8	AA	0.8	E		1					HAS02
1990 08 24.86	M	3.6	AA	3	R	7	6	18	5			TAN02
1990 08 24.86	M	3.9	S	3.0	B		8		5			BEN04
1990 08 24.86	S	4.6	S	6.4	R	12	56		5/			LUK02
1990 08 24.87	B	4.0	S	5.0	B		7					KON01
1990 08 24.87	B	4.2	S	3.0	B		8					DER
1990 08 24.87	B	4.3	S	5.0	R	4	7		7			GAM
1990 08 24.87	B	4.4	S	5.0	B		10		4			BET01
1990 08 24.88	B	4.3	S	5.0	B		10		5			LUB
1990 08 24.88	B	4.4	S	6.7	L	6	30					OGA
1990 08 24.88	B	4.5	S	3.5	B		7			&1.15	57	GRO03
1990 08 24.88	M	4.0	S	5.0	R	9	20	18	7	0.4	61	KRE
1990 08 24.88	M	4.4	S	4.0	R	9	12					KOM
1990 08 24.88	S	4.1	S	4.0	B		8	15	5	&0.4	90	SCH04 ✓
1990 08 24.90	B	3.7	S	8.0	R	5	18	15	5	1.5	90	PAR03
1990 08 24.90	B	4.0	S	4.0	B		11		7			SZA01
1990 08 24.90	B	4.0	S	5.0	R	9	20	12	6	0.27		CWI
1990 08 24.90	B	4.2	S	3.5	B	4	7		5			RZE
1990 08 24.90	B	4.2	S	3.5	B	4	7	&19	4/	1.63	85	PLE01
1990 08 24.90	B	4.2	S	10.0	B		25	&21	4/	2.37	87	PLE01
1990 08 24.91	B	3.9	S	4.0	B		11		7/			SZA01
1990 08 24.91	M	4.0	S	5.0	B		10	15	5			SKA
1990 08 24.91	S	4.5	S	5.0	B		10	20	8	1.0	100	LAA
1990 08 24.93	B	5.0	S	4.0	B		12		6			PIO
1990 08 24.93	B	5.0	S	6.0	B		20	&20	5/	&0.3		POW
1990 08 24.93	S	4.6	AA	5.0	B		7	&10	6	&0.25	80	SZA
1990 08 24.95	B	4.2	S	6.7	L	6	30	12	6	0.27		CWI
1990 08 25.00	M	4.1	SA	5.0	B	2	10		6	1.4		AND03
1990 08 25.17	M	3.8	AA	5.0	B		10	14	6/	2.0	55	MOR
1990 08 25.23	S	3.6	AA	8.0	B		11	18	6	2.5	85	SPR
1990 08 25.49	S	3.5	AA	8.0	B		20	20	8	4	90	CAM03
1990 08 25.5		3.5		0.7	E		1			1		CAM03
1990 08 25.50				20	L	7	35	15	8	1.5	90	CAM03
1990 08 25.59	B	3.8	AH	5.0	B		7	20	6	1.5	85	PRI
1990 08 25.80	B	4.3	S	5.0	B		10					KIE
1990 08 25.82	B	4.0	S	5.0	B		10	25	7/			DER
1990 08 25.82	S	3.3	AA	0.0	E		1	24				HAV
1990 08 25.82	S	3.4	AA	5.0	B		10	22	6	1.6	97	HAV
1990 08 25.83				5.0	B		12	24	5	0.8	72	TAN02
1990 08 25.83	M	3.7	AA	3	R	7	6		6/			TAN02
1990 08 25.83	M	4.1	S	5.0	B		10	15	5			SKA
1990 08 25.83	S	4.5	AA	5.0	B		7	&10	7	&0.25	80	SZA
1990 08 25.84	B	4.0	S	4.0	B		11	20.5	6/	&0.35	100	OLE
1990 08 25.84	M	3.5	S	3.0	B		8					KOS01
1990 08 25.84	M	4.0	S	5.0	R	9	20	16.6	7/		62	KRE
1990 08 25.84	S	4.0	S	6.4	R	12	30		6			DAL01
1990 08 25.85	B	3.6:	S	5.0	B	4	7		5			PAR03
1990 08 25.85	B	3.9	S	7.5	R	3	15	9	7/		72	IWA02
1990 08 25.86	B	4.3	S	5.0	R	4	7		7			GAM
1990 08 25.87	B	4.2	S	3.5	B	4	7	&16	4/	0.87	90	PLE01
1990 08 25.87	B	4.2	S	10.0	B		25	&19	4	1.0	90	PLE01
1990 08 25.87	B	4.3	S	6.6	R	6	19	11.2	7		105	GAM

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 25.87	B	4.7:	S	5.0	B		10		4			BET01
1990 08 25.87	B	4.8	S	6.0	B		20		5			POW
1990 08 25.88	B	4.4	S	6.0	B	5	20	&18	5	&0.7	65	FIL04
1990 08 25.88	B	4.9	S	6.0	B		20	8	4	0.57	102	SCI
1990 08 25.89	B	3.8	S	6.0	B		20		9			SOC
1990 08 25.89	B	4.1	S	4.0	B		11		6	&0.7	75	KOL02
1990 08 25.89	B	4.1	S	5.0	B		7	9.6	6	0.4	88	WOZ
1990 08 25.89	B	4.2:	S	5.0	B		10					PAT01
1990 08 25.89	S	3.6	AC	8.0	B		20	35	4			BAR04
1990 08 25.90	B	4.3	S	5.0	B		10		5			LUB
1990 08 25.90	M	4.4	S	5.0	B		7		4/			KOS03
1990 08 25.90	M	4.4	S	6.5	R	6	16	4.5	4/			KOS03
1990 08 25.91	B	4.1	S	10.0	R	10	40		7			SZA01
1990 08 25.91	B	4.6:	S	6.0	B		20					MOS01
1990 08 25.92	B	3.8	S	20.0	T	10	80	9	4			KAN02
1990 08 25.92	B	5.0	S	5.0	B		10	11.8	5	0.5	308	WES04
1990 08 25.92	S	4.5	S	7.0	L	11	60	10.1	6			GOZ
1990 08 25.95	S	3.5	S	6.4	R	12	20		8			URB
1990 08 25.96	B	4.4	S	3.0	B		8		6			RZE01
1990 08 25.97	B	4.3	S	5.0	B		10		5			SZU
1990 08 26.02	M	4.1	SA	5.0	B	2	10		5	1.3		AND03
1990 08 26.16	M	3.7	AA	5.0	B		10	13	7	2.17	65	MOR
1990 08 26.23	S	3.4	AA	0.0	E		1	6	5	1	90	SPR
1990 08 26.23	S	3.5	AA	8.0	B		11	20	7	2	80	SPR
1990 08 26.59	B	3.7	AH	5.0	B		7	20	5	2	80	PRI
1990 08 26.76	B	4.5	S	3.0	B		8		6			RZE01
1990 08 26.77	B	4.3	S	5.0	B		10					KIE
1990 08 26.80	M	4.1	S	5.0	B		10	15	4			SKA
1990 08 26.81	B	3.8	S	4.0	B		12		9			SOC
1990 08 26.81	B	4.1	S	5.0	B		10	22	8/			DER
1990 08 26.81	B	4.3	S	5.0	R	4	7		7			GAM
1990 08 26.81	S	4.0	S	3.4	B		6	&35	6	&0.7	85	ZER
1990 08 26.82	B	3.8	S	20.0	T	10	80	9	4			KAN02
1990 08 26.82	B	4.3	S	6.0	B		20	22	7	0.2	70	MUL
1990 08 26.82	B	5.0:	S	6.0	B		20	8	4	&0.35	94	SCI
1990 08 26.82	M	4.0	SA	5.0	B	2	10		5			AND03
1990 08 26.83	B	3.9	S	5.0	B		10	20.6	6/	&0.52	85	OLE
1990 08 26.83	B	4.1	S	5.0	B		7		5			BAN
1990 08 26.84	B	3.8	S	6.0	B		20		6			OLE
1990 08 26.84	B	3.9	S	5.0	B		7					KON01
1990 08 26.84	B	3.9	S	6.6	R	6	56	10	7		77	IWA02
1990 08 26.84	B	4.1	S	5.0	B		10		6/			WIS02
1990 08 26.84	B	4.3	S	5.0	B		10		5			LUB
1990 08 26.84	B	4.4	S	5.0	B		10		6			MAT06
1990 08 26.84	S	4.6	S	3.0	B		8					BOT
1990 08 26.85	B	3.9	S	6.4	R	6	20		7			SZA01
1990 08 26.85	B	4.0	S	5.0	B	4	7		6			CNO
1990 08 26.85	B	4.1	S	3.5	B	4	7		5			RZE
1990 08 26.85	B	4.2	S	6.0	B		20		6/			WIS02
1990 08 26.85	B	4.4	S	5.0	B		7		7			SAN02
1990 08 26.85	B	4.7	S	4.5	B		12		4			LUK01
1990 08 26.85	B	4.8:	S	6.7	L	6	30	&14.6	4	&0.29		NOW01
1990 08 26.85	M	4.5	S	5.0	B		7		4/			KOS03
1990 08 26.85	S	3.9	S	6.4	R	12	30		6			DAL01
1990 08 26.85	S	4.2	AA	5.0	B		7	&10	5	&0.33	85	SZA
1990 08 26.86	B	4.1	S	4.0	B		11	&10	7	&1		RAF
1990 08 26.86	M	3.5	S	0.0	E		1					KOS01
1990 08 26.86	M	3.8	S	5.0	R	9	20	13	7/	0.45	56	KRE
1990 08 26.86	M	3.9	AA	5.0	B		12	26	5	1.3	48	TAN02

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 26.87	B	3.8	S	5.0	B		10					PAT01
1990 08 26.87	B	4.3	S	4.5	R	6	13	18	5	2.8	273	SZU
1990 08 26.87	B	4.3	S	5.0	B		10	18	5	2.8	273	SZU
1990 08 26.87	B	4.3	S	6.3	R	9	35	17	5	2.8	273	SZU
1990 08 26.87	B	4.4	S	3.5	B	4	7	&16	4	&1.03	94	PLE01
1990 08 26.88	B	4.0	S	0.0	E		1					SPE01
1990 08 26.88	B	4.0	S	5.0	B		7	&10.5	6	&0.5	85	SPE01
1990 08 26.88	B	4.1	S	5.0	R	9	20	11	5/	0.23		CWI
1990 08 26.88	B	4.7	S	6.0	B		20		5/			POW
1990 08 26.88	S	4.0	S	5.0	B	4	7					BOD
1990 08 26.89	B	4.4	S	3.5	B		7		4/			GRO03
1990 08 26.89	M	4.2	S	3.5	B		7					PER05
1990 08 26.90	B	4.2	S	15.0	L	7	30	15.1	6	0.73	274	SZA01
1990 08 26.90	B	4.3	S	6.7	L	6	30	11	5/	0.23		CWI
1990 08 26.90	B	4.9	S	4.0	B		12	&45	6	&0.8	50	PIO
1990 08 26.90	M	4.3	S	4.0	R	9	12					KOM
1990 08 26.91	B	4.9	S	5.0	B		10	13.9	5	0.6	303	WES04
1990 08 26.92	B	4.3	S	6.0	B		20					MOS01
1990 08 26.92	B	4.5	S	5.0	B		10	&40	4	&0.9		KAC
1990 08 26.94	B	4.4	SC	3.0	B		8	15	7	0.3	68	FRA01
1990 08 26.95	B	3.6	S	5.0	B	4	7	&15	6	2	80	PAR03
1990 08 27.16	M	3.7	AA	5.0	B		10	13	7	2.92	72	MOR
1990 08 27.23	S	3.3	AA	0.0	E		1	8	6			SPR
1990 08 27.23	S	3.4	AA	8.0	B		11	20	8	3.5	85	SPR
1990 08 27.4		3.0		0.7	E		1					CAM03
1990 08 27.53	S	3.0	SC	8.0	B		20	10	8	1	110	CAM03
1990 08 27.6		3.0		0.7	E		1			1		CAM03
1990 08 27.61	B	3.8	AH	5.0	B		7	17	5	2.5	88	PRI
1990 08 27.62				20	L	7	35	8	8	0.75	81	CAM03
1990 08 27.67				25	L	4	80	15	8	1		GAR01
1990 08 27.67	M	3.6	A	0.0	E		1					GAR01
1990 08 27.76	B	4.6	S	5.0	B		10		6			MAT06
1990 08 27.79	B	4.2	S	3.5	B	4	7		5/			RZE
1990 08 27.79	B	5.0	S	5.0	B		10		4			BET01
1990 08 27.80	B	3.8	S	4.0	B		12		9			SOC
1990 08 27.80	B	4.5	S	3.0	B		8		5/			RZE01
1990 08 27.82	B	4.4	S	5.0	R	4	7		7			GAM
1990 08 27.83	B	4.0	S	5.0	B		7		5			BAN
1990 08 27.83	B	4.6	S	6.6	R	6	19	11.8	6/	1.2	100	GAM
1990 08 27.84	B	4.3	S	6.4	R	6	20		7			SZA01
1990 08 27.84	B	4.5	S	4.0	B		12		7			SAN02
1990 08 27.84	M	4.0	S	5.0	B		10	15	5			SKA
1990 08 27.85	B	3.6	S	5.0	B	4	7	&15	6	2	80	PAR03
1990 08 27.85	B	4.2	S	5.0	B	4	7		6			CNO
1990 08 27.85	B	4.7	S	4.5	B		12		4			LUK01
1990 08 27.85	M	4.0	SA	5.0	B	2	10		5	1.6		AND03
1990 08 27.85	S	4.0	S	6.4	R	12	30		6			DAL01
1990 08 27.86	B	3.8	S	5.0	B		10		7		105	OLE
1990 08 27.86	B	3.8	S	7.5	R	3	15	10	7		80	IWA02
1990 08 27.86	B	4.1	S	15.0	L	7	30	16.0	6/	1.07	274	SZA01
1990 08 27.86	B	4.2	S	0.0	E		1					SPE01
1990 08 27.86	B	4.3	S	5.0	B		10		5			LUB
1990 08 27.86	B	5.0	S	5.0	B		10	14.8	5	0.5	301	WES04
1990 08 27.86	B	5.1	S	6.0	B		20	10	4	1.83	115	SCI
1990 08 27.86	M	3.5	S	0.0	E		1					KOS01
1990 08 27.86	M	3.9	S	3.0	B		8		5			BEN04
1990 08 27.86	M	4.5	S	5.0	B		7		4/			KOS03
1990 08 27.86	M	4.5	S	15.0	L	8	48	4.5				KOS03
1990 08 27.87	B	3.8	S	6.0	B		20		6/			OLE

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 27.87	B	4.1	S	3.0	B		8		6			WIS02
1990 08 27.87	B	4.1	S	5.0	B		7	&11	6/	&0.6	75	SPE01
1990 08 27.87	B	4.3	S	4.0	B		11		7	&2	70	RAF
1990 08 27.88	B	3.5	S	5.0	B		10					PAT01
1990 08 27.88	B	4.0	S	3.5	B	4	7	&26	4/	&2.08	99	PLE01
1990 08 27.88	B	4.0	S	10.0	B		25	30.0	4	&2.3	99	PLE01
1990 08 27.88	B	4.1	S	5.0	B		10		6/			WIS02
1990 08 27.88	B	4.1	S	6.0	B		20		6			WIS02
1990 08 27.88	B	4.3	S	5.0	B		10	18	5	2.6	265	SZU
1990 08 27.88	B	4.3	S	6.3	R	9	35		5	2.7	265	SZU
1990 08 27.88	B	4.4	S	6.0	B	5	20	&20	5	&0.6	0	FIL04
1990 08 27.88	B	4.5	S	6.7	L	6	30					NOW01
1990 08 27.88	M	4.1:	S	3.5	B		7					PER05
1990 08 27.88	M	4.2	S	4.0	R	9	12					KOM
1990 08 27.89	B	3.9	S	3.0	B		8		7			OLE
1990 08 27.89	B	4.3	S	5.0	B		10		4			KAC
1990 08 27.89	M	3.8	S	5.0	R	9	20		7/			KRE
1990 08 27.90	B	3.7	S	20.0	T	10	80	11	3/			KAN02
1990 08 27.90	B	4.3	S	5.0	R	9	20	10	5			CWI
1990 08 27.90	B	5.0:	S	6.0	B		20		4/			POW
1990 08 27.90	S	3.5	S	6.4	R	12	20		8			URB
1990 08 27.91	B	4.1	S	5.0	B		10	25	9			DER
1990 08 27.91	B	4.4	S	6.0	B		20					MOS01
1990 08 27.91	B	4.6	S	3.5	B		7		4			GRO03
1990 08 27.91	M	3.8	AA	3	R	7	6					TAN02
1990 08 27.91	M	4.0	AA	5.0	B		12	22	5/	1.6	66	TAN02
1990 08 27.92	B	4.9	S	4.0	B		12	&45	6	&0.9	50	PIO
1990 08 27.93	S	3.9	S	5.0	B	4	7					BOD
1990 08 27.95	B	4.4	S	6.7	L	6	30	10	5			CWI
1990 08 27.95	S	3.4	S	6.4	R	12	20		8			URB
1990 08 27.96	S	3.8	SC	0.0	E		1	12	7	5.3	80	SHA02
1990 08 28.23	S	3.2	AA	0.0	E		1	10	6			SPR
1990 08 28.23	S	3.3	AA	8.0	B		11	20	8	2	90	SPR
1990 08 28.45	B	3.9	AH	5.0	B		7	16	4	2.5	85	PRI
1990 08 28.63				25	L	4	80	14	8	1.1		GAR01
1990 08 28.63	M	3.6	A	0.0	E		1					GAR01
1990 08 28.75	B	4.6	S	7.0	L	8	40		5			RZE01
1990 08 28.77	B	4.5	S	6.0	B		20		4			KIE
1990 08 28.81	B	4.0	S	4.0	B		12		9			SOC
1990 08 28.81	B	4.5	S	4.5	B		12		4			LUK01
1990 08 28.81	M	4.5	S	5.0	B		7		4/			KOS03
1990 08 28.82	M	3.9:	S	5.0	R	9	20		8			KRE
1990 08 28.82	M	4.0	S	3.5	B		7					PER05
1990 08 28.83	B	4.0	S	5.0	B		7		5			BAN
1990 08 28.83	B	4.1	S	6.4	R	6	20		5/			SZA01
1990 08 28.83	B	4.6	S	4.0	B		12		8			SAN02
1990 08 28.83	M	4.0	SA	5.0	B	2	10		5	1.7		AND03
1990 08 28.84	B	4.4	S	5.0	B		10		4			LUB
1990 08 28.84	B	4.4	S	6.4	R	6	20		6			SZA01
1990 08 28.84	M	4.0	S	3.0	B		8		4			BEN04
1990 08 28.85	B	4.0	S	5.0	B	4	10					MAR07
1990 08 28.85	B	4.1	S	5.0	B	4	7		6			CNO
1990 08 28.85	M	4.1	S	5.0	B		10	15	5			SKA
1990 08 28.85	S	4.1	S	6.4	R	12	30		6			DAL01
1990 08 28.86	B	3.8	S	6.6	R	6	56	10	7/		82	IWA02
1990 08 28.86	B	4.1	S	6.0	B		20	20	8	0.2	75	MUL
1990 08 28.86	B	4.4	S	6.0	B	5	20	&18	5	&0.6	0	FIL04
1990 08 28.86	S	3.8	S	5.0	B	4	7					BOD
1990 08 28.87	B	3.8	S	3.5	B		7		6			CIU

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 28.87	B	3.9	S	5.0	B		10		7			OLE
1990 08 28.87	B	3.9	S	10.0	B		25	&28.3	4	&1.2	100	PLE01
1990 08 28.87	B	4.0	S	3.5	B	4	7	&25	4/	&1.02	100	PLE01
1990 08 28.87	B	4.3	S	5.0	R	9	20					OGA
1990 08 28.87	B	4.5	S	6.0	B		20					MOS01
1990 08 28.87	M	3.5	S	0.0	E		1					KOS01
1990 08 28.87	M	4.1	S	4.0	R	9	12					KOM
1990 08 28.88	B	3.8	S	6.0	B		20		7			OLE
1990 08 28.88	B	4.0	S	5.0	B		10		6			WIS02
1990 08 28.88	B	4.1:	S	5.0	B		7	&10.5	6	&0.4	60	SPE01
1990 08 28.88	B	4.3	S	15.0	L	7	30	13.7	6/	0.69	280	SZA01
1990 08 28.88	B	4.6	S	5.0	B		10		6			MAT06
1990 08 28.88	B	4.7	S	6.0	B		20	12	4	2.67	115	SCI
1990 08 28.89	B	4.0:	S	5.0	B		10					PAT01
1990 08 28.89	M	3.8	AA	5.0	B		12	27	6	1.7	60	TAN02
1990 08 28.90	B	3.9	S	20.0	T	10	80	10	4			KAN02
1990 08 28.90	B	4.4	S	5.0	R	9	20	8	4/			CWI
1990 08 28.90	B	4.6:	S	4.0	B		11			&1	70	RAF
1990 08 28.90	B	5.0	S	6.0	B		20		4/			POW
1990 08 28.90	B	5.1	S	5.0	B		10	9.8	5	0.5	295	WES04
1990 08 28.91	B	4.4	S	6.0	B		20					LUK02
1990 08 28.91	B	4.5	S	6.0	B		20					LUK03
1990 08 28.91	B	4.9	S	4.0	B		12	&45	6			PIO
1990 08 28.91	S	3.7	SC	0.0	E		1	14	6	3.9	60	SHA02
1990 08 28.92	B	4.3	S	5.0	B		10	20	5	2.6	265	SZU
1990 08 28.92	B	4.3	S	8.0	R	15	55		5	2.7	265	SZU
1990 08 28.92	B	4.5	S	6.7	L	6	30	8	4/			CWI
1990 08 28.92	S	4.4	AA	5.0	B		10	7	7	0.37	90	ABB
1990 08 28.93	B	3.6	S	5.0	B	4	7	&15	6	&2	75	PAR03
1990 08 28.94	S	4.1	SC	3.0	B		8	11	7	0.5	79	FRA01
1990 08 29.16	M	3.7	AA	5.0	B		10	11	7	3.5	75	MOR
1990 08 29.16	S	3.7	AA	0.7	E		1					MOR
1990 08 29.79	M	4.3	SA	5.0	B	2	10		5	1.5		AND03
1990 08 29.80	B	4.2:	S	4.0	B		12		6			SOC
1990 08 29.80	B	4.8	S	7.0	L	8	40		4			RZE01
1990 08 29.80	B	5.2	S	6.0	B		20		3			KIE
1990 08 29.81	B	4.5	S	5.0	B		10					DER
1990 08 29.82	B	4.5	S	5.0	B		10		4			LUB
1990 08 29.82	M	3.9:	S	3.5	B		7					PER05
1990 08 29.82	M	4.4	S	5.0	B		7		4			KOS03
1990 08 29.82	S	4.4	AA	4.0	B		8	8	2			TAY
1990 08 29.83	B	4.2:	S	5.0	B		7					SPE01
1990 08 29.83	B	4.6	S	6.4	R	6	20		5/			SZA01
1990 08 29.83	B	5.1	S	6.0	B		20					MOS01
1990 08 29.83	B	5.1	S	6.0	B		20	12	3/	&1.38	100	SCI
1990 08 29.83	S	4.1	S	6.4	R	12	30		5			DAL01
1990 08 29.85	B	5.0	S	6.0	B		20		4/			POW
1990 08 29.85	M	4.1	S	5.0	R	9	20		7		62	KRE
1990 08 29.86	B	3.8	S	5.0	B		10		6/			OLE
1990 08 29.87	B	3.5	S	5.0	B	4	7	&15	6	&2	75	PAR03
1990 08 29.87	B	3.7	S	3.0	B		8		7			OLE
1990 08 29.87	B	3.8	S	5.0	B		10		6/			WIS02
1990 08 29.87	B	3.9	S	6.0	B		20		6/			WIS02
1990 08 29.87	B	4.3	S	8.0	R	15	55		5	4	265	SZU
1990 08 29.87	B	4.3:	S	5.0	B		10					PAT01
1990 08 29.87	B	4.4	S	5.0	B		10		5	2.8		SZU
1990 08 29.87	B	4.4	S	6.3	R	9	35		5	4	265	SZU
1990 08 29.87	B	5.2	S	5.0	B		10	13.1	5	1.0	297	WES04
1990 08 29.87	M	3.4	S	0.0	E		1					KOS01

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 08 29.88	B	4.0	S	3.5	B	4	7	&21	4/			PLE01
1990 08 29.88	B	4.0	S	10.0	B		25	&24	4	0.77	102	PLE01
1990 08 29.88	B	4.1	S	20.0	T	10	80	7.5	4			KAN02
1990 08 29.88	B	4.5	S	15.0	L	7	30	9.2	6	0.57	261	SZA01
1990 08 29.88	M	4.1:	S	4.0	R	9	12					KOM
1990 08 29.88	S	4.5	S	5.0	R	9	20	6	3/			CWI
1990 08 29.89	M	3.9	AA	5.0	B		12	22	5	2.0	56	TAN02
1990 08 29.90	B	4.4	S	6.0	B	5	20	&13	4			FIL04
1990 08 29.90	S	4.7	S	6.7	L	6	30	6	3/			CWI
1990 08 29.94	B	4.8	S	4.0	B		12	&45	6			PIO
1990 08 30.48	B	3.9	AH	5.0	B		7	14	4	1.75	80	PRI
1990 08 30.77	B	6.0:	S	6.0	B		20		2			KIE
1990 08 30.81	B	4.5:	S	4.0	B		12		5			SOC
1990 08 30.82	B	5.3	S	4.0	B		11		4/			SZA01
1990 08 30.83	M	4.9	S	5.0	R	9	20		6			KRE
1990 08 30.84	B	4.6	S	5.0	B		10		3/			LUB
1990 08 30.84	B	5.3	S	31.0	L	6	80		5/			SZA01
1990 08 30.85	B	5.1	S	31.0	L	6	80		5/			SZA01
1990 08 30.85	M	4.5	SA	5.0	B	2	10		5	1.3		AND03
1990 08 30.85	S	5.1	AA	5.0	B		12	6	5			PAN
1990 08 30.86	B	4.0	S	10.0	B		25	&19	4/			PLE01
1990 08 30.87	B	5.5:	S	10.0	R	10	40		5			SZA01
1990 08 30.88	B	5.8:	S	4.0	B		11		5/			SZA01
1990 08 30.89	B	4.6	S	6.0	B	5	20	& 5	3/			FIL04
1990 08 30.89	B	5.0	S	6.0	B		20	7	3/	&0.25	80	SCI
1990 08 30.96	S	4.0	SC	5.0	B		10	30	5	0.5		MCK
1990 08 31.43	B	3.9	AH	5.0	B		7	14	3	1.5	80	PRI
1990 08 31.81	B	4.5	S	6.6	B	6	20	&16	4			PLE01
1990 09 01.17	M	3.7	AA	5.0	B		10	11	7	2.5		MOR
1990 09 01.47	B	4	: AH	5.0	B		7	14	2	1	80	PRI
1990 09 02.16	M	3.7	AA	5.0	B		10	11	7	2.0	70	MOR
1990 09 02.83	S	4.2	AA	4.0	B		8	9	3			TAY
1990 09 03.18	M	3.7:	AA	5.0	B		10					MOR
1990 09 03.75	B	5.5	S	4.0	B		12		6			SAN02
1990 09 03.76	B	3.5:	S	5.0	B	4	7	&15	6			PAR03
1990 09 03.77	B	3.5:	S	6.0	B	5	20	&15	6			PAR03
1990 09 03.81	B	5.4	S	5.0	B	4	7		4			CNO
1990 09 03.85	M	3.2	S	3.0	B		8					KOS01
1990 09 04.76	B	5.0	S	5.0	B		10		3/			LUB
1990 09 04.76	B	5.0	S	6.0	B		20		2			KIE
1990 09 04.77	B	5.2	S	7.0	L	8	40		3			RZE01
1990 09 04.78	B	5.8	S	20.0	T	10	80	4	2			KAN02
1990 09 04.79	B	6.1	S	6.0	B		20	7	3/			SCI
1990 09 04.81	B	6.1:	S	6.4	R	6	20		5			SZA01
1990 09 04.82	B	6.1	S	6.6	B	6	20	&17	4			PLE01
1990 09 04.83	B	5.9	S	6.4	R	6	20		5			SZA01
1990 09 04.83	B	6.1	S	6.4	R	6	20		5			SZA01
1990 09 05.81	B	6.1	S	6.4	R	6	20		5			SZA01
1990 09 06.33				7.8	R	8	30	7	6	0.5	75	JON
1990 09 06.33	S	4.3	SC	5.0	B		3					JON
1990 09 06.39	M	4.0	A	0.0	E		1					GAR01
1990 09 06.82	S	4.7	AA	4.0	B		8	10	3			TAY
1990 09 07.06	B	5.2	AA	5.0	B	4	7	10	3			SIM
1990 09 07.40	S	4.0	SC	8.0	B		20	10	8	1.5	70	CAM03
1990 09 07.43	M	4.2	A	5.0	B		10			3.0		GAR01
1990 09 07.49	B	4.2	AH	5.0	B		7	10	1	3	85	PRI
1990 09 08.19	M	4.3	AA	5.0	B		10			3.5	70	MOR
1990 09 08.40	S	4.0	SC	8.0	B		20	4	8	2	60	CAM03
1990 09 08.42	M	4.3	A	0.0	E		1					GAR01
1990 09 08.44				20	L	7	35	8	7	1.5	80	CAM03

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 08.45	B	4.5	AH	5.0	B		7	10	1	3	90	PRI
1990 09 08.50		3.8	SC	0.7	E		1					CAM03
1990 09 08.80	S	4.3	AA	0.0	E		1	12				HAV
1990 09 08.80	S	4.5	AA	5.0	B		10	9.0	5/	1.10	81	HAV
1990 09 08.81	S	4.4	AC	6.0	B		11		5			BAR04
1990 09 09.07	B	5.0	AC	10.0	B	4	20	5	4			NOW
1990 09 09.15	M	4.5	AA	5.0	B		10	8	7/	4	85	MOR
1990 09 09.15	S	4.5	AA	0.7	E		1					MOR
1990 09 09.37	S	4.1	AA	0.0	E		1					SEA
1990 09 09.39	S	4.4	SC	5.0	B		3					JON
1990 09 09.44	S	4.1	SC	20	L	7	35	5	6	1.5	80	CAM03
1990 09 09.46	S	4.1	SC	8.0	B		20	8	7	3		CAM03
1990 09 09.50		3.8	SC	0.7	E		1					CAM03
1990 09 09.53	B	4.8	AH	5.0	B		7	9	1	3.5	90	PRI
1990 09 10.15	I	4.6	AA	0.7	E		1					MOR
1990 09 10.15	M	4.6	AA	5.0	B		10	9	7/	4	85	MOR
1990 09 10.34	S	5.1	SC	2.3	B		3					JON
1990 09 10.34	S	5.2	SC	5.0	B	7	10	7		1.2	75	JON
1990 09 10.38	S	4.2	AA	0.0	E		1					SEA
1990 09 10.42	S	4.2	SC	8.0	B		20	4	6	3	50	CAM03
1990 09 10.57	B	5.0	AH	5.0	B		7	9	1	3	90	PRI
1990 09 11.42				8.0	B		15	4	7	3.5	75	SEA
1990 09 11.42	S	4.4	AA	2.5	B		2					SEA
1990 09 11.43	S	4.5	AA	5.0	B		10		9			WIL02
1990 09 11.45	B	5.1	AH	5.0	B		7	8	1	2.5	90	PRI
1990 09 11.77	M	4.1	AA	5.0	B		12	13	5			TAN02
1990 09 12.39				7.8	R	8	30	10	7	0.5	80	JON
1990 09 12.39	S	4.8	SC	2.3	B		3					JON
1990 09 12.42	S	4.4	AA	0.0	E		1					SEA
1990 09 13.38	S	5.0	SC	5.0	B		7		7	2	90	CUR01
1990 09 13.41	S	4.4	AA	0.0	E		1					SEA
1990 09 13.42				5.0	B		7	10	7	1.0	80	JON
1990 09 13.42	S	5.2	SC	2.3	B		3					JON
1990 09 13.78	M	4.4	AA	5.0	B		12	14	6	1.7	86	TAN02
1990 09 14.37				5.0	B		7	11	7	0.6	90	JON
1990 09 14.37	S	5.0	SC	2.3	B		3					JON
1990 09 14.44	S	4.5	SC	20	L	7	35	4	6	2	85	CAM03
1990 09 14.45	S	4.3	SC	8.0	B		20	6	7	2.5	90	CAM03
1990 09 14.47	B	5.4	AH	5.0	B		7	8	1	2.5	90	PRI
1990 09 15.15	M	4.9	AA	5.0	B		10		8	3.5	90	MOR
1990 09 15.34				5.0	B		7	11	7	0.8	85	JON
1990 09 15.34	S	5.1	SC	2.3	B		3					JON
1990 09 15.45	B	5.5	AH	5.0	B		7	7	0	3	90	PRI
1990 09 15.47	S	4.5	SC	8.0	B		20	6	7	2.5	80	CAM03
1990 09 15.50	S	4.5	AA	0.0	E		1					SEA
1990 09 16.14	M	5.0	AA	5.0	B		10		7/	3.5	90	MOR
1990 09 16.38	S	5.2	SC	5.0	B		7		7	1.5	90	CUR01
1990 09 16.38	S	5.3	SC	5.0	B		7	7	7			JON
1990 09 16.41	S	4.2	SC	8.0	B		20	6	7	3	88	CAM03
1990 09 16.48	M	4.8	AA	5.0	B		10			4	88	SEA
1990 09 16.50	B	5.5	AH	5.0	B		7	7	0	3.5	90	PRI
1990 09 17.15	M	5.0	AA	5.0	B		10		7	2.0	92	MOR
1990 09 17.38				5.0	B		7	10	6	0.4	105	JON
1990 09 17.38	S	5.2	SC	2.3	B		3					JON
1990 09 17.41	S	4.7	AA	0.0	E		1					SEA
1990 09 17.50	B	5.6	AH	5.0	B		7	6	0	2	90	PRI
1990 09 18.02	B	5.6	AA	5.0	B	4	7		2			SIM
1990 09 18.33	M	5.0	AA	0.0	E		1					WOL01
1990 09 18.34	M	4.8	AA	5.0	B		7		6	0.5	100	WOL01

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 18.39				5.0	B		7	12	6	1.25	95	JON
1990 09 18.39	S	4.9	SC	2.3	B		3					JON
1990 09 18.40	B	5.6	AH	5.0	B		7	6	0	3	90	PRI
1990 09 18.42	S	4.6	AA	0.0	E		1			1.5		SEA
1990 09 18.46	S	5.2	AA	5.0	B		10		9	2	90	WIL02
1990 09 19.03	B	5.5	AA	5.0	B	4	7		1			SIM
1990 09 19.33	M	5.0	AA	0.0	E		1					WOL01
1990 09 19.34	M	4.8	AA	5.0	B		7		6	0.2	90	WOL01
1990 09 19.39				5.0	B		7	10	6	1.25	95	JON
1990 09 19.39	S	5.1	SC	2.3	B		3					JON
1990 09 19.45	S	4.7	AA	0.0	E		1					SEA
1990 09 19.50	B	5.6	AH	5.0	B		7	6	0	2.5	90	PRI
1990 09 20.41				5.0	B		7	10		1.0	95	JON
1990 09 20.41	S	5.1	SC	2.3	B		3					JON
1990 09 20.45	S	4.8	AA	0.0	E		1					SEA
1990 09 20.45	S	5.6	AA	5.0	B		10		9	2	100	WIL02
1990 09 20.48	B	5.6	AH	5.0	B		7	6	0	5	100	PRI
1990 09 21.44	S	4.2	SC	8.0	B		20	5		5	85	CAM03
1990 09 21.47	B	5.7	AH	5.0	B		7	5	0	3	100	PRI
1990 09 22.47	B	5.7	AH	5.0	B		7	5	0	2.5	100	PRI
1990 09 22.49				8.0	B		20	4	7	2	80	CAM03
1990 09 22.49	S	4.2	SC	20	L	7	35	4	6	2	80	CAM03
1990 09 23.13	M	5.5	AA	5.0	B		10		8			MOR
1990 09 23.42	S	5.0	SC	5.0	B		7			0.5	110	JON
1990 09 23.46	B	5.9	AH	5.0	B		20	5	0	2	100	PRI
1990 09 24.43	B	5.9	AH	5.0	B		7	5	0	1	100	PRI
1990 09 25.33	M	5.4	AA	5.0	B		7	7	6			WOL01
1990 09 25.42	S	5.3	SC	5.0	B		7	7				JON
1990 09 25.43	B	6.0	AH	5.0	B		7	5	0	2	100	PRI
1990 09 26.35	S	5.4	SC	5.0	B		7					JON
1990 09 27.36	S	5.8	SC	5.0	B	7	7					JON
1990 09 27.44	S	5.1	AA	2.5	B		2					SEA
1990 09 28.33	M	5.4	AA	5.0	B		7		5			WOL01
1990 10 01.33	M	5.5	AA	5.0	B		7	& 4	4			WOL01
1990 10 01.39	S	5.7	SC	4.5	R	6	13					JON
1990 10 05.33	S	6.4	SC	4.5	R	6	13	4				JON
1990 10 07.37	S	6.1	SC	4.5	R	6	13	3	6			JON
1990 10 07.39				8.0	B		15	& 2	8	2	115	SEA
1990 10 07.39	S	5.6	AA	2.5	B		2					SEA
1990 10 08.36	S	5.9	SC	5.0	B		7					JON
1990 10 08.36	S	6.1	SC	4.5	R	6	13	3.5	6	0.5	110	JON
1990 10 09.42	S	5.7	AA	2.5	B		2					SEA
1990 10 10.42	S	5.9	AA	5.0	B		10					SEA
1990 10 11.40	S	5.8	AA	5.0	B		10		8	2		SEA
1990 10 14.40	S	5.9	AA	5.0	B		10					SEA
1990 10 16.40	S	5.9	AA	8.0	B		15		8	2		SEA
1990 10 17.40	M	5.9	AA	8.0	B		15					SEA
1990 10 18.40	S	5.9	AA	8.0	B		15					SEA
1990 10 19.35	S	6.1	SC	4.5	R	6	13	5	5			JON
1990 10 20.40	S	6.0	AA	8.0	B		15	& 3	8	1	125	SEA
1990 10 22.34	S	6.5	SC	4.5	R	6	13					JON
1990 10 23.36				31.7	L	5	86	2	7	1.0	130	JON
1990 10 23.36	S	6.6	SC	4.5	R	6	13					JON
1990 10 26.36				31.7	L	5	86	2	6	0.2	140	JON
1990 10 26.36	S	6.6	SC	4.5	R	6	13					JON
1990 10 29.36	S	6.8	SC	7.8	R	8	30					JON
1990 11 13.66	S	8.0	VN	31.7	L	5	86					JON
1990 11 26.81	S	6.5	AA	8.0	B		20	3				PEA
1990 11 27.81	S	6.5	AA	8.0	B		20	4	7			PEA

Comet Levy 1990c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 11 28.81	B	6.6	AA	8.0	B		20					PEA
1990 11 28.81	S	6.5	AA	8.0	B		20	3.8	7	0.15	233	PEA
1990 11 29.80	S	6.6	AA	8.0	B		20	3.5	7			PEA
1990 12 12.79	S	7.2	AA	8.0	B		20	3.2	6/	0.07	265	PEA
1990 12 17.81	S	7.3	AA	8.0	B		20	3.8	6			PEA
1990 12 18.80	S	7.3	AA	8.0	B		20	3.8	6			PEA
1990 12 22.80	S	7.4	AA	8.0	B		20	3.2	6/	0.05	276	PEA
1990 12 23.79	B	7.5	AA	8.0	B		20					PEA
1990 12 23.79	S	7.4	AA	8.0	B		20	3.5	6		279	PEA
1990 12 24.32	B	7.2	S	7.0	B		10	6.9	5			DEA
1990 12 25.80	S	7.5	AA	8.0	B		20	3.8	6			PEA
1990 12 26.80	S	7.4	AA	8.0	B		20	3.5	6			PEA
1990 12 27.80	S	7.5	AA	8.0	B		20	3.5	6			PEA
1990 12 28.80	S	7.5	AA	8.0	B		20	4	6			PEA
1991 01 07.51	! M	7.6	NP	5.0	B		10					HAL
1991 01 11.52	! M	7.6	NP	5.0	B		10					HAL

Comet Tsuchiya-Kiuchi 1990i

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 17.20	S	8.9	AA	8.0	B		20	8	2			MOR
1990 07 19.21	M	8.9	AA	8.0	B		20	8	2/			MOR
1990 07 19.26	S	8.8	AA	14	S	4	28	6	3			SPR
1990 07 20.25	S	8.8	AA	14	S	4	28	7	2			SPR
1990 07 21.25	S	8.9	AA	14	S	4	28	8	2			SPR
1990 07 22.23	S	8.7	AA	20	T	10	64	7	3			SPR
1990 07 22.24	M	8.9	AA	8.0	B		20	8	3			MOR
1990 07 23.20	M	8.8	AA	8.0	B		20		3			MOR
1990 07 27.23	S	8.5	AA	14	S	4	28	5	3			SPR
1990 07 28.23	S	8.8	AA	20	T	10	64	5	2			SPR
1990 08 11.18	M	7.9	AA	8.0	B		20	8	3/			MOR
1990 08 12.18!	M	7.8	AA	8.0	B		20	7	4			MOR
1990 10 12.18	S	8.4	S	31.6	L	5	62	1.5	5			MID01
1990 10 13.50	M	7.7	AA	8.0	B		20		7			MOR
1990 10 14.52	M	7.9	AA	8.0	B		20		7			MOR
1990 10 15.85	S	7.3	AA	20	L	4	45	2.5	5			PEA
1990 10 16.40	S	7.6	HR	8.0	B		20	3.5	5			BOR
1990 10 16.75	S	7.4	AA	8.0	B		15	2	5			SEA
1990 10 17.38	S	7.8	AA	10.0	B	4	20	3	2			NOW
1990 10 17.40	S	7.5	HR	5.0	B		10	4.5	5			BOR
1990 10 18.83	S	7.2	AA	20	L	4	45	4	5			PEA
1990 10 19.67	S	8.7	S	31.7	L	5	86	2	2			JON
1990 10 19.84	S	7.4	AA	20	L	4	45	2.5	5			PEA
1990 10 20.39	S	7.5	S	8.0	R	3	20	& 3	7			GRE
1990 10 20.40				12.0	B		20	3.5	5	0.4	285	BOR
1990 10 20.40	S	7.2	S	5.0	B		12					GRE
1990 10 20.40	S	7.6	HR	5.0	B		10	5	5			BOR
1990 10 21.16	S	7.1	SC	20.3	T	10	80	3.8	4			GRA04
1990 10 21.18	S	8.1	S	31.6	L	5	62	2	6			MID01
1990 10 21.41	S	7.5	HR	5.0	B		10	4.5	5			BOR
1990 10 21.73	S	7.1	AA	8.0	B		15		5			SEA
1990 10 21.85	S	7.4	AA	20	L	4	45	3	6			PEA
1990 10 22.18	S	6.6	AA	12.0	R	4	20	2.5	6			LOO01
1990 10 22.84	S	7.4	AA	20	L	4	45	3	5			PEA
1990 10 23.16	S	7.8	AA	8.0	B		15	& 4	7	0.6	270	MIK
1990 10 23.17	S	7.1	AA	12.0	R	4	20	2.5	6			LOO01
1990 10 23.67	S	8.3	S	4.5	R	6	13					JON
1990 10 24.18	S	7.8	S	10.0	B		14	3.7	5			HAS02
1990 10 26.19	S	7.7	AA	20.0	R	8	30	4	6			LOO01

Comet Tsuchiya-Kiuchi 1990i [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 26.66	S	8.0	MS	7.8	R	8	30					JON
1990 10 27.18	S	7.0	AA	12.0	R	4	20	3.6	6			LOO01
1990 10 28.29	B	7.5	S	7.0	B		10					DEA
1990 10 28.73	S	7.2	AA	8.0	B		15	5	4			SEA
1990 10 29.66	S	8.0	SC	7.8	R	8	30					JON
1990 10 29.84	B	7.6	AA	8.0	B		20	4.5	5			PEA
1990 10 30.42	S	7.7	HR	5.0	B		10	6.5	5			BOR
1990 11 05.19	S	7.0	SC	20.3	T	10	80	5.8	3			GRA04
1990 11 05.64	S	7.6	SC	7.8	R	8	30					JON
1990 11 07.63	S	7.6	SC	7.8	R	8	30					JON
1990 11 08.64	S	7.4	SC	7.8	R	8	30	4				JON
1990 11 09.21	S	9.0	S	31.6	L	5	62	5	4			MID01
1990 11 09.64	S	7.6	SC	7.8	R	8	30	4				JON
1990 11 10.51	M	7.4	AA	8.0	B		20	5	5			MOR
1990 11 13.38	B	8.0	SC	11.4	L	8	91	7	6	0.07	220	DID
1990 11 13.63	S	7.4	SC	4.5	R	6	13	6				JON
1990 11 13.82	S	7.4	AA	20	L	4	45	6	5			PEA
1990 11 14.38	B	8.0	SC	11.4	L	8	91	8	4			DID
1990 11 14.83	B	7.3	AA	8.0	B		20	4.5	5			PEA
1990 11 15.36	B	8.1	SC	11.4	L	8	91	5	3			DID
1990 11 15.40	S	7.4	AA	20.0	T	10	87	1.4	2			SHA04
1990 11 16.38	B	8.5	SC	11.4	L	8	91	5	2			DID
1990 11 16.88	M	7.5	SC	16	L	6	111		2			LIN03
1990 11 17.03	S	8	: A	5.0	B		10	&10	1	1.0	295	ZHU
1990 11 17.04	B	7.9	A	13	L	4	18	8				ZHU
1990 11 17.04	B	7.9	A	13	L	4	38		2			ZHU
1990 11 17.84	M	7.0	SC	16	L	6	111		3			LIN03
1990 11 18.40	S	7.2	AA	20.0	T	10	87	2.1	2			SHA04
1990 11 20.23	B	9.0	SC	11.4	L	8	91	4	0			DID
1990 11 21.06	B	7.9	A	13	L	4	18	6				ZHU
1990 11 21.07	B	8.0	A	13	L	4	38		3			ZHU
1990 11 21.08	S	7.8	A	5.0	B		10	8	1			ZHU
1990 11 21.75	S	8.0	AA	8.0	B		20	4	4			PEA
1990 11 21.77	B	6.9	S	5.0	B		7		7			OHK
1990 11 22.50	M	7.4	S	8.0	B		20	7	4			MOR
1990 11 22.77	B	7.0	S	5.0	B		7		7			OHK
1990 11 22.80	B	7.7	AA	8.0	B		20	4	4			PEA
1990 11 23.77	B	7.0	S	5.0	B		7		7			OHK
1990 11 24.49	M	7.4	S	8.0	B		20	8	4			MOR
1990 11 24.89	M	8.5	SC	16	L	6	111		2			LIN03
1990 11 25.50	M	7.6	AA	8.0	B		20	8	4			MOR
1990 11 25.84	M	8.5	SC	16	L	6	111		2			LIN03
1990 11 26.80	S	8.3	AA	8.0	B		20	3.8	3			PEA
1990 11 27.79	S	8.2	AA	8.0	B		20	4.8	4			PEA
1990 11 28.36	B	9.0	SC	11.4	L	8	91	5	0			DID
1990 11 28.80	S	8.2	AA	8.0	B		20	6	4			PEA
1990 11 29.79	S	8.4	AA	8.0	B		20	6	3/			PEA
1990 12 10.59	S	8.5	AA	8.0	B		20		2			PEA
1990 12 11.62	S	8.6	AA	8.0	B		20	5	2			PEA
1990 12 12.78	S	8.5	AA	8.0	B		20	6	3			PEA
1990 12 17.81	S	8.7	AA	8.0	B		20	6	2/			PEA
1990 12 18.15	B	8.0	S	7.0	B		10	6	3			DEA
1990 12 18.80	S	8.9	AA	8.0	B		20	6	2			PEA
1990 12 22.79	S	8.9	AA	8.0	B		20	7	3			PEA
1990 12 23.78	S	9.0:	AA	8.0	B		20					PEA
1990 12 26.79	S	8.9	AA	8.0	B		20	8	1			PEA
1990 12 27.79	S	9.0	AA	8.0	B		20	5	1			PEA
1990 12 28.79	S	9.0	AA	8.0	B		20	5	1			PEA
1991 01 08.13	S	9.4	AC	41	L	5	64		1			HAL

Comet Tsuchiya-Kiuchi 1990i [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 11.22	!	S 9.8	WA	41	L	4	83		1			HAL

Comet Arai 1991b

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 08.19		S 10.1	AC	41	L	5	64					HAL
1991 01 11.34		S 9.9	CA	41	L	4	83					HAL
1991 01 16.34		M 9.9	CA	41	L	4	83		4/			HAL

Periodic Comet Encke

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 10 26.78	S	8.3	S	6	R	12	22	6	1			NAK01
1980 10 27.79	S	8.0	S	6	R	12	22	6	2			NAK01
1980 10 31.81	S	7.6	S	6	R	12	22	8	3			NAK01
1980 11 01.80	S	7.4	S	6	R	12	22	9	3			NAK01
1980 11 03.80	S	7.2	S	6	R	12	22	8	4			NAK01
1980 11 09.81	S	6.7	S	6	R	12	22	8	4			NAK01
1980 11 10.82	S	6.7	S	6	R	12	22	7	4			NAK01
1980 11 14.83	S	6.7	S	6	R	12	22	5	5			NAK01
1980 11 17.83	S	6.5	S	6	R	12	22	3.5	6			NAK01
1980 11 26.84	S	6.8	S	6	R	12	22	2	7			NAK01
1990 08 18.47	S	[12.5	NP	25.6	L	4	156					MOR
1990 08 19.49	S	12.5:	NP	25.6	L	4	67	3.0	0			MOR
1990 09 01.46	S	12.0	NP	25.6	L	4	111	1.9	1			MOR
1990 09 02.48	S	11.6	NP	25.6	L	4	67	2.5	1			MOR
1990 09 02.48	S	11.8	NP	25.6	L	4	111	2.3	1			MOR
1990 09 10.48	S	10.1	NP	8.0	B		20	3.8	0/			MOR
1990 09 10.48	S	10.1	NP	25.6	L	4	45	3.8	0/			MOR
1990 09 15.50	S	9.8	NP	25.6	L	4	45	2.4	2			MOR
1990 09 15.52	S	9.8	NP	8.0	B		20	4.4	2			MOR
1990 09 15.94	S	10.4	AC	20.3	T	10	56	2.9	3			DAH
1990 09 16.10	S	10.5	S	31.6	L	5	62	3	3			MID01
1990 09 16.43				50.8	L	4	120			0.12	90	MOR
1990 09 16.50	S	9.8	NP	25.6	L	4	45	4	2			MOR
1990 09 16.51	S	9.8	NP	8.0	B		20	4	2			MOR
1990 09 17.12	S	9.7	A	12.0	R	4	20	4	4			LOO01
1990 09 17.50	S	9.6	NP	8.0	B		20	5	3			MOR
1990 09 18.69	M	9.4	AA	6.2	R	11	39		3			WOL01
1990 09 19.08	S	9.6	A	12.0	R	4	20	6	4			LOO01
1990 09 23.09	S	8.8	AA	8.0	B		15	4.5	3			HAV
1990 09 23.96	S	8.8	S	20.3	L	6	49	4.0	2/			GRA04
1990 09 25.12	S	8.5	S	10.0	B		14	2.7	3			HAS02
1990 09 25.12	S	10.2	AA	20.3	T	10	80	1.7	1			TAN02
1990 09 25.13	S	8.7	AA	8.0	B		20	& 4	1			SPE01
1990 09 25.50	S	9.1	NP	8.0	B		20	9	3			MOR
1990 09 25.98	S	8.5	S	20.3	L	6	49	5.5	3			GRA04
1990 09 26.12	S	10.0	AA	20.3	T	10	80	2.5	2			TAN02
1990 09 26.18	S	8.1	AA	8.0	B		20	2.7	2			SHA02
1990 09 28.18	S	8.7	S	10	R	16	80	3	2			KIE01
1990 09 28.34	B	8.7	AC	10.0	B	4	20	3	2			NOW
1990 09 28.69	M	8.0	AA	6.2	R	11	39		3			WOL01
1990 09 29.12	S	8.2	AA	8.0	B		15	5.0	4/	?	307	HAV
1990 09 29.14	S	8.7	S	10.0	B		14	2.0	4			HAS02
1990 09 29.17	B	8.5	V	12.0	R	4	20					LOO01
1990 09 29.17	S	8.2	V	12.0	R	4	20	2.5	7			LOO01
1990 09 30.10	B	8.5:	S	20	T	10	80	& 2	1			KAN02
1990 09 30.13	S	8.7	V	31.6	L	5	62	1.8	4			MID01
1990 10 01.14	S	8.9	S	10	R	16	40	3	2			KIE01

Periodic Comet Encke [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 01.19	S	9.7	AA	25	L	4	36	6	3		275	PAN
1990 10 01.39	S	8.6	HR	8.0	B		20	3.5	5			BOR
1990 10 01.69	M	7.6	AA	6.2	R	11	39		3			WOL01
1990 10 02.13	M	9.9	AA	20.3	T	10	80	2.3	2			TAN02
1990 10 02.79	B	7.9	S	6.0	B		15	4	4			HIR02
1990 10 03.10	B	8.2:	S	20	T	10	80	& 2	1			KAN02
1990 10 03.17	B	7.6	AA	9.0	R		30	5	5			LOO01
1990 10 03.39	S	8.5	AC	8.0	B		20	2.3	5			BOR
1990 10 04.17	S	9.5	AA	25	L	4	36	5	3			PAN
1990 10 05.40	S	8.4	AC	8.0	B		20	2.7				BOR
1990 10 07.20	S	8.2	AA	8.0	B		15	3	2			PAN
1990 10 07.40	S	8.1	HR	8.0	B		20	2.4	6			BOR
1990 10 08.19	S	7.7	AA	10.0	B	4	14	3.7	6			LOO01
1990 10 12.16	S	8.5	S	31.6	L	5	62	2	6			MID01
1990 10 12.18	S	7.2	S	20.3	T	10	80	2.0	5			DAH
1990 10 12.18	S	8.3	AA	20.0	R	15	60	1.7	6/			LOO01
1990 10 13.15	B	8.0:	AA	20	T	10	80	& 1.5	2			KAN02
1990 10 13.53	B	8.1	AA	8.0	B		20		9			MOR
1990 10 14.21	S	8.3	AA	25	L	4	36	2.5	2			PAN
1990 10 14.52	B	8.3	AA	8.0	B		20		9			MOR
1990 10 15.17	S	7.3:	S	10.0	B		14					HAS02
1990 10 16.16	B	7.9:	AA	20	T	10	80	& 1.5	2			KAN02
1990 10 16.17	S	7.6	AA	8.0	B		15	2.0	6			HAV
1990 10 16.41	B	8.2	HR	8.0	B		20					BOR
1990 10 16.41	S	8.1	HR	8.0	B		20	2.1	7			BOR
1990 10 17.15	B	7.8:	AA	20	T	10	80	& 1.5	2			KAN02
1990 10 17.19	S	7.5	SC	20.3	T	10	80	1.1	6			DAH
1990 10 17.19	S	8.1	S	31.6	T	5	62	1.4	7			MID01
1990 10 17.41	S	8.1	HR	8.0	B		20	1.7	7			BOR
1990 10 18.15	B	7.8:	AA	20	T	10	80	& 1.5	2			KAN02
1990 10 19.15	B	8.0:	AA	20	T	10	80	& 1.5	1			KAN02
1990 10 20.42	S	8.3	HR	12.0	B		20	& 1.25	7/			BOR
1990 10 21.42				12.0	B		20	& 1.25	7/			BOR

Periodic Comet Schwassmann-Wachmann 3 (1989d1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 06 23.45!	S	11.4	NP	25.6	L	4	111	1.2	2			MOR
1990 06 30.45!	S	11.3	AC	25.6	L	4	111	1.4	3			MOR
1990 07 22.45	S	[13.5		50.8	L	4	275					MOR

Periodic Comet Honda-Mrkos-Pajdušáková (1990f)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 29.45	S	11.2	NP	25.6	L	4	67	3.8	0/			MOR
1990 08 18.50	M	8.1	AA	25.6	L	4	45	2.0	2			MOR
1990 08 19.50	M	8.2	AA	8.0	B		20	5.0	3			MOR
1990 08 19.50	M	8.2	AA	25.6	L	4	45	2.5	2/			MOR
1990 08 28.09	B	8.5:	AA	20.0	T	10	80	& 1.5	2			KAN02
1990 09 01.50	M	8.0	AA	8.0	B		20	2.5	8/			MOR
1990 09 02.50!	M	7.8	AA	8.0	B		20		8/			MOR
1990 09 10.51	M	8.2	AA	8.0	B		20		8/			MOR
1990 09 10.51	M	8.2	AA	25.6	L	4	45		7			MOR
1990 09 15.51	M	8.2	S	8.0	B		20		8/			MOR
1990 09 16.11	S	8.3	S	20.3	T	10	80	1.0	7			DAH
1990 09 16.16	S	8.4	S	31.6	L	5	62	1.3	6			MID01
1990 09 16.51	M	8.2	S	8.0	B		20		9			MOR
1990 09 17.51	M	8.3	S	8.0	B		20		9			MOR
1990 09 18.68	M	8.5	AA	6.2	R	11	39		3			WOL01

Periodic Comet Honda-Mrkos-Pajdušáková (1990f) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 19.68	M	9.0	AA	6.2	R	11	39		3			WOL01
1990 09 23.15	S	8.7	AA	8.0	B		15	2.0	5/			HAV
1990 09 25.13	S	8.0:	S	10.0	B		14	& 1.5				HAS02
1990 09 27.15	S	8.5	S	31.6	L	5	62	1.6	5			MID01
1990 09 28.36	B	8 :	AC	10.0	B	4	20	1	3			NOW
1990 09 29.15	S	9.1	AA	8.0	B		15	2.0	5/			HAV
1990 09 30.15	S	9.0	S	31.6	L	5	62	1.1	6			MID01

Periodic Comet Taylor (1990n)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 11.29	I	[13.5		41	L	4	183					HAL
1991 01 16.31	I	[13.5		41	L	4	183					HAL

Periodic Comet Johnson (1990h)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 16.23	S	[14.3	NP	50.8	L	4	275					MOR

Periodic Comet Wild 2 (1989t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 13.52	S	[13.0		25.6	L	4	156					MOR
1990 10 14.53!	S	13.5:	NP	50.8	L	4	195		2			MOR
1990 11 09.20		[12.2	AC	31.6	L	5	62					MID01
1990 11 10.54	S	12.4	AC	25.6	L	4	156	1.0	1			MOR
1990 11 22.55	S	11.9	AC	25.6	L	4	111	2	2/			MOR
1990 11 24.52	S	11.7	AC	25.6	L	4	111	1.8	2/			MOR
1990 11 25.52	S	11.8	AC	25.6	L	4	111	1.5	2			MOR
1990 12 09.56	S	11.7	AC	25.6	L	4	111	1.3	2			MOR
1990 12 23.81	S	12.4	VN	41	L	4	200	0.8	3			PEA
1990 12 25.81	S	12.3	AC	41	L	4	200	1.1	3			PEA
1990 12 26.81	S	12.3	AC	41	L	4	200	1.0	3/			PEA
1990 12 27.81	S	12.2	AC	41	L	4	90	1.2	2			PEA
1990 12 28.81	S	12.2	AC	41	L	4	90	1.2	2			PEA
1991 01 11.54	S	12.5	AC	41	L	4	183					HAL

Periodic Comet Russell 4 (1989g1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 06 17.20	S	[13.5	NP	50.8	L		275					MOR

Periodic Comet Wild 4 (1990a)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 07 22.20	S	13.1	AC	50.8	L		120	1.3	2/			MOR

Periodic Comet Holt-Olmstead (1990k)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 14.31	S	[14.0	NP	50.8	L	4	275					MOR

Periodic Comet Mueller 2 (1990j)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 10 14.30	S	[14.0	NP	50.8	L	4	275					MOR

Periodic Comet Metcalf-Brewington (1991a)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 07.24	S	9.3:	NP	20	L	6	55					HAL
1991 01 08.10	M	8.5	NP	5.0	B		10					HAL
1991 01 09.40	S	9.9	HD	31.7	L	5	86	3	4			JON
1991 01 11.17	M	8.6	NP	5.0	B		10					HAL
1991 01 13.80	S	9.2	AA	15.0	L	4	26	& 5	4/			PER01

Periodic Comet Wolf-Harrington (1990e)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 16.20	S	[13.8	NP	50.8	L	4	195					MOR
1990 10 14.34	S	[13.5	NP	50.8	L	4	275					MOR
1991 01 11.15	S	12.9	WA	41	L	4	183					HAL

Periodic Comet Russell 3 (1989d)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 06 17.28	S	14.3	NP	50.8	L		275	0.60	2			MOR

Periodic Comet Swift-Gehrels (1991c)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 01 14.07	I	[13.0		41	L	4	183					HAL

Periodic Comet Kearns-Kwee (1989u)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 16.39	S	[14.0	NP	50.8	L	4	275					MOR
1990 10 14.35	S	[14.0	NP	50.8	L	4	275					MOR
1990 11 25.55	S	13.6	NP	25.6	L	4	156	0.8	2			MOR
1991 01 11.28	S	13.3	WA	41	L	4	183					HAL
1991 01 16.27	S	13.3	WA	41	L	4	183		2/			HAL

Periodic Comet Peters-Hartley (1990d)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 06 17.22!	S	11.2	AC	50.8	L	4	78	3.2	1			MOR
1990 06 23.23!	S	11.3	AC	25.6	L	4	67	3.1	0/			MOR
1990 06 24.23!	S	11.2	AC	50.8	L	4	78	3.0	0/			MOR
1990 07 14.24	S	11.0	AC	25.6	L	4	67	2.9	1			MOR
1990 07 15.24	S	11.4	AC	25.6	L	4	67	3.1	0/			MOR
1990 08 12.21	S	[12.0		25.6	L	4	111					MOR

Periodic Comet Tuttle (1980 XIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 10 29.78	S	9.6	AC	6	R	12	22	3	3			NAK01
1980 10 31.79	S	9.4	AC	6	R	12	22	4	3			NAK01
1980 11 01.76	S	9.5	AC	6	R	12	22	3	3			NAK01
1980 11 03.76	S	8.9	AC	6	R	12	22	6	4			NAK01
1980 11 09.76	S	8.3	AC	6	R	12	22	5	4			NAK01
1980 11 10.75	S	8.4	AC	6	R	12	22	5	5			NAK01
1980 11 11.76	S	8.2	AC	6	R	12	22	5	4			NAK01
1980 11 14.76	S	8.0	S	6	R	12	22	7	5			NAK01
1980 11 17.76	S	7.9	S	6	R	12	22	7	4			NAK01
1980 11 18.76	S	7.8	S	6	R	12	22	7	4			NAK01
1980 11 26.76	S	7.4	S	6	R	12	22	8	5			NAK01
1980 11 29.81	S	7.5	S	6	R	12	22	6	4			NAK01
1980 12 01.80	S	7.4	S	6	R	12	22	7	5			NAK01
1980 12 03.80	S	7.6	S	6	R	12	22	8	5			NAK01

Periodic Comet Tuttle (1980 XIII) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 12 04.79	S	7.2	S	6	R	12	22	7	4			NAK01
1980 12 07.82	S	7.0	S	6	R	12	22	7	4			NAK01
1980 12 13.82	S	7.2	S	6	R	12	22	7	4			NAK01
1980 12 14.82	S	7.2	S	6	R	12	22	5	4			NAK01
1980 12 15.82	S	7.2	S	6	R	12	22	4	4			NAK01

Periodic Comet Brorsen-Metcalf (1989 X = 1989o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 07 13.74	S	9.6	AC	20	L	6	58	3.5	1			NAK01
1989 07 14.72	S	9.3	AC	20	L	6	58	6	1			NAK01
1989 07 23.73	S	8.9	AC	20	L	6	58	6	2			NAK01
1989 07 24.77	S	8.8	AC	12	L	7	44	4	3			YAS
1989 07 25.65	S	8.9	AA	13	L	6	24	5	3			ISH02
1989 07 26.74	S	8.0	AC	20	L	6	46	6	2/			NAK01
1989 07 27.65	S	8.3	AA	13	L	6	24	6	3			ISH02
1989 07 27.66	S	8.7	S	15	L	9	33	5	1			IWA01
1989 07 27.74	S	7.8	AC	20	L	6	46	7.5	3/			NAK01
1989 07 27.78	M	8.2	S	13	L	6	33	7	6			KAM03
1989 07 28.75	S	7.6	AC	20	L	6	46	7	4			NAK01
1989 07 28.76	M	7.6	AC	6.5	R	8	16	10	4			NAK01
1989 07 28.76	S	7.7	AA	7.0	B		10		4			YAS
1989 07 30.74	S	7.5	AA	20	L	6	46	7	4			NAK01
1989 07 30.75	M	7.4	AA	6.5	R	8	16	13	4			NAK01
1989 08 03.66	S	8.3	S	10.0	B		14		2			IWA01
1989 08 04.73	M	6.8	S	20	L	6	46	8	5		275	NAK01
1989 08 04.77	S	7.4	AA	7.0	B		10	8	4			ISH02
1989 08 04.78	B	7.0	S	5	R	8	13		3			OKA05
1989 08 04.78	M	7.7	S	13	L	6	33	7	6			KAM03
1989 08 07.69	S	7.3	S	10.0	B		14	6	3			IWA01
1989 08 07.73	M	6.7	S	6.5	R	8	16	11	5			NAK01
1989 08 08.68	S	7.0	S	10.0	B		14					IWA01
1989 08 08.73	M	6.5	S	20	L	6	46	8	5		270	NAK01
1989 08 08.74	M	6.5	S	6.5	R	8	16	9	5			NAK01
1989 08 10.69	M	6.2	S	6.5	R	8	16	6.5	5			NAK01
1989 08 10.70	M	6.4	S	20	L	6	46	6.5	5		290	NAK01
1989 08 11.75	M	6.4	S	6.5	R	8	16	8	5/	0.3	285	NAK01
1989 08 11.76	M	6.5	S	20	L	6	46	5.5	5	0.5	275	NAK01
1989 08 11.77	S	6.9	S	10.0	B		14	15	5			IWA01
1989 08 12.74	M	6.5	S	20	L	6	46	6.5	6	0.6	280	NAK01
1989 08 12.75	M	6.3	S	6.5	R	8	16	9.5	5/	0.3	280	NAK01
1989 08 12.76	B	7.0	AA	10.0	B		20			0.5		OHT
1989 08 12.76	S	6.7	S	10.0	B		14	15	5			IWA01
1989 08 12.80	S	6.5	AA	5.0	B		7		5			YAS
1989 08 14.73	S	6.4	AA	7.0	B		10		5			YAS
1989 08 17.78	S	6.5	AA	7.0	B		10		4			ISH02
1989 08 19.77	S	6.2	AA	7.0	B		10		6			YAS
1989 08 20.74	M	6.1	S	20	L	6	46	4	7		285	NAK01
1989 08 20.75	S	6.0	AA	7.0	B		10	7	6			YAS
1989 08 20.76	M	6.1	S	6.5	R	8	16	5.5	7			NAK01
1989 08 21.81	S	5.9	AA	7.0	B		10	6	6			YAS
1989 08 23.76	M	5.9	S	6.5	R	8	16	4.5	7		295	NAK01
1989 08 23.76	M	6.0	S	20	L	6	46	4	7	0.4	295	NAK01
1989 08 23.78	S	6.3	AA	13	L	6	24	5	4	0.17		ISH02
1989 08 23.79	S	6.2	AA	7.0	B		10	& 6	5			ISH02
1989 08 27.76	B	5.8	AA	3.0	B		8					OHT
1989 08 27.78	M	5.9	S	7.0	B		16	6.5	7			NAK01
1989 08 27.78	S	5.8	AA	7.0	B		10	4	6			ISH02
1989 08 27.79	S	5.8	AA	13	L	6	24	4	6	0.33		ISH02

Periodic Comet Brorsen-Metcalf (1989 X = 1989o) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 08 27.80	B	6.0	S	5.6	B		8			2		OKA05
1989 08 28.77	M	6.1	S	20	L	6	46	4		2.5	300	NAK01
1989 08 28.78	M	6.0	S	6.5	R	8	16	4.5	7/	2.2	300	NAK01
1989 08 28.78	M	6.3	AA	10.0	B		20					OHT
1989 08 28.78	S	5.6	AA	7.0	B		10	5	6		315	YAS
1989 08 28.78	S	5.7	AA	7.0	B		10	4	6			ISH02
1989 08 28.79	S	5.7	AA	13	L	6	24	4	6			ISH02
1989 08 31.82	M	5.7	S	13	L	6	33	6	6			KAM03
1989 09 01.79	B	5.9	S	5.6	B		8			2		OKA05
1989 09 01.79	M	5.5	AA	12.0	B		20	4	7	0.5		MIT
1989 09 16.82	S	6.3	AA	7.0	B		10	5	6			YAS

Periodic Comet Schwassmann-Wachmann 1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 09 14.93	S	11.9	V	31.6	L	5	62	1.3	4			MID01
1990 09 15.24	S	12.4	NP	25.6	L	4	67	2.1	2			MOR
1990 09 15.86	S	11.9	V	31.6	L	5	62	1.1	3			MID01
1990 09 16.25	S	12.0	NP	50.8	L	4	78	1.9	2			MOR
1990 09 16.88	S	12.0	V	31.6	L	5	62	0.8	2			MID01
1990 09 20.83	S	11.8	V	31.6	L	5	62	1.4	2			MID01
1990 09 25.90		[12.5:	AC	20.3	L	6	135					GRA04
1990 09 26.88		[12.8		31.6	L	5	62					MID01
1990 09 30.11		[12.5		31.6	L	5	62					MID01
1990 10 10.78		[12.5		31.6	L	5	62					MID01
1990 10 10.86		14.0		14.0	A	2		0.8	2			HAS02
1990 10 11.88		[12.7		31.6	L	5	62					MID01
1990 10 14.21	S	13.5	NP	50.8	L	4	195	1.0	0			MOR
1990 10 16.88		[12.3	V	31.6	L	5	62					MID01
1990 10 17.81		[12.3	V	31.6	L	5	62					MID01
1990 10 19.84		[12.7	V	31.6	L	5	62					MID01
1990 10 21.90		[12.8	AC	20.3	T	10	133					DAH
1990 10 21.92		[12.8	V	31.6	L	5	62					MID01
1990 10 25.84		[12.5	V	31.6	L	5	62					MID01
1990 10 26.91		[12.7	V	31.6	L	5	62					MID01
1990 11 06.75		[12.1	V	31.6	L	5	62					MID01
1990 11 08.84		[12.8	V	31.6	L	5	62					MID01
1990 11 10.15	S	12.0	NP	25.6	L	4	111	2.3	0/			MOR
1990 11 11.12	S	12.5	NP	25.6	L	4	111	1.8	0			MOR
1990 11 17.86		[12.8	V	31.6	L	5	62					MID01
1990 11 18.92		[12.7	V	31.6	L	5	62					MID01
1990 11 19.81		[12.8	V	31.6	L	5	62					MID01
1990 11 22.22	S	12.6	NP	25.6	L	4	111	1.7	1			MOR
1990 11 24.31	S	12.8	NP	25.6	L	4	111	1.8	1			MOR
1990 11 25.31	S	12.9	NP	25.6	L	4	111	1.8	1			MOR
1990 12 09.13	S	[13.3	NP	25.6	L	4	156	1.1	0/			MOR
1990 12 12.80		[12.0	V	31.6	L	5	62					MID01
1990 12 21.73		[12.0	V	31.6	L	5	130					MID01
1991 01 11.19	I	[13.5		41	L	4	183					HAL

Periodic Comet Stephan-Oterma (1980 X)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 10 31.80	S	10.0	AC	15	L	6	30	3	6			NAK01
1980 11 01.78	S	10.2	AC	15	L	6	30	2.5	6			NAK01
1980 11 03.78	S	9.8	AC	15	L	6	30	3	7			NAK01
1980 11 09.79	S	9.9	AC	15	L	6	30	2	6			NAK01
1980 11 10.79	S	10.2	AC	15	L	6	30	2	5/			NAK01
1980 11 17.78	S	10.0	AC	15	L	6	30	2	6			NAK01

Periodic Comet Stephan-Oterma (1980 X) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 18.77	S	9.9	AC	15	L	6	30	3	5			NAK01
1980 11 26.79	S	9.8	AC	15	L	6	30	4	6			NAK01
1980 11 29.79	S	9.4	AC	15	L	6	28	3	5			NAK01
1980 12 03.77	S	9.5	AC	15	L	6	28	3	4			NAK01
1980 12 04.75	S	9.1	AC	15	L	6	28	3	5			NAK01
1980 12 10.54	S	9.2	AC	15	L	6	28	3.5	6			NAK01
1980 12 13.51	S	8.9	AC	15	L	6	28	4.5	6			NAK01
1980 12 16.76	S	9.0	AC	15	L	6	28	4	6			NAK01
1981 01 07.50	S	10.0	AC	15	L	6	75	1.5	3			NAK01
1981 01 08.53	S	9.8	AC	15	L	6	75	1.5	4			NAK01
1981 01 11.55	S	9.8	AC	15	L	6	75	2.5	5			NAK01
1981 01 13.40	S	10.4	AC	15	L	6	75	2	3/			NAK01
1981 01 22.39	S	10.3	AC	15	L	6	50	2	4			NAK01
1981 01 26.42	S	10.4	AC	15	L	6	50	2	5			NAK01
1981 01 28.41	S	10.8	AC	15	L	6	50	& 2.5				NAK01
1981 01 30.46	S	10.9	AC	15	L	6	50	2.5				NAK01
1981 02 02.48	S	11.2	AC	15	L	6	50	2.5	3			NAK01
1981 02 04.43	S	11.4	AC	15	L	6	50	2	4			NAK01

Periodic Comet Shoemaker-Levy 1 (1990o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 11 17.86		[12.2:	V	31.6	L	5	62					MID01
1990 11 19.80		[12.5:	V	31.6	L	5	62					MID01
1990 11 21.74	S	12.8	VN	41	L	4	200					PEA
1990 11 22.15	S	12.8:	NP	25.6	L	4	111	2.2	0/			MOR
1990 11 22.59	S	12.8	VN	41	L	4	200					PEA
1990 11 24.29	S	13.3	NP	25.6	L	4	111	2.0	0/			MOR
1990 11 25.35	S	13.5	NP	25.6	L	4	156	1.2	0/			MOR
1990 12 09.15	S	[13.3	NP	25.6	L	4	156					MOR

ROMAN NUMERAL DESIGNATIONS OF COMETS IN 1989 (from MPC 17273).

Comet	T	Name	Year/letter	Ref.
1989 I	Jan. 4.4	P/Tempel 1	1987e1	IAUC 4498
1989 II	Feb. 4.1	P/d'Arrest	1987k	IAUC 4365
1989 III	Feb. 26.1	Shoemaker	1989e	MPC 16204
1989 IV	June 2.6	(SMM 8)	1989m	IAUC 4793
1989 V	June 12.5	Shoemaker-Holt-Rodriguez	1988h	MPC 14904
1989 VI	June 18.4	P/Churyumov-Gerasimenko	1988i	IAUC 4625
1989 VII	July 8.8	(SMM 9)	1989q	IAUC 4815
1989 VIII	Aug. 19.9	P/Pons-Winnecke	1989g	IAUC 4736
1989 IX	Aug. 20.3	Helin-Roman	1989s	MPC 16001
1989 X	Sept. 11.9	P/Brorsen-Metcalf	1989o	MPC 14747
1989 XI	Sept. 25.0	P/Gunn		MPC 11502
1989 XII	Sept. 28.9	(SMM 10)	1989x	IAUC 4884
1989 XIII	Oct. 10.5	P/Lovas 1	1989p	IAUC 4813
1989 XIV	Oct. 18.5	P/du Toit-Neujmin-Delparte	1989l	IAUC 4787
1989 XV	Oct. 26.7	P/Schwassmann-Wachmann 1		MPC 11510
1989 XVI	Nov. 1.1	P/Helin-Roman-Alu 2	1989y	MPC 15857
1989 XVII	Nov. 3.1	P/Gehrels 2	1989n	IAUC 4800
1989 XVIII	Nov. 7.6	McKenzie-Russell	1989f1	MPC 16204
1989 XIX	Nov. 11.9	Okazaki-Levy-Rudenko	1989r	MPC 16378
1989 XX	Nov. 28.4	P/Clark	1989h	IAUC 4742
1989 XXI	Dec. 15.9	Helin-Roman-Alu	1989v	MPC 15857
1989 XXII	Dec. 27.9	Aarseth-Brewington	1989a1	MPC 17174

SOURCES OF VISUAL PHOTOMETRY FOR P/HALLEY. II.

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The first listing of sources of visual photometric data for P/Halley was published in the July 1986 issue (Green 1986, *ICQ* 8, 75-77). Presented here is a list of some additional sources of such data for the current apparition of this comet. Note that the fourth edition of the *ICQ* Archive on 9-track magnetic tape contains 6345 magnitude estimates of P/Halley made from 1909 to 1989. A paper entitled "The Visual Brightness Behavior of P/Halley during 1981-1987" (Green and Morris 1987, *Astron. Astrophys.* 187, 560-568) provides a general discussion of *ICQ* archival brightness data on this comet.

Additional International Comet Quarterly (ICQ) sources of total visual magnitudes:

- *ICQ* 8, 135-150 (1986).
- *ICQ* 9, 80-91, 127-130, 170-171 (1987).
- *ICQ* 10, 1, 30, 56-61, 89-91, 122 (1988).
- *ICQ* 11, 24, 37, 47 (1989).
- *ICQ* 12, 16-33 (1990).

Sources of total magnitudes obtained non-visually:

- Felenbok, P., et al. (1982). *Astron. Astrophys.* 113, L1-L2 [negative detection, limiting magnitudes, 1981 Dec. 3; essentially the same paper, by the same authors, as that by Picat et al. below].
- Gerasimenko, S. I.; N. N. Kiselev; and G. P. Chernova (1985). *Int. Halley Watch Newsletter* No. 7, 7-10 [BVR photometry for 1985 Feb. 16, Mar. 12, 16, 17, Apr. 10, 14].
- Nazarchuk, G. K. (1985). *Int. Halley Watch Newsletter* No. 7, 5-7 [*B* m_1 and m_2 magnitudes, 1984 Sept. 25, 26].
- Picat, J. P., et al. (1982). in *Proceedings of the ESO Workshop on "The Need for Coordinated Ground-based Observations of Halley's Comet"* (P. Veron, M. Festou, and K. Kjar, Eds.; Garching bei Munchen: European Southern Observatory), pp. 273-275 [negative detection on 1981 Dec. 3; similar to the paper by Felenbok et al. above (same authors)].
- Schild, R. (1985). *Publ. Astron. Soc. Pacific* 97, 1011-1012.
- West, R. M.; and H. E. Jørgensen (1989). *Astron. Astrophys.* 218, 307-316 [*V* observations of P/Halley during 1988 Apr.-May].
- West, R. M. (1990a). *Astron. Astrophys.* 228, 531-538 [*V* observations of P/Halley during 1989 Jan. 1-9; preliminary information was given on *IAU Circ.* 4712 in Jan. 1989].
- West, R. M. (1990b). *IAU Circ.* No. 5059 [*V* observations made during 1990 Feb. 21-24; further information on this observing run may be found in West (1990), *The Messenger* No. 61, pp. 17-18].

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RECENT NEWS AND RESEARCH CONCERNING COMETS

Howard J. Brewington, discoverer of comet Aarseth-Brewington 1989a₁, reached me by telephone in my office quite late on the night of Jan. 6-7 to tell me that he was certain that he had found a new comet visually with his 16-inch *f*/4.5 reflector (55×). Confirming observations came quickly that there was indeed a ninth-magnitude comet moving northeastward near the Pisces-Cetus border. Brewington had logged 125 hours, 25 minutes, of observing time since his first comet discovery. After the comet was announced as comet 1991a, we received word of independent discoveries by numerous individuals, including veteran comet hunters Tsuruhiko Kiuchi of Japan, William A. Bradfield of Australia, and Leo Boethin of the Philippines. The fact that Brewington, Kiuchi, and Bradfield found the object on the same night was so striking that we immediately presumed an outburst had just taken place — and this fact was confirmed by the report of a pre-discovery photograph showing the comet to be at $m_1 \sim 15$ a mere 41 hours before Brewington's discovery (cf. *IAUC* 5168).

As soon as enough precise positions were available to compute a preliminary orbit, Brian G. Marsden noted the similarity of the orbit to that of P/Metcalf 1906 VI, not seen since 1906-07, when it was well observed for some 3 months. The orbit was quickly linked with the 1906-07 observations to confirm the identification, and the comet was 're-named' P/Metcalf-Brewington. Despite the outburst in brightness, by early February comet 1991a had not faded much more than would be expected by a standard r^{-4} law.

(Continued on next page...)

Other New Discoveries

While the details of comet 1991a were being sorted out, we were also following developments concerning a new photographic comet discovery by Masaru Arai of Yorii, Japan. Comet Arai 1991b was near $m_1 = 10$ visually when discovered in early January, moving northwestward in Cancer. This comet had passed perihelion on 1990 Dec. 10 at $q = 1.4$ AU. Pre-discovery images showing this comet at $m_1 \sim 10$ on 1990 Dec. 23 (cf. *IAUC* 5170) suggest that comet 1991b was near this brightness for some weeks prior to discovery.

Inadvertently omitted from my column in the October 1989 issue was the discovery of comet 1990k by Henry E. Holt and C. Michelle Olmstead on films taken Sept. 14 and 17 with the 18-inch (46-cm) Schmidt telescope at Palomar. Holt and Olmstead, along with H. R. Holt and J. A. Brown, were filling in for Gene and Carolyn Shoemaker as part of the Shoemakers' regular search program for comets and unusual asteroids; the Shoemakers frequently go to Australia during the summer months. This was the fifth comet named for Holt, who has been working with the Shoemakers for a few years now. With an orbital period of six years, P/Holt-Olmstead passed perihelion in late September 1990 at a perihelion distance of 2 AU.

David Levy has now joined the Shoemaker effort and been involved with the discoveries on Palomar 18-inch Schmidt films of five new comets, to add to his list of six visual discoveries. [Levy notes that it took him ~ 60 hours of hunting between his discoveries of comets 1989r and 1990c.] Comets 1990o, 1990p, and 1991e are all short-period comets, known as P/Shoemaker-Levy 1, 2, and 3, respectively. P/Shoemaker-Levy 1 was near $m_1 = 13$ at discovery (on films taken Nov. 15 and 16) and was followed for a short time by visual observers.

P/Shoemaker-Levy 2 was first reported as asteroidal and given the minor-planet designation 1990 UL₃ on *IAU Circular* No. 5138, although suspicions were raised over its Jupiter-crossing orbit ($Q = 6.98$ AU, $q = 1.84$ AU, $P = 9.3$ yr). Steve Larson and Levy found definite images of a 28" tail coming out of 1990 UL₃ on CCD exposures obtained Dec. 19 and 20 with the 1.5-m Catalina telescope near Tucson. Brian Skiff then noticed a straight, diffuse tail of similar dimension on CCD frames obtained Dec. 7 with the Lowell Observatory 1.1-m reflector, and an announcement was made on *IAUC* 5149 that this would be redesignated as P/Shoemaker-Levy 2. No coma is evident in any images, however, and this object will be added to the growing list of objects that that strongly imply the existence of a 'transition' between comets and minor planets — objects such as (944) Hidalgo, (2060) Chiron, (3200) Phaethon, (3552) Don Quixote, 1982 YA, P/Arend-Rigaux, P/Neujmin 1, etc., to name a few.

P/Shoemaker 3 appears to have an orbital period just over 7 years, and was near $m_1 = 16.5$ when discovered on 1991 Feb. 7 films. The Shoemakers and Levy also combined to find comets Shoemaker-Levy 1991d and 1991f on Jan. 22 and Feb. 9 films at $m_1 \sim 15.5$ and 17, respectively. Comet 1991d has a rather high inclination ($i = 77^\circ$), and at press time the orbital elements are not known for comet 1991f.

Meanwhile, the Shoemakers quietly continue to 'home in' on the record for comet discoveries, having taken sole possession — with the discovery of comet 1991f — of second place among comet discoverers (going by names on comets). As of this writing, those observers with ten or more comets named after them are (asterisks indicating they are still actively observing): Pons, 26; Shoemaker, 22*; Brooks, 21; Barnard, 16; Bradfield, 14*; Louis Swift, 13; Tempel, 13; Mrkos, 12*; Giacobini, 12; Honda, 12; Messier, 12; Hartley, 11*; Levy, 11*; Borrelly, 11; Peltier, 10; Winnecke, 10.

New Recoveries

P/Taylor was recovered as comet 1990n by Jim Scotti with the Spacewatch Telescope at Kitt Peak, Arizona, on CCD images obtained Nov. 11 and 12. The comet was diffuse with an 8" coma and a 9" tail, $m_1 = 19.7$ (*IAUC* 5134). P/Swift-Gehrels was recovered as comet 1991c by amateur astronomer T. Seki of Geisei, Japan, on photographs obtained during the second week in January. The comet was then at $m_1 = 16.5$ -17.0, diffuse with central condensation, and close to the prediction in the *ICQ 1991 Comet Handbook*. Both P/Taylor and P/Swift-Gehrels are making their fourth observed returns to perihelion.

Observations of Other Comets

With this issue, the *ICQ* has now published 2862 tabulated observations of comet Levy 1990c, including 2760 observations with magnitude information, putting this comet easily in first place among long-period comets in the *ICQ* archive (cf. *ICQ* 12, 171), and second only to P/Halley among all comets. As this comet is still brighter than 10th magnitude in a dark sky during early 1991, the tally should easily pass 3000 observations. The archive has at least one m_1 estimate of comet 1990c for every UT date from 1990 June 20 to September 28.

Comet Austin 1989c₁ has moved into third place among long-period comets in the archive, with 1614 observations (1514 of which contain magnitude information). Comet Okazaki-Levy-Rudenko 1989r has moved into fourth place among long-period comets, with 1174 observations (1141 of which contain magnitude estimates).

Comet Meetings

Part of an on-going set of conferences originating in Uppsala, Sweden, "Asteroids, Comets, Meteors 1991" will take place during 1991 June 24-28 in Flagstaff, Arizona; contact P. Jones (Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058) for further information. An "International Workshop on Periodic Comets" will take place in Montevideo, Uruguay, during August 5-8, just after the meeting of the General Assembly of the International Astronomical Union (IAU) in Buenos Aires, Argentina; for information, contact J. A. Fernández (Departamento de Astronomía, Facultad de Humanidades y Ciencias, Tristán Narvaja 1674, Montevideo, Uruguay).

— Daniel W. E. Green (1991 February 11)

