INTERNATIONAL COMET QUARTERLY

Whole Number 82 APRIL 1992 Vol. 14, No. 2

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

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

The regular (invoiced) subscription rate is US$24.00 per year (price includes the annual *Comet Handbook*; the price without the *Handbook* is US$16.00 per year). Subscribers who do not wish to be billed may subscribe at the special rate of US$20.00 per year (rate is $12.00 without *Handbook*). [The last set of digits (after the hyphen) on the top line of the mailing address label gives the Whole Number that signifies the last *ICQ* issue which will be sent under the current subscription status.] Make checks or money orders payable in U.S. funds (and drawn on a U.S. bank) to *International Comet Quarterly* and send to Daniel Green; Smithsonian Astrophysical Observatory; 60 Garden St.; Cambridge, MA 02138, U.S.A. [Group subscription rates available upon request.] Back issues are $4.00 each — *except* for "current" *Comet Handbooks*, which are available for $10.00 ($8.00 to subscribers if ordered with their *ICQ* subscription; see above). Up-to-date information concerning comet discoveries, orbital elements, and ephemerides can be obtained by subscribing to the *IAU Circulars* and/or the *Minor Planet Circulars* (via postal mail and also available via computer access); for further information, contact the *ICQ* Editor at the above address.

Manuscripts will be reviewed for possible publication (if possible, send via computer networks; or, send typed, double-spaced copy to the Editor at the Cambridge address above); authors should first obtain a copy of "Information and Guidelines for Authors" from the Editor. Cometary observations also should be sent to the Editor in Cambridge; all data intended for publication in the *ICQ* that is not sent via computer electronic mail should be sent on standard *ICQ* observation report forms, which can be obtained upon request from the Editor. Those who can send manuscripts and observational data in machine-readable form are encouraged to do so [especially through e-mail via the computer networks *SPAN* (CFAPS2::GREEN), *BITNET* (GREEN@CFA), or Internet (GREEN@CFA.HARVARD.EDU), or via floppy disks that can be read on an IBM PC], and should contact the Editor for further information.

Among the Observation Coordinators (OCs) listed below, those with postal addresses have e-mail contacts with the *ICQ* Editor (or regularly send data to the Editor on IBM PC-compatible floppy disks); observers in the general area of such OCs who lack access to e-mail networks may send data to the OC for relay to the *ICQ* in electronic form.

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This issue is No. 82 of the publication originally called *The Comet* (founded March 1973) and is Vol. 14, No. 2, of the *ICQ*. *[ISSN 0736-6922]*

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— CORRIGENDA —

• In the July 1991 issue, p. 95, 1st full paragraph, line 10, *for* $m_2 = 12.0 \pm 0.2$; tail subtends $\sim 30°$ [MOD]. Mar. 12.27: *read* $m_2 = 12.0 \pm 0.2$ [MOD]. Mar. 12.23: in 40-cm L, tail subtends $\sim 30°$ [MOD]. Mar. 12.27:

• In the January 1992 issue, p. 7, 'Periodic Comet Levy (1991q)', line 6, *for* mag 12.5 ± 0.1, *read* mag 12.7 ± 0.1,

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Comet Handbooks

The *ICQ*'s *1993 Comet Handbook*, edited by S. Nakano and D. W. E. Green, has just been published and is being mailed with this April issue of the *ICQ* to those subscribers who paid in advance. Other *ICQ* subscribers may purchase single copies of the *1993 Comet Handbook* (and also the *1992 Comet Handbook*, which is still available) for $8.00. The 1993 edition includes ephemerides for 51 periodic comets predicted to be brighter than $m_1 \sim 21$ and for 4 long-period comets brighter than $m_1 \sim 18$ during the year 1993.

TABULATION OF COMET OBSERVATIONS

With the tabulated data in this issue, the total number of observations in the *ICQ* archive has passed the 50,000 mark. From time to time it may be useful in these pages to outline problems encountered by the *ICQ*'s editorial staff in the process of archiving data submitted by observers and observation coordinators. More and more data are being submitted in computer-readable format (either via e-mail or via floppy disk), which reduces the huge amount of work necessary to archive the data, but it is not clear that this has caused an improvement on the number of errors entering the archive. Due to careful data entry by the *ICQ* staff and to checking and re-checking of all figures before publication, we can say that very few errors are introduced once the data reach the *ICQ*. However, it is up to individual observers to check and re-check not only all submitted data, but also all *published* data, and to inform the *ICQ* promptly of any errors. While some observers do perform this valuable task, it is likely that the majority do not, especially those observers who submit data via an observation coordinator. It is important for coordinators to encourage observers to carefully record all observations in a notebook and to urge those observers to check their *ICQ*-published data for possible transmitting errors. Some of the data being sent by e-mail are not in proper archival format (which is different from the published form seen on these pages); contact the Editor if uncertain about format.

Of the observations arriving on report forms, many are still written by hand and many of these are very difficult to read or decipher (and must be held from publication). We still get a great many observations, both on paper and via computer, which do not have complete information and must be withheld from publication: the most common omission is the reference used for the magnitude estimate, and sometimes when this *is* stated, it is not clear what the reference really is (especially in cases where a source is used that is not in our reference list, and such cases require full documention so that we can assign a new source abbreviation). And all too frequently, we are getting observations with magnitude estimates referring to an inappropriate source (such as a 10th- or 11th-magnitude comet's brightness being estimated using the *SAO Star Catalog*, an 8th-magnitude comet's brightness being estimated using the *Atlas Coeli Catalogue*, or a 9th-magnitude comet's brightness being estimated using the *Sky Catalogue 2000*, or using nebulous deep-sky objects as comparisons) — in which case observations are usually withheld from publication and from inclusion in the archive.

Another constantly recurring problem is where observers will state figures that are not appropriate or significant. For example, a coma diameter given as 20′.0 (or even 8′.0) is rarely accurate to a tenth of an arc minute. If an estimate of tail length is only good to ± 5′, it does not make sense to give the length to an 'accuracy' of 0°.01 (which corresponds to 0′.6). Times of observation should only be given to 0.01 day, not to 0.001 day and certainly *not* in hours and minutes of time. If a magnitude is given as '10' or '10.', we will assume that '10 :' is what is meant. If observers are only estimating magnitudes to the nearest whole magnitude, or even to the nearest half magnitude, we ask that they place a colon after the estimates, to discern these values from those of observers who are able to obtain an accuracy on the order of a few tenths of a magnitude. Some observers insist on using the *IAU Circular* convention of stating instrument aperture in meters, rather than in centimeters, and we again request that observers use only cm, stating fractions of a cm for binoculars and for other instruments only when the fraction is known.

Many variations of the standard *ICQ* report form are now in use, all of which (including the IHW form) follow the original *ICQ* rather closely. In recent years, student aides working with the *ICQ* Editor have entered the vast majority of paper-reported observations, and it is therefore important that the report forms be as uniform as possible. Use of the original *ICQ* form is still preferred to other forms, because it was created by the Editor from the specific angle of making the whole data entry process as easy as possible, keeping in mind how the data are entered into the computer. *ICQ* report forms will be sent free of charge to those who request them.

Such items as magnitude method, stellar magnitude sources, instrument type, and observer are tabulated in the *ICQ* in coded form, to permit maximum use of a single observation line. The Keys to these coded abbreviations are far too lengthy to publish fully on any regular basis in the pages of the *ICQ*, but a complete list of the Keys to abbrevations used in the *ICQ* is available from the Editor for $4.00 postpaid. Of course, for several years now we have given the key to observer codes in each issue for those specific observations published therein.

As for the actual observations, we again recommend that observers pick numerous comparison stars prior to observing a particular comet, and that at least 2 stars fainter than the comet and 2 stars brighter than the comet be used for a magnitude estimate (with the 4 stars each being within ~ 0.7 magnitude of the comet). If uncertain about the various methods used for making total visual magnitude estimates, consult the article by C. S. Morris in the October 1980 issue of the *ICQ*, page 69. We greatly encourage an estimate of the comet's coma diameter (even if only rough, and then listed with an ampersand) with each magnitude estimate, because this is potentially one of the best diagnostic tools available to researchers for later analyzing differences in magnitude estimates made at the same time. Tail information should be considered secondary in importance to complete coma information, for visual observations.

Descriptive Information (to complement the Tabulated Data):

◇ *Comet Bradfield 1987 XXIX* ⟹ 1987 Oct. 13.06: also 0°.5 tail in p.a. 135° [WAR01].

◇ *Comet Levy 1990 XX* ⟹ 1991 Mar. 11.71: in 15.3-cm f/6.5 R (30×), m_1 = 9.6 (MM: E; ref: 'Praesepe photometrical standard'), 3′ coma, DC = 3 [MAM]. Mar. 16.69: in 15.3-cm f/6.5 R (30×), m_1 = 10.0 (MM: E; ref: 'Praesepe photometrical standard'), 3′ coma, DC = 2 [MAM].

(Continued on next page...)

◇ *Comet Shoemaker-Levy 1991d* ⟹ 1991 Oct. 21.41: stellar cond. of mag 13-14 [MOD]. Nov. 5.45: stellar cond. of mag ~ 13, offset ~ 0'.5 in p.a. 65° ± 10° [MOD]. Nov. 10.46: at 164×, stellar cond. of mag 14.1 ± 0.1, offset ~ 0'.3 in p.a. 18° ± 5° [MOD]. Nov. 17.47: at 164×, stellar central cond. of mag 13.5 ± 0.3 [MOD]. Dec. 11.47: "tail tapers to a point near its end"; at 190×, stellar central cond. of mag 13.5 ± 0.1 [MOD]. Dec. 31.48: at 190×, stellar central cond. of mag ~ 13 [MOD]. 1992 Jan. 12.46: in 35.9-cm L (164×), stellar central cond. of mag 13.2 ± 0.2 [MOD]. Jan. 16.210: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows a coma of dia. ~ 4'.5 and a straight tail 0°.3 long in p.a. 310° [MIK]. Feb. 6.47: in 40-cm *f*/7 L (100×), 1'.1 coma, DC = 4 [MOD].

◇ *Comet Shoemaker-Levy 1991a*$_1$ ⟹ 1992 Jan. 29.770: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows starlike object of mag ~ 15, w/ 20″ coma and short 1'.5 tail in p.a. 80° [MIK].

◇ *Comet Zanotta-Brewington 1991g*$_1$ ⟹ 1991 Dec. 23.76: discovery [ZAN]. 1992 Jan. 5.77: diffuse tail [ROD01]. Jan. 11.98: in 25-cm *f*/20 'tri-schiefspiegler' (105×), m_1 = 9.5 (ref: AA; MM: M), 4′ coma, DC = 1 [NOW]. Jan. 17.73: strong central cond. [ZAN]. Jan. 20.11: comet asymmetrical in Swan-band filter [SPR]. Jan. 22.80: coma ~ 4′ × 5′, long axis toward the NE; central cond. very bright; 3 layers of coma [DIA]. Jan. 27.72: "the coma appeared slightly elongated in p.a. ~ 210°; no sign of a split nucleus" [MID01]. Jan. 28.80: coma ~ 2′ × 3′; tail appears to be a bit more broad and curved [DIA]. Jan. 30.73: nucleus of mag 9-10; altitude ~ 10° [GRA04]. Jan. 31.45: in 20×80 B, $m_1 \simeq 7.0$, coma dia. 2′, DC = 3 [CAM03]. Feb. 3.80: coma ~ 1′ × 3′ [DIA]. Feb. 26.43: enhanced using Swan-band filter [SEA]. Mar. 5.42: more diffuse than previously; brighter using Swan-band filter [SEA].

◇ *Comet Mueller 1991h*$_1$ ⟹ 1992 Jan. 6.935: 2-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows an object of mag ~ 14 w/ an almost-starlike coma of dia. ~ 40″; tail ~ 0°.06 long in p.a. 265°; although comet looks relatively bright on the frame, an attempt to detect it with 36-cm T (80×) was unsuccessful [MIK]. Jan. 16.183: 1-min CCD exp. (taken as on Jan. 6.935) shows 0'.8 coma, DC = 6, fanlike tail ~ 2′ long in p.a. 150° [MIK]. Jan. 29.803: 1-min exp. w/ CCD (see Jan. 6.935) shows diffuse oval 3'.0 × 4'.1 coma extending to a short tail in p.a. 65°; central cond. of dia. 24″ [MIK]. Jan. 30.78: observation was difficult due to the very low surface brightness of the comet; a star of mag 10-11 was involved in the coma [GRA04]. Feb. 7.864: 1-min CCD exp. (taken as on Jan. 6.935) shows 5'.4 coma, DC = 5; 0°.18 conical tail in p.a. 60° [MIK]. Feb. 7.88: very diffuse object; large delicate coma [MIK]. Feb. 8.837: 1-min CCD exp. (taken as on Jan. 6.935) shows 4'.5 coma, DC = 5; 0°.14 conical tail in p.a. 55° [MIK]. Feb. 19.03: at 169×, no stellar cond. seen [MOD]. Feb. 19.783: 1-min CCD exp. (taken as on Jan. 6.935) shows circular coma of dia. 5'.0 w/ trace of 2 || streaks of plasma 0°.14 long in p.a. 70° and slightly curved toward the N [MIK]. Feb. 24.07: in 25.4-cm *f*/20 'tri-schiefspiegler', m_1 = 10.0 (ref: AA; MM: M), 4′ coma, DC = 5 [NOW]. Feb. 24.136: 20-min exp. on 2415 Technical Pan film w/ 41-cm L shows coma of dia. 1'.9 and 28′ tail in p.a. 74° [Paul E. Roques, Williams, AZ]. Feb. 24.801: 1-min CCD exp. (taken as on Jan. 6.935) shows circular 4'.6 coma and 2 thin, threadlike streaks of plasma each ~ 0°.3 long in p.a. 45° (less conspicuous, w/ 2 disconnections, curved toward the N) and 70° (threadlike wavy structure, curved toward the S) [MIK]. Feb. 25.121: Technical Pan exp. w/ 10-cm *f*/2.64 Schmidt (D) shows 2′ coma and a broad, diffuse tail extending 1°.5 in p.a. 75° [Roques]. Feb. 28.117: Technical Pan exp. w/ 10-cm D shows 2'.5 coma and tails of length 2°.2 (ion) in p.a. 75° and 6′ (dust, diffuse) in p.a. 55° [Roques]. Feb. 29.114: Tech pan exp. as on Feb. 25.121 shows 3′ coma and 3°.2 tail in p.a. 76° [Roques]. Mar. 1.04 and 2.03: tail half as wide as coma [MOD].

◇ *P/Arend-Rigaux* ⟹ 1991 Oct. 18.42: at 248×, stellar central cond. of mag ~ 15.5 [MOD].

◇ *Periodic Comet Chernykh (1991o)* ⟹ 1991 Sept. 7.31: a diffuse object was suspected at comet's predicted position (~ 20% certainty), of dia. 0'.5, DC = 0, m_1 = 14.4; light haze [MOD].

◇ *Periodic Comet Faye (1991n)* ⟹ 1991 Sept. 12.08: m_2 = 11.8 [LOO01]. Oct. 2.89, 26.88, 29.94: asymmetrical coma [LOO01]. Oct. 4.08: stellar cond. of mag 13.0 ± 0.1; "coma elongated towards W?" [MOD]. Oct. 5.19: at 196×, stellar cond. of mag 12.9 ± 0.05, offset in p.a. ~ 90° [MOD]. Oct. 8.36: tail subtends up to ~ 40°; "a section of tail, as wide as the coma, centered at p.a. 247°, is the brightest part"; at 164×, stellar cond. of mag 12.6 ± 0.1, offset in p.a. ~ 67° [MOD]. Oct. 11.14: in 35.9-cm *f*/7 L (85×), up to 0°.1 of tail suspected in p.a. 238°; at 164×, stellar cond. of mag 13.0 ± 0.1 offset in p.a. ~ 58° [MOD]. Oct. 14.18: in 35.9-cm *f*/7 L (85×), DC = 6, 0°.6 tail in p.a. 253°; at 164×, stellar cond. of mag 12.7 ± 0.1, offset in p.a. ~ 73° [MOD]. Oct. 17.30: in 35.9-cm *f*/7 L (85×), 0°.10 tail in p.a. 265°; tail subtends up to ~ 40°; a section of tail, as wide as the coma (~ 1′), centered at p.a. 265°, is the brightest part; at Oct. 17.33, at 164×, stellar cond. of mag 12.4 ± 0.1, offset in p.a. ~ 85° [MOD]. Oct. 18.13: conspicuous central cond. of mag 11 [VIE]. Oct. 18.29: in 20-cm L, tail subtends ~ 5° [MOD]. Oct. 18.33: in 35.9-cm *f*/7 L (85×), 0°.11 tail in p.a. 265°; at 164×, stellar cond. of mag 12.5 ± 0.1 offset in p.a. ~ 85°; first 0°.03 of tail subtends ~ 40° — rest of tail subtends ~ 5° [MOD]. Oct. 29.07: comet involved with star of mag ~ 12 [MOD]. Oct. 30.04: in 40-cm L, tail subtends 40°-50°; at 190×, stellar central cond. of mag 13.0 ± 0.1 [MOD]. Oct. 30.12: central cond. of mag 12.5 [VIE]. Oct. 30.16: "small condensed area" [SPR]. Nov. 1.17: in 40-cm L, also 0°.02 tail that tapers to its end in p.a. 340°; both tails are as wide as coma [MOD]. Nov. 1.20: in 35.9-cm *f*/7 L (164×), stellar central cond. of mag 12.9 ± 0.05 [MOD]. Nov. 1.77: at 166×, distinct stellar central cond. was seen [ZHU]. Nov. 3.15: tail send spanning p.a. 280°-340°; tail brightest and longest in p.a. 280°, but not as well defined as 2 days ago — rest of tail is 0°.02 long [MOD]. Nov. 5.32: in 40-cm *f*/7 L (100×), 1'.0 coma, 0°.04 tail (as wide as coma) in p.a. 270° [MOD]. Nov. 5.42: very sharp false nucleus; possible tail in p.a. 50° [SEA]. Nov. 8.47: in 25.4-cm L, comet little changed when viewed through Swan band filter [SEA]. Nov. 10.2: 15-min exp. on Ektar 1000 film w/ 40-cm *f*/7 A by Don Himes shows 0'.55 coma and tails 0°.08 and 0°.03 long in p.a. 270° and 13°; former tail is as wide as coma, and its S edge is well-defined (N edge is not); latter tail subtends ~ 20° and is brighter of the two, its edges being not well defined; tails are connected by a fan-shaped tail that extends 0'.6 from center of coma and subtends 103° [MOD]. *(Continued...)*

(Continued from previous page) Nov. 10.20: in 35.9-cm *f*/7 L (85×), 0°.03 tail in p.a. 269°; tail as wide as coma; stellar central cond. of mag 12.9 ± 0.05 [MOD]. Nov. 14.26: in 40-cm *f*/7 L (100×), fan-shaped tail spans p.a. 270°-10° (subtends ~ 100°), w/ the brightest part being 0°.02 long in p.a. 0° [MOD]. Nov. 15.17: "offset condensed area; coma asymmetrical" [SPR]. Nov. 27.08: tail as wide as coma [MOD]. Nov. 28.18: coma asymmetrical [SPR].

Dec. 11.19-11.20: estimate of tail's p.a. is rough (± 10°); at 190×, stellar cond. of mag 13.6 ± 0.1 [MOD]. Dec. 25.79: in 10.0-cm *f*/10 M (25×), $m_1 \simeq 11.0$ [PAR03]. Dec. 27.17: in 35.9-cm L (164×), stellar central cond. of mag 14.4 ± 0.05 [MOD]. Dec. 28.08: in 35.9-cm L (164×), stellar cond. of mag 14.3 ± 0.05; coma elongated ~ 0'.5 in p.a. 52° ± 2° [MOD]. 1992 Jan. 1.19: in 35.9-cm L (164×), stellar cond. of mag 14.3 ± 0.05; coma elongated ~ 0'.5 in p.a. 46° ± 5° [MOD].

◇ *Periodic Comet Hartley 2 (1991t)* ⟹ 1991 Aug. 13.06: coma fan-shaped [HAV]. Sept. 13.13: in 28.0-cm *f*/10 T (88×), 30′ tail in p.a. ~ 85° [COM]. Oct. 17.44: in 35.9-cm *f*/7 L (85×), tail as wide as coma ~ 2′ — tail 0°.06 long in p.a. 295° [MOD]. Oct. 18.41: in 40-cm *f*/7 L (100×), tail as wide as coma ~ 2′ — tail 0°.08 long in p.a. 288° [MOD]. Nov. 14.155: in 25-cm *f*/4 L (53×), $m_1 = 10.0$: (rf: SC; MM: S), 2'.8 coma, DC = 4 [LOO01].

◇ *Periodic Comet Kowal 2 (1991f$_1$)* ⟹ 1991 Dec. 27.96: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows the comet to be considerably fainter than on frames taken 1992 Feb. 7-8 [MIK]. 1992 Jan. 6.912: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows a diffuse object of mag ~ 15 w/ bright central cond.; total coma dia. ~ 0'.5; "two short streamers at 90° angle are present"; also tail ~ 0°.03 long in p.a. 310° [MIK]. Feb. 8.94: wide fan-like tail [MIK].

◇ *Periodic Comet Levy (1991q)* ⟹ 1991 Aug. 16.03: in 11-cm *f*/7.4 L (32×), $m_1 = 10.3$ (MM: B; ref: 'Pleiades photometrical standard'), 2'.5 coma, DC = 3 [BAR06].

◇ *P/Machholz* ⟹ 1991 July 31.09: at 88×, "comet probably seen, but observation was brief (~ 5 min); $m_1 \simeq 9.0$ ± 0.3 (MM: S), 1′ coma, DC = 3 [MOD]. Aug. 2.10: at 164×, stellar central cond. of mag 11.8 ± 0.2 suspected [MOD]. Aug. 12.07: at 68×, DC = 4, stellar central cond. of mag ~ 13 suspected [MOD]. Aug. 13.07: at 88×, almost stellar central cond. of mag 12.8 ± 0.2 [MOD].

◇ *P/Schwassmann-Wachmann 1* ⟹ 1991 Nov. 1.29: stellar central cond. of mag 15.5 ± 0.2 [MOD]. Nov. 14.32: almost stellar central cond. of mag 15.5 ± 0.2 [MOD]. 1992 Feb. 7.846 and 8.817: 1-min exp. w/ 19-cm *f*/4 flat-field camera (+ 574×384 Wright CCD) shows a cond. of mag ~ 13 and dia. 42″; there is no trace of any coma; looks to be in early stage of outburst; not seen in 36-cm T (80×) on Feb. 7.846 due to star of mag ~ 6 only 4'.8 away; several other frames were taken between Feb. 7.846 and 7.944 to confirm the comet's motion [MIK]. Feb. 19.763: 1-min exp. w/ CCD (taken as on Feb. 7.846) shows 'stellar' cond. of dia. 33″ w/ asymmetric coma of dia. ~ 1′, elongated toward p.a. 180° [MIK]. Feb. 24.813: 1-min exp. w/ CCD (taken as on Feb. 7.846) shows central cond. of mag ~ 14.5 and dia. 18″, surrounded by a delicate coma of dia. ~ 1'.5 [MIK].

◇ *Periodic Comet Wirtanen (1991s)* ⟹ 1991 Oct. 18.43: at 68×, DC = 4, stellar central cond. of mag ~ 12 [MOD].

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OBSERVATIONS OF COMETS

The headings for the tabulated data are as follows: "DATE (UT)" = Date and time to hundredths of a day in Universal Time; "MM" = the method employed for estimating the total visual magnitude [B = Bobrovnikoff, M = Morris, S = Sidgwick/In-out — see October 1980 issue of *ICQ*, pages 69-73 — etc.; also, P stands for photographic magnitude, and photoelectrically-determined values fall under U, L, and V for the standard *U*, *B*, and *V*, respectively]. "MAG." = total visual magnitude estimate; a colon indicates that the observation is only approximate, due to bad weather conditions, *etc.* (A left bracket, [, indicates limiting magnitude, comet not seen.) "RF" = reference for magnitude estimates (see the April 1988 issue, page 34). "AP." = aperture in centimeters of the instrument used for the observations, usually given to tenths. "T" = type of instrument used for the observation (R = refractor, L = Newtonian reflector, B = binoculars, C = Cassegrain reflector, A = camera, T = Schmidt-Cassegrain reflector, S = Schmidt-Newtonian reflector, E = naked eye, *etc.*). "F/" and "PWR" are the focal ratio and power or magnification, respectively, of the instrument used for the observation — given to nearest whole integer (round even).

"COMA" = estimated coma diameter of the comet in minutes of arc. An ampersand (&) indicates an approximate estimate. An exclamation mark (!) precedes a coma diameter when the comet was not seen (*i.e.*, was too faint) and where a limiting magnitude estimate is provided based on an "assumed" coma diameter (a default size of 1′ or 30″ is recommended; cf. *ICQ* **9**, 100); a plus mark (+) precedes a coma diameter when a diaphragm was used electronically, thereby specifying the diaphragm size (i.e., the coma is almost always larger than such a specified diaphragm size). "DC" = degree of condensation on a scale where 9 = stellar and 0 = diffuse; a slash (/) indicates a value midway between the given number and the next-higher integer. "TAIL" = estimated tail length in degrees, to 0.01 degree if appropriate; again, an ampersand indicates a rough estimate. "PA" = estimated measured position angle of the tail to nearest whole integer in degrees (north = 0°, east = 90°). "OBS" = the observer who made the observation (given as a 3-letter, 2-digit code). An asterisk between the DATE and MM columns indicates that the observation is an updated version of one already published in a previous issue of the *ICQ*, *The Comet Quarterly*, or *The Comet*. (An exclamation mark in this same location indicates that the observer has corrected his estimate in some manner for atmospheric extinction.)

Key to observers with observations published in this issue, with 2-digit numbers between Observer Code and Observer's Name indicating source [11 = Dutch Comet Section; 16 = Yamaneko Group of Comet Observers (c/o Akimasa Nakamura, Aichi, Japan); etc.]. Those with asterisks (*) preceding the 5-character code are new additions to the Observer Key:

CODE	S	OBSERVER, LOCATION
ABE01	16	Ikuo Abe, Japan
AND01	21	Karl-Gustav Andersson, Sweden
BAR		Sandro Baroni, Italy
*BAR06	26	A. R. Baransky, Okhnovka, Ukraine
*BJO	21	Bjorn Davidsson, Sweden
BOA		Andrea Boattini, Italy
CAM03	14	Paul Camilleri, Australia
CAV		Marco Cavagna, Italy
COM	11	Georg Comello, The Netherlands
DAH	24	Haakon Dahle, Norway
DAN01	21	Jorgen Danielsson, Sweden
DEA		Vicente Ferreira de Assis Neto, Brazil
*DIA		Francisco Garcia Diaz, Spain
GAS		C. Martin Gaskell, OK, U.S.A.
GRA04	24	Bjoern Haakon Granslo, Norway
HAS02		Werner Hasubick, Germany
HAS07	16	Akie Hashimoto, Japan
HAV		Roberto Haver, Italy
HAY01	16	Hironori Hayashi, Japan
ISH02	16	Akiyoshi Ishikawa, Japan
JAH		Jost Jahn, Germany
JON	09	Albert F. Jones, New Zealand
KAN	16	Kiyotaka Kanai, Japan
KAR02	21	Timo Karhola, Sweden
KOR01		Valeriy L. Korneyev, Zelenograd, Russia
KOS	31	Attila Kosa-Kiss, Romania
KRY01	17	Timur Valer'evich Kryachko, Russia
LEV		David Levy, AZ, U.S.A.
LOO01		Frans R. van Loo, Belgium
MAR02		Jose Carvajal Martinez, Spain

CODE	S	OBSERVER, LOCATION
MID01	24	Oernulf Midtskogen, Norway
MIK		Herman Mikuz, Slovenia
MOD		Robert J. Modic, OH, U.S.A.
MOE		Michael Moeller, Germany
NAK01	16	Akimasa Nakamura, Japan
NAK06	16	Yuuzi (Yuji) Nakamura, Japan
NON		Gary T. Nowak, VT, U.S.A.
OKA02	16	Masanori Okada, Japan
OKA03	16	Akio Oka, Japan
OLE	18	Arkadiusz Olech, Poland
ONO	16	Osamu Onodera, Japan
PAR03	18	Mieczyslaw Paradowski, Poland
PEA	14	Andrew R. Pearce, Australia
ROD01		Diego Rodriguez, Spain
SCH04	11	A. H. Scholten, The Netherlands
SEA	14	David A. J. Seargent, Australia
SEA01	14	John Seach, Australia
SHU	26	Sergey Shurpakov, Russia
SPE01	18	Jerzy Speil, Poland
SPR		C. E. Spratt, BC, Canada
TAN01	16	Kunihiko Taniguchi, Japan
TOM	16	Akira Tominaga, Japan
TOM01		Maura Tombelli, Italy
VIE		Jean-Francois Viens, Quebec, Canada
WAR01	21	Johan Warell, Sweden
WES04	18	Tomasz Weselak, Poland
YAS	16	Masanori Yasuki, Japan
ZAN		Mauro Vittorio Zanotta, Italy
ZHU		Sergey Valentinowich Zhuiko, Russia

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Comet Bradfield 1980 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 04.36	B	4.0	S	8.0	B		15					KAN
1981 01 05.36	B	4.3	S	5.0	B		7			2.2		KAN
1981 01 07.37	B	5.1	S	5.0	B		7			3		KAN
1981 01 07.38	S	5.0	S	15	L	6	28			0.6	60	TAN01
1981 01 08.36	B	5.1	S	5.0	B		7			3.6		KAN
1981 01 08.38	B	4.9	S	7.0	B		10		9	3		ISH02
1981 01 08.38	S	5.5	S	15	L	6	28	2	8	1.4	60	TAN01
1981 01 10.36	S	5.6	S	15	L	6	28	2	8	1.1	80	TAN01
1981 01 10.37	B	5.3	S	5.0	B		7			2.9		KAN
1981 01 10.38	B	5.3	S	7.0	B		10		9	2.5		ISH02
1981 01 11.37	S	6.2	S	15	L	6	28	2	8	0.6	60	TAN01
1981 01 11.38	B	5.6	S	5.0	B		7			4.0		KAN
1981 01 11.38	B	5.8	S	7.0	B		10		8	3		ISH02
1981 01 12.37	S	6.5	S	15	L	6	28	3	8	0.7	60	TAN01
1981 01 13.37	S	4.9	S	15	L	6	28	3	8	0.7	60	TAN01
1981 01 13.38	B	4.6	S	7.0	B		10					KAN
1981 01 13.38	B	4.7	S	7.0	B		10		9	3.5		ISH02
1981 01 14.37	B	4.6	S	5.0	B		7			4.0		KAN
1981 01 14.38	B	4.7	S	7.0	B		10		8	4		ISH02
1981 01 14.38	S	5.2	S	15	L	6	28	4	8	1.1	70	TAN01
1981 01 16.37	S	5.5	S	15	L	6	28	4	8	0.5	60	TAN01
1981 01 16.38	B	4.9	S	7.0	B		10		8	3		ISH02
1981 01 16.39	B	4.9	S	5.0	B		7			2.9		KAN
1981 01 17.38	B	5.5	S	7.0	B		10			2.4		KAN
1981 01 17.39	S	5.8	S	15	L	6	28	3	7	0.8	50	TAN01
1981 01 20.38	B	6.9	S	7.0	B		10			0.17		KAN
1981 01 20.39	B	6.6	S	7.0	B		10		7	0.5		ISH02
1981 01 20.39	S	7.6	S	15	L	6	28	3	7			TAN01
1981 01 21.37	B	7.3	S	8.0	B		15			&0.13		KAN
1981 01 22.39	S	6.9	S	15	L	6	28	4	7	0.2	50	TAN01
1981 01 22.40	B	7.1	S	8.0	B		15			1.2		KAN
1981 01 23.39	S	6.8	S	15	L	6	28	4	7	0.08		TAN01
1981 01 25.37	B	7.7	S	8.0	B		15			0.83		KAN
1981 01 26.39	B	7.9	S	8.0	B		15			1.2		KAN
1981 01 26.39	S	7.5	S	15	L	6	28	3.5	6	0.07		TAN01
1981 01 27.38	B	7.9	S	8.0	B		15			1		KAN

Comet Bradfield 1980 XV [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 27.38	S	7.1	S	15	L	6	28	3.5	5	0.07		TAN01
1981 01 28.38	B	7.5	S	8.0	B		15			0.17		KAN
1981 01 28.39	S	7.7	S	15	L	6	50	3.5	5			TAN01
1981 01 29.40	B	7.9	S	8.0	B		15			0.25		KAN
1981 01 30.39	B	8.1	S	8.0	B		15					KAN
1981 01 30.39	S	7.8	S	15	L	6	28	3	5			TAN01
1981 01 31.38	S	8.5	S	15	L	6	50					TAN01
1981 02 02.39	I	8.5	S	8.0	B		15					KAN
1981 02 02.39	S	9.0	S	15	L	6	50	2	5			TAN01

Comet Bradfield 1987 XXIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 13.06	S	6.4	SC	14.0	N	4	28			0.2	90	WAR01
1987 10 20.14	S	6 :	SC	14.0	N	4	28	5		0.2	80	WAR01
1987 10 30.87	S	5.3	SC	14.0	N	4	28			0.3	90	WAR01
1987 10 31.11	S	5.3	SC	14.0	N	4	28			0.2	70	WAR01
1987 12 21.09	S	5.5	SC	14.0	N	4	28	10		0.3		WAR01

Comet Liller 1988 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 06.16	S	4 :	SC	3.5	B		7	10		0.4	250	WAR01

Comet Okazaki-Levy-Rudenko 1989 XIX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 09 20.44	B	8.9	S	12.0	B		20	6	5			HAS07
1989 09 23.46	B	8.6	S	12.0	B		20	4	4	0.12		NAK06
1989 10 04.44	B	7.9	S	12.0	B		20	3.5	5	0.22		NAK06
1989 10 08.41	B	8.6	S	12.0	B		20	6	7			HAS07
1989 10 09.39	S	7.5	S	10.0	B		14		4			ABE01
1989 10 09.39	S	8.3	S	12	L	6	40	5	3			HAY01
1989 10 09.40	B	8.5	S	12.0	B		20	6	7			HAS07
1989 10 17.38	B	7.3	S	12.0	B		20	7	7			HAS07
1989 10 20.38	B	7.0	S	12.0	B		20	8	7			HAS07
1989 10 20.38	S	7.0	S	12	L	6	40	6	4			HAY01
1989 10 23.38	S	7.0	S	10.0	B		14		4			ABE01
1989 10 23.39	B	7.2	AA	12.0	B		20	6	7			HAS07
1989 10 29.37	S	6.2	S	7.0	B		16					HAY01
1989 10 29.83	S	6.6	S	10.0	B		14		4			ABE01
1989 11 01.82	S	6.5	S	10.0	B		14		5			ABE01
1989 11 02.83	B	6.6	S	3.5	B		7					OKA02
1989 11 02.83	S	6.0	AA	7.0	B		16	5	5/	0.5		HAY01
1989 11 02.84	B	6.6	S	12.0	B		20	5	6/			HAS07
1989 11 02.84	M	6.4	S	10.0	B		20	3	8			OKA03
1989 11 04.80	B	6.2	S	10.0	B		14		5	0.5		ABE01
1989 11 09.83	S	5.3	AA	15	L	5	38	4	6			ONO
1989 11 09.84	M	6.0	AA	10.0	B		20	3	7	1	330	OKA03
1989 11 10.82	B	6.3	S	3.5	B		7			0.5		OKA02
1989 11 10.82	S	6.3	S	12	L	6	40	4	5	0.25		HAY01
1989 11 10.84	M	6.0	AA	10.0	B		20	3	7	1.5	330	OKA03
1989 11 11.81	S	6.0	S	10.0	B		20	4	6	1		HAY01
1989 11 11.82	S	6.2	AA	10.0	B		14		4			ABE01
1989 11 16.19	S	5.9	SC	15.0	L	8	67	2		0.10	300	WAR01
1989 11 18.81	S	6.2	AA	10.0	B		14		6	0.3		ABE01
1989 11 18.82	B	5.9	AA	12	L	6	40	4	4/	0.67		HAY01
1989 11 19.82	B	5.9	AA	12	L	6	40	4	5	0.33		HAY01
1989 11 19.82	S	6.2	AA	10.0	B		14		5			ABE01

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

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 11 20.82	S	6.3	AA	10.0	B		14		6	2		ABE01
1989 11 20.83	B	6.2	AA	12	L	6	40	6	4	0.33		HAY01
1989 11 21.82	B	5.5	AA	3.5	B		7					OKA02
1989 11 21.82	B	5.8	AA	12	L	6	40	5	5	0.33		HAY01
1989 11 22.82	S	6.1	AA	10.0	B		14		5			ABE01
1989 11 22.84	B	6.0	AA	12.0	B		20	5	5	<0.5		HAS07
1989 11 24.85	M	5.5	AA	10.0	B		20	5	6			OKA03
1989 11 25.80	S	6.0	S	10.0	B		14		6	0.2		ABE01
1989 11 25.83	B	5.4	AA	3.5	B		7			1		OKA02
1989 11 25.85	M	5.5	AA	10.0	B		20	5	6	2	290	OKA03
1989 11 27.85	B	6.0	AA	12	L	6	40	6	4/	0.25		HAY01
1989 11 28.81	S	6.2	AA	10.0	B		14		5	0.2		ABE01
1989 11 28.84	S	6.3	AA	12	L	6	40	5	4			HAY01
1989 11 29.83	B	6.2	AA	12	L	6	40	7	4	0.25		HAY01
1989 11 30.83	S	6.2	AA	10.0	B		14		4	1.5		ABE01
1989 11 30.84	S	6.5	AA	12	L	6	40	6	4			HAY01
1989 12 02.83	S	6.5	S	10.0	B		14		4			ABE01

Comet Aarseth-Brewington 1989 XXII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 11 19.37	S	8.6	S	10.0	B		14	3	2			ABE01
1989 11 20.39	S	8.6	S	10.0	B		14	2	2			ABE01
1989 11 26.35	S	8.5	AA	15	L	5	38	2	7			ONO
1989 11 30.84	S	7.5	S	10.0	B		14	5	4	0.2		ABE01
1989 12 02.84	S	7.3	S	10.0	B		14	5	4			ABE01
1989 12 03.85	S	7.1	AA	12	L	6	40	3	3			HAY01
1989 12 04.85	S	6.9	S	10.0	B		14	7	5			ABE01
1989 12 08.86	S	6.0	S	12	L	6	40	3	4			HAY01
1989 12 09.85	B	6.2	S	12	L	6	40	3	4	0.17		HAY01
1989 12 09.86	S	5.8	S	10.0	B		14		7	0.3		ABE01
1989 12 09.87	B	5.8	AA	12.0	B		20	5	6			HAS07
1989 12 11.85	S	5.5	S	10.0	B		14		7	0.3		ABE01
1989 12 11.85	S	5.8	S	12	L	6	40	3	4	0.5		HAY01
1989 12 12.85	S	5.0	AA	10.0	B		14		7	0.2		ABE01
1989 12 14.86	B	5.4	S	12	L	6	40	3	5	0.5		HAY01
1989 12 15.85	B	5.0	S	12	L	6	40	3	6			HAY01
1989 12 15.86	S	4.9	AA	2.1	B		7	5	6	1		ABE01
1989 12 16.86	B	4.6	S	12	L	6	40	3	6	0.75		HAY01
1989 12 19.86	S	4.5	AA	10.0	B		14		7	1.5		ABE01
1989 12 20.88	B	3.5	AA	3.5	B		7					OKA02

Comet Austin 1990 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 02.04	B	5.0	S	5.0	B		10		4/			OLE
1990 05 02.05	B	4.9	S	6.0	B		20		4			OLE
1990 05 03.03	B	5.1	S	5.0	B		10		5			OLE
1990 05 03.04	B	5.1	S	6.0	B		20		4/			OLE
1990 05 03.05	B	5.1	S	3.0	B		8		5			OLE
1990 05 04.01	B	5.0	S	6.0	B		20		4/			OLE
1990 05 04.01	B	5.1	S	5.0	B		10		5			OLE
1990 05 05.01	B	5.2	S	5.0	B		10		4			OLE
1990 05 05.02	B	5.3	S	6.0	B		20		4			OLE
1990 05 08.03	B	5.6	S	5.0	B		10		4/			OLE
1990 05 10.03	B	5.9:	S	6.0	B		20		5			OLE
1990 05 16.01	B	5.9	S	5.0	B		10		3			OLE
1990 05 16.02	B	6.0	S	6.0	B		20		3/			OLE
1990 05 16.98	B	6.0	S	6.0	B		20		3			OLE

Comet Austin 1990 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 05 19.97	B	6.1	S	5.0	B		10		3/			OLE
1990 06 04.70	B	7.0	S	5	R	4	10	15	3			KRY01
1990 06 04.70	B	7.1	S	12	R	15	32	15	5	2.5	320	KRY01

Comet Skorichenko-George 1990 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 03 19.45	B	8.6	S	5	R	4	10	4	5			KRY01
1990 03 28.46	B	9.0	S	5	R	4	10	4	4			KRY01

Comet Levy 1990 XX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1990 06 04.71	B	10.3	BD	12	R	15	32	2	2			KRY01
1990 06 22.69	B	9.6	S	12	R	15	32	4	4			KRY01
1990 06 26.70	B	9.3	S	12	R	15	32	5	5			KRY01
1990 06 27.68	B	9.0	S	12	R	15	32	5	4			KRY01
1990 07 04.72	B	7.9	S	12	R	15	32	5	5			KRY01
1990 07 18.60	B	7.1	S	12	R	15	32	7	6			KRY01
1990 07 22.57	B	7.0	S	12	R	15	32	8	8			KRY01

Comet McNaught-Hughes 1990g

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 04 21.68	S	13.5	VN	41	L	4	200	0.8	2			PEA
1991 04 23.75	S	13.5	VN	41	L	4	200		1/			PEA
1991 05 12.54	S	13.5	VN	41	L	4	200	0.8	2			PEA
1991 05 16.55	S	13.6	VN	41	L	4	200					PEA

Comet Shoemaker-Levy 1991d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 06 05.13	S	[13.0	GA	35.9	L	7	164	! 0.5				MOD
1991 06 06.12	S	[13.5	GA	40	L	7	190	! 0.5				MOD
1991 10 18.44	S	12.8:	GA	35.9	L	7	85	0.7	2			MOD
1991 10 21.41	M	12.6	GA	35.9	L	7	85	0.7	5			MOD
1991 11 05.45	M	12.2	GA	35.9	L	7	85	0.9	4			MOD
1991 11 10.46	M	11.8	GA	35.9	L	7	85	0.9	4			MOD
1991 11 15.15	S	12.1:	NP	25.2	L	4	140	1.8	1/			KOR01
1991 11 16.19	S	10.8	A	20.0	T	10	77	& 2.5	3			COM
1991 11 17.47	M	11.7	GA	35.9	L	7	85	0.80	5			MOD
1991 11 26.16	S	11.9:	NP	25.2	L	4	98	1.4	1			KOR01
1991 12 02.10	S	11.4	NP	25.2	L	4	98	2.1	1/			KOR01
1991 12 03.15	S	11.3	NP	25.2	L	4	98	2.1	1			KOR01
1991 12 06.22	S	10.3	A	20.0	T	10	77	& 1.5	4			COM
1991 12 10.21	S	10.3	A	20.0	T	10	77	& 1.5	3/			COM
1991 12 11.19	S	10.2	A	20.0	T	10	77	2	3			COM
1991 12 11.47	M	10.9	GA	40	L	7	100	1.1	5	0.03	280	MOD
1991 12 11.48	M	10.9	GA	20.0	L	5	35	1.5	4			MOD
1991 12 15.20	S	10.5	A	20.0	T	10	77	& 1.5	2/			COM
1991 12 16.15	S	10.8	NP	25.2	L	4	98	3.2	2			KOR01
1991 12 29.15	S	10.5	NP	25.2	L	4	70	3.5	2/			KOR01
1991 12 30.12	S	10.5	NP	25.2	L	4	70	2.9	2			KOR01
1991 12 31.13	S	10.4	NP	25.2	L	4	70	2.7	2			KOR01
1991 12 31.48				40	L	7	100	1.0	5	0.03	305	MOD
1992 01 01.15	S	10.4	NP	25.2	L	4	70	2.7	2			KOR01
1992 01 04.12	S	10 :	A	18.7	L	5	38	& 3	2			SHU
1992 01 05.14	S	10.3	NP	25.2	L	4	70	3.3	3			KOR01
1992 01 06.14	S	10.3	NP	25.2	L	4	70	3.4	2/			KOR01

Comet Shoemaker-Levy 1991d [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 08.47	M	11.2:	GA	20	L	5	68	1.2	4			MOD
1992 01 11.15	S	10.2	AA	25.2	L	4	70	4.5	2/			KOR01
1992 01 12.46	M	11.0	GA	35.9	L	7	85	1.1	5	0.01	302	MOD
1992 01 12.48	M	10.9	GA	20.0	L	5	68	1.2	5			MOD
1992 01 13.14	S	10.3	NP	25.2	L	4	70	4.3	2			KOR01
1992 01 13.14	S	10.5	A	18.7	L	5	38	3	2			SHU
1992 01 15.15	S	10.3	NP	25.2	L	4	70	4.0	2			KOR01
1992 01 16.17	S	10.9	AC	20.0	L	4	40	& 7	5			MIK
1992 01 16.50	S	10.2	AC	40.6	L	5	53	3.5	4		90	LEV
1992 01 19.03	S	10.3	NP	20	C	15	45	3.5	2			KOR01
1992 01 20.05	S	10.3	NP	25.2	L	4	70	3.3	2			KOR01
1992 01 25.74	S	10.5	NP	25.2	L	4	98	2.4	2			KOR01
1992 01 26.08	S	10.9	AC	20.3	T	10	80	2.0	5			DAH
1992 01 26.08	S	10.9	AC	20.3	T	10	80	2.0	5			DAH
1992 01 26.74	S	10.6	NP	25.2	L	4	98	2.1	1/			KOR01
1992 01 30.74	S	10.9	NP	25.2	L	4	98	1.8	2			KOR01
1992 01 30.83	S	10.8	AC	20.3	T	10	100	1.5	3/			GRA04
1992 01 31.74	S	11.0	NP	25.2	L	4	140	1.6	2			KOR01
1992 02 03.18	S	11.3	AC	20.0	L	4	40	& 3	5			MIK
1992 02 06.47	M	10.6	GA	20.0	L	5	35	1.9	3			MOD
1992 02 10.44	S	11.1	GA	20.0	L	5	35	1.7	2			MOD
1992 02 10.45	M	11.5	GA	35.9	L	7	85	1.3	5			MOD
1992 02 11.50	S	11.5	NP	30.3	C	15	160	1.4	2			KOR01
1992 02 12.50	S	11.6	NP	30.3	C	15	160	1.4	1			KOR01
1992 02 14.51	S	11.9	NP	30.3	C	15	160	1.4	1			KOR01
1992 02 18.09	S	12.1	NP	25.2	L	4	140	1.3	1			KOR01
1992 03 05.12	S	11.2	AC	25	L	4	53	2	3			LOO01
1992 03 07.19	S	10.7	AC	25	L	4	53	3	3			LOO01
1992 03 09.18	S	12.0:	AC	35.5	T	11	80	& 3	5			MIK
1992 03 11.18	S	11.5	AC	25	L	4	53	1.5	3			LOO01
1992 04 05.12	S	11.2	AC	25	L	4	53	2	4			LOO01

Comet Helin-Lawrence 1991l

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 04 11.26	S[	14.7	GA	40	L	7	190	! 0.5				MOD
1991 04 18.19	S[	14.4	GA	40	L	7	190	! 0.5				MOD
1991 05 08.26	S[	13.8	GA	35.9	L	7	164	! 0.5				MOD
1991 05 10.19	S[	14.1	GA	35.9	L	7	164	! 0.5				MOD
1991 05 11.18	S	14.0	GA	40	L	7	100	0.45	2			MOD
1991 05 12.55	S	13.6	VN	41	L	4	200	0.7	2			PEA
1991 05 16.56	S	13.6	VN	41	L	4	200		2			PEA
1991 06 02.15	S[	13.7	GA	40	L	7	190	! 0.5				MOD
1991 06 03.14	S[	14.0	GA	40	L	7	190	! 0.5				MOD
1991 06 05.15	S[	14.3	GA	35.9	L	7	164	! 0.5				MOD
1991 06 06.14	S[	14.4	GA	40	L	7	190	! 0.5				MOD
1991 06 07.15	S[	14.4	GA	40	L	7	190	! 0.5				MOD
1991 06 13.14	S	14.8	GA	40	L	7	190	0.25	1			MOD
1991 06 14.14	S	14.4	GA	40	L	7	190	0.30	2			MOD

Comet Shoemaker-Levy 1991a1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 20.75	I[	13.5	NP	25.2	L	4	140					KOR01
1992 01 25.75	S	13.4:	NP	25.2	L	4	244	0.7	3			KOR01
1992 01 27.70	S	13.4:	NP	25.2	L	4	244	0.7	3			KOR01
1992 01 29.77	C	15.0	S	19.0	T	4		0.33	9	0.03	80	MIK
1992 01 31.73	S	13.4:	NP	25.2	L	4	244	0.7	2/			KOR01
1992 02 07.83	C	14.5	S	19.0	T	4		0.42	9			MIK

Comet Shoemaker-Levy 1991a1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 02 08.80	C	14.7	S	19.0	T	4		0.33	9	0.02	70	MIK
1992 02 11.51	S	13.2	NP	30.3	C	15	225	0.9	2			KOR01
1992 02 12.52	S	13.2	NP	30.3	C	15	225	0.9	2/			KOR01
1992 02 14.52	S	13.1	NP	30.3	C	15	225	1.2	3			KOR01
1992 02 18.07	S	13.0	NP	25.2	L	4	244	1.3	2/			KOR01
1992 02 19.75	C	14.3	S	19.0	T	4		0.5	9	&0.02	45	MIK
1992 02 26.08	S	12.8	NP	25.2	L	4	244	1.3	2			KOR01
1992 02 27.08	S	12.8	NP	25.2	L	4	244	1.3	2			KOR01
1992 03 04.09	S	12.7	NP	29.0	C	17	247	1.4	1			KOR01
1992 03 07.09	S	12.6	NP	29	C	17	247	1.5	1/			KOR01
1992 03 08.09	S	12.6	NP	29	C	17	247	1.5	1/			KOR01
1992 03 09.10	S	12.6	NP	29	C	17	247	1.5	1/	0.02		KOR01
1992 03 14.11	S	12.3	NP	29	C	17	196	1.5	2			KOR01
1992 03 15.11	S	12.3	NP	29	C	17	196	1.7	2	0.03		KOR01
1992 03 16.11	S	12.2	NP	29	C	17	196	1.7	2	0.04		KOR01
1992 03 19.10	S	12.5	GA	29	C	17	196	1.4	2	0.02		KOR01
1992 03 20.10	S	12.5	GA	29	C	17	196	1.4	2	0.02		KOR01
1992 03 21.09	S	12.4	GA	29	C	17	196	1.3	2	0.03		KOR01
1992 03 22.10	S	12.4	GA	29	C	17	196	1.3	2/	0.03		KOR01
1992 03 28.10	S	12.2	GA	29	C	17	196	1.5	2/	0.04		KOR01
1992 03 29.08	S	12.1	GA	30.0	L	5	154	1.5	2	0.02		KOR01
1992 03 30.08	S	12.1	GA	30.0	L	5	154	1.6	2	0.02		KOR01
1992 03 31.09	S	12.0	GA	30.0	L	5	154	1.6	2	0.02		KOR01
1992 04 01.09	S	11.9	GA	30.0	L	5	154	1.6	2	0.03		KOR01
1992 04 04.09	S	11.9	GA	30.0	L	5	154	1.6	2	0.04	320	KOR01

Comet Zanotta-Brewington 1991g1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 23.76	I	9 :		15.5	L	5	25	& 4	4			ZAN
1991 12 24.71	I	9 :		15.5	L	5	25	4	4			ZAN
1991 12 25.71	S	9.6	AC	33	L	4	50	3	3/			BOA
1991 12 25.72	S	9.6	AA	8.0	B		15	3.5	3			HAV
1991 12 25.75	S	9.5	AC	8.0	B		20	2.4	2/			CAV
1991 12 25.77				50	L	6	93		4	0.1	41	CAV
1991 12 26.79	M	10.0:	S	30.0	L	5						ROD01
1991 12 27.75	S	9.4	AC	8.0	B		20					CAV
1991 12 28.01	M	10.4	GA	20.0	L	5	35	1.6	2			MOD
1991 12 28.71	S	9.4	AC	33	L	4	50	3.5	3/			BOA
1991 12 28.72	S	9.4	AC	33	L	4	50		4			TOM01
1991 12 28.73	S	9.1	AA	8.0	B		15	5	3/	?	45	HAV
1991 12 29.71	S	9.2	AC	33	L	4	50	3.5	3			BOA
1991 12 29.72	S	9.2	AC	44	L	4	50		3/			TOM01
1991 12 29.74	S	9.1	AC	8.0	B		20	2.5	3/			CAV
1991 12 29.76	S	9.1	AA	8.0	B		20	4	3			ZAN
1991 12 30.67	S	9.3	AC	20.3	T	10	133	3.1	4			DAH
1991 12 30.70	S	8.5:	SC	8.0	B	4	20	2.5	5			DAN01
1991 12 30.72	S	9.1	AC	33	L	4	50	4	2/			BOA
1991 12 30.73	S	8.9	AC	44	L	4	50		4			TOM01
1991 12 30.73	S	9.0	AA	8.0	B		20	4	4/			ZAN
1991 12 31.72	S	8.8	AC	10.0	B		25	2.1	4			HAS02
1992 01 01.72	S	8.8	AC	10.0	B		25	3.0	4			HAS02
1992 01 01.72 !	S	9.0	V	20.3	T	10	133	2.8	6			DAH
1992 01 02.72	S	8.8	AC	10.0	B		25	2.5	4			HAS02
1992 01 02.72	S	8.9	AC	8.0	B		15		3/			TOM01
1992 01 02.73	S	8.6	AA	8.0	B		15	5	4	0.10	40	HAV
1992 01 02.73	S	8.9	AA	8.0	B		15	4	3/			BOA
1992 01 03.74	S	8.7	AA	8.0	B		40	5	3	0.3	25	BAR
1992 01 03.75	S	8.6	AA	8.0	B		15	4.5	4	0.3	40	HAV

Comet Zanotta-Brewington 1991g1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 03.75	S	8.6	AC	8.0	B		11		3/			TOM01
1992 01 03.81	M	8.9	S	30.0	L	5	75	3.5	4			MAR02
1992 01 04.70	B	8.6	S	15.2	L	5	44	7.5	4	0.3	40	MOE
1992 01 04.73	S	8.8	S	15.2	L	5	100	6	4			MOE
1992 01 04.75	S	8.6	AA	8.0	B		20	5	4			ZAN
1992 01 04.79	M	8.9	S	30.0	L	5	125	2.8	4	0.08	310	MAR02
1992 01 05.13	S	8.9	AA	20.0	T	10	64	4.5	3			SPR
1992 01 05.64	B	8.3	AA	6.0	R	5	20	6	4/			KOR01
1992 01 05.65	S	8.4	AA	12.0	R	5	20	8	4	0.15		KOR01
1992 01 05.67	S	8.4	AA	25.2	L	4	35	7.6	4/	0.18		KOR01
1992 01 05.72	S	8.4	AA	8.0	B		20	6	4/			ZAN
1992 01 05.72	S	8.7	AC	20.3	T	10	80	2.3	4			DAH
1992 01 05.74	S	8.4	AA	8.0	B		15	4.5	4/	0.2	40	HAV
1992 01 05.74	S	8.4	AC	8.0	B		11		4			TOM01
1992 01 05.77	M	8.8	S	30.0	L	5				0.17	40	ROD01
1992 01 06.12	S	8.9	AA	20.0	T	10	64	4.5	4			SPR
1992 01 06.62	S	8.4	A	18.7	L	5	38	5	4			SHU
1992 01 06.65	S	8.2	AA	12.0	R	5	20	& 9	4	0.20		KOR01
1992 01 06.65	S	8.3	AA	25.2	L	4	35	8.4	4	0.25		KOR01
1992 01 06.75	S	8.4	AA	8.0	B		20	6	4/			ZAN
1992 01 07.66	S	8.2	AA	25.2	L	4	35	9.5	5	0.2		KOR01
1992 01 08.97	S	8.5	S	25.4	L	6	57		3			VIE
1992 01 09.72	S	8.2	AC	20.3	T	10	80	3.4	5			DAH
1992 01 10.73	S	8.4	AC	15.2	L	5	44	8.5	5	0.3	50	MOE
1992 01 10.74	S	8.3	AA	10.0	B		14	& 3	6			LOO01
1992 01 11.98	B	7.5	AA	20	L	6	37	10	2			NOW
1992 01 11.98	S	8.4	S	25.4	L	6	57		3			VIE
1992 01 12.01	M	9.7	GA	20.0	L	5	68	1.5	3			MOD
1992 01 12.13	S	8.4	AA	14.0	S	4	28	4	4			SPR
1992 01 12.64	S	8.1	A	18.7	L	5	38	& 5	3			SHU
1992 01 12.72	S	7.7	AA	8.0	B		20	5	5/			ZAN
1992 01 12.75	S	8.6:	AC	15.2	L	5	44	6.5	5			MOE
1992 01 13.66	S	8.3	A	18.7	L	5	38	4	4			SHU
1992 01 13.73	S	7.6	AA	8.0	B		20	6	6			ZAN
1992 01 14.50	S	7.7	AA	8.0	B		15					SEA01
1992 01 14.65	S	8.2	A	18.7	L	5	38	4	3			SHU
1992 01 14.73	S	7.6	AA	8.0	B		20	6	5			ZAN
1992 01 15.04	M	9.8	GA	20.0	L	5	68	1.4	2			MOD
1992 01 15.73	S	7.5	AA	8.0	B		20	6	5			ZAN
1992 01 16.73	S	7.5:	SC	20.3	T	10	133	3.1	5			DAH
1992 01 16.74	S	7.4	AA	8.0	B		20	6	5/			ZAN
1992 01 17.73	S	7.3	AA	8.0	B		20	6	6			ZAN
1992 01 18.67	S	7.8	AA	6.0	B		15	7	4			KOR01
1992 01 18.71	S	7.7	AA	11	L	7	32	7.5	4			KOR01
1992 01 19.66	B	7.7	AA	5.0	B		7	10	4			KOR01
1992 01 19.66	S	7.7	AA	12	R	5	20	7	4			KOR01
1992 01 19.96	S	8.2	S	25.4	L	6	57		3			VIE
1992 01 20.11	S	7.2	AA	20.0	T	10	64	3.5	5			SPR
1992 01 20.70	S	7.8	AC	15.2	L	5	44	5.5	6			MOE
1992 01 20.73	B	8.6	AA	20.4	L	6	35					JAH
1992 01 20.73	S	8.3	AA	20.4	L	6	35	3.2	4			JAH
1992 01 20.98	S	8.2	S	25.4	L	6	57		4			VIE
1992 01 21.71	S	7.8	AC	15.2	L	5	44	6.5	6	0.5	60	MOE
1992 01 21.71	S	8.1	AC	15.2	L	5	100	5.5	6			MOE
1992 01 21.74	B	8.6	AA	20.4	L	6	35					JAH
1992 01 21.74	B	8.9	PP	20.4	L	6	35					JAH
1992 01 21.74	S	8.3	AA	20.4	L	6	35	& 4	4		25	JAH
1992 01 22.72	S	8.4	AC	48.5	L	4	120	4	5	0.3	60	MOE
1992 01 22.80	S	6.9:	AA	25.5	L	4	77	& 4.5	3			DIA

Comet Zanotta-Brewington 1991g1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 22.97	S	7.8	S	25.4	L	6	57		4			VIE
1992 01 23.71	S	7.9	AC	15.2	L	5	44	& 3.5	5	0.3	60	MOE
1992 01 24.81	S	7.0	AA	25.5	L	4	77	& 4	3	&0.1	47	DIA
1992 01 25.07	I	7.8:	UM	25	L	8	107					GAS
1992 01 25.66	B	7.3	AA	5.0	R	4	7	8	4			KOR01
1992 01 25.66	S	7.2	AA	20	R	15	60	7.5	4			KOR01
1992 01 25.81	M	7.6	S	30.0	L	5	125	1.1	6	0.1	30	MAR02
1992 01 25.81	S	7.0	AA	25.5	L	4	77	& 3	3	&0.17	47	DIA
1992 01 25.97	S	7.7	S	25.4	L	6	57		4			VIE
1992 01 26.66	S	7.3	AA	25.2	L	4	35	7	4			KOR01
1992 01 26.75	S	7.7	S	8.0	B		20		6			CAV
1992 01 26.81	S	7.0	AA	25.5	L	4	77	& 3	3	&0.13	45	DIA
1992 01 26.97	S	7.7	S	25.4	L	6	57		4			VIE
1992 01 27.02	M	9.0	GA	20.0	L	5	35	1.3	5			MOD
1992 01 27.67	S	7.3	AA	25.2	L	4	35	8	3			KOR01
1992 01 27.72	S	8.9	AG	31.6	L	5		1.0	6			MID01
1992 01 28.80	S	7.0	AA	25.5	L	4	77	& 2.5	3	&0.1	45	DIA
1992 01 29.79	S	7.0:	AA	25.5	L	4	77		3			DIA
1992 01 30.73	S	7.9	AC	20.3	T	10	100	1.9	5			GRA04
1992 01 30.79	S	7.8	AA	25.5	L	4	77	& 2.5	2	&0.08	43	DIA
1992 01 31.67	S	7.6	AA	25.2	L	4	35	5	3			KOR01
1992 01 31.79	S	8.1:	AA	25.5	L	4	77	& 2.5	2	&0.07	43	DIA
1992 02 01.07	O	8.3	S	25	L	8	170	2.5				GAS
1992 02 01.45		7.3	SM	8.0	B		20	2	3			CAM03
1992 02 01.75	S	7.5	AC	8.0	B		11		3			TOM01
1992 02 01.79	S	8.4:	AA	25.5	L	4	77	& 2.5	2			DIA
1992 02 02.42	S	6.8	AA	5.0	B		10		2			SEA01
1992 02 02.42	S	7.0	AA	8.0	B		15		2			SEA01
1992 02 02.99	M	9.2	GA	35.9	L	7	85	1.1	4			MOD
1992 02 03.80	S	8.4	AA	25.5	L	4	77	& 2	2		43	DIA
1992 02 04.00	M	9.3	GA	20.0	L	5	35	1.2	3			MOD
1992 02 06.01	M	9.1	GA	35.9	L	7	85	1.3	4			MOD
1992 02 10.99	S	7.4	S	7.0	B		10	2.9	5			DEA
1992 02 26.43	S	9.2	AA	10.0	B		25	4	5			SEA
1992 03 05.42	S	9.8	AA	10.0	B		25					SEA

Comet Mueller 1991h1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 01 16.20	S	14.4:	AC	35.5	T	11	80	& 1	1			MIK
1992 01 26.04	S	12.4	AC	20.3	T	10	44	1.7	3			DAH
1992 01 26.86	S	13.2:	PC	25.2	L	4	140	0.7	6			KOR01
1992 01 27.06	S[	13.5	GA	35.9	L	7	164	! 1.0				MOD
1992 01 27.86	S	13.0:	PC	25.2	L	4	140	0.8	6			KOR01
1992 01 30.78	S	10.9	VF	20.3	T	10	100	3.5	1/			GRA04
1992 01 30.87	S	12.7	PC	25.2	L	4	140	1.2	5			KOR01
1992 01 31.86	S	12.6	PC	25.2	L	4	140	1.2	5			KOR01
1992 02 03.87	S	11.3:	AC	15.2	L	5	44	& 5	0			MOE
1992 02 04.07	S	12.1	GA	35.9	L	7	85	1.5	1			MOD
1992 02 06.12	S	11.8	GA	35.9	L	7	85	2.0	3			MOD
1992 02 06.16	S	11.3	GA	20.0	L	5	35	2.2	1			MOD
1992 02 07.88	S	10.6	AC	20.0	L	4	40	& 7	3			MIK
1992 02 09.83	S	11.0:	AC	15.2	L	5	44	& 4	1			MOE
1992 02 11.51	S	11.4	NP	30.3	C	15	160	1.7	4			KOR01
1992 02 12.51	S	11.3	NP	30.3	C	15	160	1.8	4			KOR01
1992 02 14.50	S	11.0	NP	30.3	C	15	160	2.3	3/			KOR01
1992 02 17.64	S	10.6	NP	25.2	L	4	140	2.7	3/			KOR01
1992 02 18.68	S	10.4	NP	25.2	L	4	70	2.9	4	0.2		KOR01
1992 02 18.78	S	8.3	AA	25	L	4	53	2.8	6			LOO01

Comet Mueller 1991h1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 02 19.03	M	9.7	GA	20.0	L	5	68	2.0	3			MOD
1992 02 19.78	S	9.2	AA	6.0	B		20	& 7	5			MIK
1992 02 21.96	B	8.5	S	7.0	B		10	6.8	5			DEA
1992 02 22.04	M	9.2	GA	20.0	L	5	35	3.3	3			MOD
1992 02 22.13	S	9.2	AA	40.6	L	5	53	5	2	0.5	80	LEV
1992 02 23.76	S	8.9	AC	15.2	L	5	44	5.5	4	0.3	80	MOE
1992 02 23.80	S	9.4	AC	20.3	T	10	80	1.5	5			DAH
1992 02 24.02	S	8.6	S	25.4	L	6	57		3			VIE
1992 02 24.07	M	8.3	AA	20	L	6	37	9	4			NOW
1992 02 24.79	S	8.3	AA	6.0	B		20	& 6	6			MIK
1992 02 25.76	S	8.9	AC	20.3	T	10	80	3.4	4			DAH
1992 02 26.69	S	9.4	AA	25.2	L	4	70	3.4	4	0.4		KOR01
1992 02 27.69	S	9.3	AA	25.2	L	4	70	3.5	4	0.4		KOR01
1992 02 28.78	S	7.5	AA	12.0	B		20	2.8	6			LOO01
1992 02 29.77	S	7.9	AA	6.0	B		20	& 5	7			MIK
1992 02 29.78	S	7.6	AA	12.0	R		20	2.8	6			LOO01
1992 03 01.04	M	8.7	GA	35.9	L	7	85	1.7	5	0.03	80	MOD
1992 03 01.05	M	8.5	GA	20.0	L	5	35	2.5	4			MOD
1992 03 01.77	S	7.7	AA	10.0	B		14	3	6			LOO01
1992 03 02.00	S	8.0	S	25.4	L	6	57		4			VIE
1992 03 02.03				35.9	L	7	85	1.5	4	0.03	78	MOD
1992 03 02.05	M	8.8	GA	20.0	L	5	35	1.6	3			MOD
1992 03 03.68	S	8.6	AA	29.0	C	17	78	4.8	4	0.7		KOR01
1992 03 04.00	S	7.8	S	25.4	L	6	57		4			VIE
1992 03 05.03	S	9.3:	GA	35.9	L	7	85	1.1	3			MOD
1992 03 06.68	S	8.3	AA	29.0	C	17	78	4.9	5	0.6		KOR01
1992 03 07.69	S	8.2	AA	29.0	C	17	78	5.0	5	0.6		KOR01
1992 03 08.69	S	8.0:	AA	29.0	C	17	78	5.0	4	0.7	66	KOR01
1992 04 04.09	S	7.3	AA	30.0	L	5	55	12	5	1.4	293	KOR01

Comet Bradfield 1992b

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 02 13.65	S	10.1	GA	31.7	L	5	86	1	1			JON

Comet Tanaka-Machholz 1992d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1992 04 10.12	S	8.4	AA	6.0	B		20	& 5	5			MIK
1992 04 21.01	S	8.1	HD	20.3	T	10	80	3.2	4/			GRA04
1992 04 24.02	S	8.4	AG	20.3	T	10	123	3.1	4			GRA04
1992 04 26.00	S	8.2	AC	20.3	T	10	80	3.4	6			DAH
1992 04 26.03	S	8.3	AG	20.3	T	10	80	3.2	3/			GRA04
1992 04 30.02	S	8.2	HD	20.3	T	10	80	3.1	4			GRA04

Periodic Comet Machholz

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 07 24.06	S[	2.5	SC	20.0	L	5	35	! 1.0				MOD
1991 07 29.08	S[	6.0	SC	20.0	L	5	35	! 1.0				MOD
1991 07 31.09	S[	8.5	SC	20.0	L	5	35	! 1.0				MOD
1991 08 01.10	S	9.8	GA	35.9	L	7	85	0.9	2			MOD
1991 08 02.10	S	10.3	GA	35.9	L	7	85	1.0	3			MOD
1991 08 11.07	M	11.4	GA	20.0	L	5	35	1.4	3			MOD
1991 08 12.07	S	11.3	GA	20.0	L	5	35	1.6	3			MOD
1991 08 13.07	M	11.4	GA	20.0	L	5	35	1.4	3			MOD
1991 08 13.07	M	11.4	GA	20.0	L	5	68	1.2	4			MOD
1991 08 14.07	M	11.5	GA	20.0	L	5	68	1.3	3			MOD
1991 09 01.07	S[	13.5	GA	35.9	L	7	164	! 0.5				MOD

Periodic Comet Machholz [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 02.07	S	[13.7	GA	40	L	7	190	! 0.5				MOD
1991 09 05.06	S	[13.7	GA	40	L	7	190	! 0.5				MOD
1991 09 07.06	S	[13.3	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Wirtanen (1991s)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 12.76	S	9.9	AC	20	L	6	58	2.5	1/			NAK01
1991 08 13.75	S	10.0	AC	20	L	6	58	3	2/			NAK01
1991 08 19.11	S	10.6	A	25.0	L	4	53	1	6/			LOO01
1991 09 06.78	S	9.4	AC	20	L	6	58	4	3			NAK01
1991 09 07.41	M	10.6	GA	20.0	L	5	35	1.5	3			MOD
1991 09 08.12	S	10.1	A	25.0	L	4	53	1	7			LOO01
1991 09 09.76	S	9.8	AC	10.0	B		20	3	4			ISH02
1991 09 12.13	S	9.4	AA	25.0	L	4	53	1.7	4			LOO01
1991 09 12.13	S	10.0	A	11.0	L	7	32	& 4	0			SCH04
1991 09 14.13	S	10.5	A	28.0	T	10	88	& 1.5	3/			COM
1991 09 18.13	S	10.3	A	28.0	T	6	56		3			COM
1991 09 19.79	S	9.1	AC	20	L	6	46	3.5	4			NAK01
1991 09 21.14	S	9.3	A	25.0	L	4	53	4	3			LOO01
1991 10 08.43	M	10.4	GA	20.0	L	5	35	2.2	2			MOD
1991 10 10.10	S	10.0	AA	25.2	L	4	70	3	3			KOR01
1991 10 11.11	S	10.1	AA	25.2	L	4	70	3	3/			KOR01
1991 10 13.43	M	10.4	GA	20.0	L	5	35	2.8	2			MOD
1991 10 13.79	S	10.4	AC	20	L	6	58	3	3			NAK01
1991 10 13.79	S	10.5	AC	13	L	6	44	3	2			ISH02
1991 10 14.14	S	10.6	AA	25.0	L	4	53	1	6			LOO01
1991 10 17.11	S	10.6	NP	25.2	L	4	70	2.1	2			KOR01
1991 10 18.43	M	10.4	GA	20.0	L	5	35	2.1	3			MOD
1991 10 20.81	S	10.3	AC	20	L	6	58	2.5	2			NAK01
1991 11 03.10	S	10.9	NP	25.2	L	4	70	1.4	1			KOR01
1991 11 04.80	S	10.9	AC	20	L	6	58	3	1/			NAK01
1991 11 08.79	S	11.0	AC	13	L	6	88	2	2			ISH02
1991 11 10.42	M	11.3	GA	20.0	L	5	35	1.7	1			MOD
1991 11 10.43	M	11.8	GA	35.9	L	7	85	1.4	2			MOD
1991 11 10.80	S	11.0	AC	20	L	6	58	3.5	1			NAK01
1991 11 12.12	S	11.2	NP	25.2	L	4	98	1.1	1/			KOR01
1991 11 15.82	S	11.8	AC	20	L	6	106	2.2	2			NAK01
1991 11 17.45	M	11.9	GA	20.0	L	5	35	1.7	1			MOD
1991 11 17.45	M	12.5	GA	35.9	L	7	85	1.5	2			MOD
1991 12 11.44	M	13.7	GA	40	L	7	100	0.8	1			MOD

Periodic Comet Arend-Rigaux

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 08.40	S	[14.5	GA	35.9	L	7	164	! 0.5				MOD
1991 10 17.42	S	[14.7	GA	40	L	7	190	! 0.5				MOD
1991 10 18.42	S	14.7:	GA	40	L	7	190	0.2	4			MOD
1991 11 17.42	S	[14.7	GA	40	L	7	190	! 0.5				MOD
1991 11 17.42	S	[15.4	GA	40	L	7	190	! 0.2				MOD
1991 12 11.41	S	[15.2	GA	40	L	7	190	! 0.2				MOD
1992 01 12.44	S	[15.4	GA	40	L	7	248	! 0.2				MOD
1992 02 06.44	S	[15.2	GA	40	L	7	190	! 0.2				MOD
1992 03 01.39	S	[15.2	GA	40	L	7	190	! 0.2				MOD

Periodic Comet Wild 2 (1990 XXVIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 05 12.83	S	13.5	VN	41	L	4	200	0.6				PEA

Periodic Comet Wild 2 (1990 XXVIII) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 05 16.84	S	13.6	VN	41	L	4	200	0.4	3			PEA
1991 07 15.28	S	[13.0	NP	25.6	L	4	111					PEA

Periodic Comet Hartley 2 (1991t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 07 15.44	S	9.9	AA	8.0	B		20	6.5	2/			PEA
1991 07 18.72	S	10.1	AC	20	L	6	58	4.5	1			NAK01
1991 07 19.76	S	9.6	AC	12	L	7	44	4	3			YAS
1991 07 21.74	S	9.7	AC	20	L	6	58	4.5	1			NAK01
1991 07 22.78	S	9.6	AC	12	L	7	44	4.5	3			YAS
1991 07 23.71	S	9.5	AC	20	L	6	58	6	1			NAK01
1991 08 08.73	S	8.0	AA	10.0	B		20	4	3			ISH02
1991 08 09.05	S	8.6	AA	10.0	B		14	3	3			LOO01
1991 08 12.10	S	8.7	AA	8.0	B		15	6	3/	0.2	275	HAV
1991 08 12.73	S	8.6	AC	20	L	6	46	5	4			NAK01
1991 08 13.06	S	8.7	AA	8.0	B		15	6	4	0.25	270	HAV
1991 08 13.71	S	8.8	AC	20	L	6	46	6	4/		260	NAK01
1991 08 14.10	S	8.5	AA	8.0	B		15	5.5	4/	0.25	270	HAV
1991 08 14.71	S	8.5	AC	20	L	6	46	6.5	5			NAK01
1991 08 14.80	S	8.8	AA	12	L	7	44	5	4			YAS
1991 08 15.03	B	9.3	A	11	L	7	32	3.2	4			BAR06
1991 08 15.98	B	9.4	A	11	L	7	32	3.2	3			BAR06
1991 08 16.99	B	9.3	A	11	L	7	32	3.2	4			BAR06
1991 08 18.11	S	8.0	AA	12.0	B		20	4	3			LOO01
1991 08 19.06	S	7.9	AC	25	L	4	53	5	5			LOO01
1991 08 21.08	S	8.0	A	6.0	R	10	15	1.3	4			COM
1991 08 21.13	S	8.0	AA	12.0	B		20	3	6			LOO01
1991 08 22.07	S	8.4	AA	8.0	B		15	5	4/	0.2	270	HAV
1991 08 22.07	S	8.6	AA	11.0	L	7	32	4	5			SCH04
1991 08 22.11	S	8.0	AA	10.0	B		14	& 2.5	5/			LOO01
1991 09 01.11	S	7.8	A	11.0	L	7	32	4	5			SCH04
1991 09 04.85	S	7.8	AA	8.0	B		20	4	4/			PEA
1991 09 06.74	M	7.8	NP	20	L	6	46	6	5		290	NAK01
1991 09 08.12	S	8.2	AA	25	L	4	53	2	4			LOO01
1991 09 09.12	S	7.5	A	11.0	L	7	32	5	5			SCH04
1991 09 09.74	S	7.9	AA	10.0	B		20	4	5			ISH02
1991 09 09.82	S	7.5	AA	12	L	7	44	4.5	6			YAS
1991 09 09.87	S	7.7	AA	8.0	B		20	4	5			PEA
1991 09 10.87	S	7.8	AA	8.0	B		20	3.5	5			PEA
1991 09 12.12	S	7.5	A	11.0	L	7	32	7	6			SCH04
1991 09 12.13	S	7.4	AC	25	L	4	53	3	7			LOO01
1991 09 13.12	S	7.7	A	11.0	L	7	32	5	6			SCH04
1991 09 13.13	S	7.8	A	6.0	R	10	15	& 1.5	6			COM
1991 09 14.14	S	7.6	AA	5.0	B		10		7			LOO01
1991 09 15.82	S	8.1	AA	12	L	7	44	4.5	6			YAS
1991 09 15.87	S	8.1	AA	8.0	B		20	3.6	5			PEA
1991 09 18.11	S	8.3	A	6.0	R	10	15	& 1	5			COM
1991 09 18.86	S	8.2	AA	8.0	B		20	4	5			PEA
1991 09 19.13	S	7.8	A	6.0	R	10	15	& 1	6/	0.3	90	COM
1991 09 19.76	M	8.0	AC	20	L	6	46	5	5			NAK01
1991 09 19.87	S	8.3	AA	8.0	B		20	3	4/			PEA
1991 09 21.16	S	7.5	AA	25	L	4	53	2.5	7			LOO01
1991 09 28.78	S	8.3	AA	10.0	B		20	4	4			ISH02
1991 10 05.13	S	8.4	AA	8.0	B		15	6.5	5/	0.25	290	HAV
1991 10 05.42	M	8.8	AA	20.0	L	5	35	1.9	3			MOD
1991 10 07.83	S	8.5	AA	12	L	7	44	5.5	5			YAS
1991 10 07.84	S	8.3	AA	8.0	B		20	4	4			PEA
1991 10 08.42	M	8.4	AA	20.0	L	5	35	2.4	4			MOD

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

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 08.83	S	8.5	AA	8.0	B		20	3.5	4			PEA
1991 10 10.13	S	8.9	AA	25.2	L	4	70	5	4			KOR01
1991 10 11.13	S	8.9	AA	25.2	L	4	70	5.3	4			KOR01
1991 10 13.40				35.9	L	7	85	2.4	4	0.03	289	MOD
1991 10 13.41	M	8.7	GA	20.0	L	5	35	2.5	4			MOD
1991 10 13.44	M	8.6	GA	5.0	B		10	3.5	3			MOD
1991 10 13.76	S	8.4	AC	10.0	B		20	4	3			ISH02
1991 10 13.77	S	7.9	AC	20	L	6	46	5	5/			NAK01
1991 10 14.17	S	7.8	AA	25	L	4	53	2.5	4			LOO01
1991 10 15.83	S	8.5	AA	8.0	B		20	4.5	3			PEA
1991 10 16.83	S	8.8	AA	20	L	4	45	4	2			PEA
1991 10 17.14	S	8.5	AA	25.2	L	4	70	4.5	3			KOR01
1991 10 17.44	M	8.9	GA	20.0	L	5	35	2.7	3			MOD
1991 10 18.39	M	9.0	GA	20.0	L	5	35	2.6	4			MOD
1991 10 18.40	M	8.8	GA	5.0	B		10	3.0	3			MOD
1991 10 20.76	S	7.9	AC	20	L	6	46	4.5	5		290	NAK01
1991 10 22.44	M	9.1	GA	20.0	L	5	35	2.0	4			MOD
1991 11 01.09	S	10.0	AA	20.0	L	4	52	5	2			ZHU
1991 11 03.16	S	9.4	AA	25.2	L	4	70	3.3	3			KOR01
1991 11 03.78	S	8.6	AC	10.0	B		20	4.5	4			ISH02
1991 11 04.77	S	8.9	AC	20	L	6	46	4.5	3/			NAK01
1991 11 04.82	S	8.4	AC	10.0	B		20	6	3			ISH02
1991 11 05.81	M	10.2	AC	16	L	6	40	3	2			TOM
1991 11 08.78	S	8.7	AC	10.0	B		20	6	4			ISH02
1991 11 09.16	S	9.6	A	20.0	T	10	77	& 2	2/			COM
1991 11 09.45	M	9.4	GA	20.0	L	5	35	4.2	3			MOD
1991 11 10.40	M	9.5	GA	20.0	L	5	35	2.9	2			MOD
1991 11 10.41	M	9.4	GA	5.0	B		10	4.0	3			MOD
1991 11 10.77	S	9.1	AC	20	L	6	46	5.5	4			NAK01
1991 11 12.17	S	9.8	AA	25.2	L	4	70	3.7	2			KOR01
1991 11 15.77	S	8.9	AC	10.0	B		20	5	2			ISH02
1991 11 15.77	S	9.5	AA	20	L	6	46	5	3			NAK01
1991 11 16.18	S	10.0	A	20.0	T	10	77	& 2	2			COM
1991 11 16.80	S	10.3	AC	16	L	6	40	4	2			TOM
1991 11 16.81	S	10.0	AC	20	L	6	48	2.5	3			YAS
1991 11 17.44	M	10.7	GA	20.0	L	5	35	1.9	3			MOD
1991 11 18.82	S	10.4	AC	20	L	6	48	2.5	3			YAS
1991 12 04.78	S	10.2	AC	20	L	6	58	3.5	3			NAK01
1991 12 04.87	S	10.8	AC	20	L	6	67	2	2			YAS
1991 12 06.21	S	11.4	A	20.0	T	10	77					COM
1991 12 06.86	S	11.2	AC	20	L	6	67	2.5	2			YAS
1991 12 10.19	S	11.7	A	20.0	T	10	77	> 2	0/			COM
1991 12 11.18	S	11.7	A	20.0	T	10	77	> 3	0/			COM
1991 12 11.39	M	12.2	GA	40	L	7	100	1.1	3			MOD
1991 12 13.83	S	10.8	AC	13	L	6	62	2	1			ISH02
1991 12 15.19	S	12.0:	A	20.0	T	10	77	> 3	0			COM
1991 12 18.82	S	11.6	AC	20	L	6	58	2.5	4			NAK01
1991 12 31.40	M	13.2	GA	40	L	7	100	1.2	2			MOD
1992 01 12.41	M	13.8	GA	35.9	L	7	164	0.65	1			MOD
1992 02 06.40	S[	14.0	GA	40	L	7	190	! 0.5				MOD
1992 02 10.32	S[	14.3	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Faye (1991n)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 09.71	S	13.3	AC	32	L	7	96	1.1	4/			NAK01
1991 08 13.69	S	12.8	AC	20	L	6	106	1.3	4			NAK01
1991 08 14.67	S	12.6	AC	20	L	6	106	1.3	5			NAK01
1991 08 21.05	S	12.4	A	28.0	T	10	88	& 1	1			COM

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 04.94	S	11.9	A	28.0	T	10	88	& 1.2	1			COM
1991 09 06.70	S	11.5	AC	20	L	6	106	2.5	7			NAK01
1991 09 08.06	S	10.9	AA	25	L	4	53	2.4	6			LOO01
1991 09 09.65	S	11.3	AC	20	L	6	67	0.8	5			YAS
1991 09 10.64	S	11.3	AC	20	L	6	67	0.8	5			YAS
1991 09 12.08	S	10.0	AC	25	L	4	53	1.6	5			LOO01
1991 09 12.14	S	10.4	A	11.0	L	7	32	5	1			SCH04
1991 09 13.12	S	11.5	A	28.0	T	10	88	1.3	4			COM
1991 09 13.16	S	10.2:	S	25.4	L	6	57		3			VIE
1991 09 13.93	S	10.6	A	30.0	L	5	58	4	1/			SCH04
1991 09 14.05	S	10.5	AA	25	L	4	53	2	6			LOO01
1991 09 14.13	S	10.3	A	28.0	T	10	88	& 1.2	5			COM
1991 09 15.19	S	10.0:	S	25.4	L	6	57		3			VIE
1991 09 15.81	S	11.0	AC	20	L	6	67	0.8	5			YAS
1991 09 18.12	S	10.6	A	28.0	T	6	56	1	3			COM
1991 09 19.12	S	10.5	A	28.0	T	6	56	& 1.2	5	&0.3	270	COM
1991 09 19.72	S	10.6	AC	20	L	6	106	3.5	6			NAK01
1991 09 21.12	S	9.8	AC	25	L	4	53	1.3	6			LOO01
1991 09 28.55	S	10.8	AC	13	L	6	44	2	3			ISH02
1991 09 30.94	S	10.6	A	20.0	T	10	60	& 1	5	&0.2	250	COM
1991 10 02.53	S	9.8	AC	20	L	6	58	4	6			NAK01
1991 10 02.61	S	10.0	AC	28	T	10	80	1.5	6			YAS
1991 10 02.89	S	9.8	AA	25	L	4	53	1.5	6			LOO01
1991 10 02.93	S	10.0	A	30.0	L	5	58	& 3	5/			SCH04
1991 10 04.08	M	11.6	GA	35.9	L	7	98	0.7	5			MOD
1991 10 04.87	S	10.3:	AA	20.0	C	14	71		3			PAR03
1991 10 04.94	S	10 :	S	44.5	L	5	62	1.5	5	0.07	250	KAR02
1991 10 04.95	S	9.5	AA	8.0	B		15	5	5	0.15	250	HAV
1991 10 05.19	M	10.9	GA	35.9	L	7	45	1.0	5	0.03	270	MOD
1991 10 06.95	S	10.0:	AA	10.0	M	10	25		3			PAR03
1991 10 07.02	S	10.0	A	11.0	L	7	54	& 3	5			SCH04
1991 10 07.53	S	10.3	AA	15.2	L	5	47					SEA
1991 10 07.80	S	10.0	AC	20	L	6	48	1.5	6			YAS
1991 10 07.81	S	10.4	VN	20	L	4	45	1.2	5/			PEA
1991 10 08.25	M	10.1	GA	20.0	L	5	35	1.1	5	&0.02	247	MOD
1991 10 08.36	M	10.5	GA	35.9	L	7	85	0.8	5	0.05	247	MOD
1991 10 08.82	S	10.4	VN	20	L	4	45	1.5	5			PEA
1991 10 09.03	S	9.4:	AA	8.0	B		20	& 5	2			WES04
1991 10 09.17	M	10.1	GA	20.0	L	5	68	1.1	4			MOD
1991 10 09.76	S	10.6	PC	25.2	L	4	70	2.3	4	0.11	264	KOR01
1991 10 09.89	M	10.5:	AA	15.0	L	5	75	1.4	3			SPE01
1991 10 10.00	S	10.6	PC	25.2	L	4	70	2.1	4/	0.13	266	KOR01
1991 10 10.91	S	10.8	A	20.0	T	10	80	& 1.2	4	&0.2	250	COM
1991 10 11.02	S	9.4:	AA	8.0	B		20	4.3	3			WES04
1991 10 11.10	M	9.9	GA	20.0	L	5	35	1.3	5			MOD
1991 10 11.80	S	10.4	PC	25.2	L	4	70	2.5	4/	0.09	273	KOR01
1991 10 11.89	M	10.5:	AA	15.0	L	5	75	1.4	3			SPE01
1991 10 12.11	M	9.9	GA	20.0	L	5	35	1.3	5	0.05	253	MOD
1991 10 12.20	M	9.9	GA	5.0	B		10	1.5	4			MOD
1991 10 13.07	S	9.3:	AA	8.0	B		20	6.5	3/			WES04
1991 10 13.16	M	9.9	GA	20.0	L	5	35	1.3	5	0.05	245	MOD
1991 10 13.50	S	9.5	AC	20	L	6	58	4.5	6			NAK01
1991 10 13.60	S	9.6	AC	13	L	6	44	4	4			ISH02
1991 10 13.62	S	9.8	AA	20	L	6	48	1.8	6			YAS
1991 10 14.12	S	9.6	AA	25	L	4	53	1.5	4			LOO01
1991 10 14.19	M	9.9	GA	20.0	L	5	35	1.2	5	0.05	253	MOD
1991 10 14.21	M	9.9	GA	5.0	B		10	1.5	4			MOD
1991 10 14.89	M	10.2:	AA	15.0	L	5	75	1.4	2/			SPE01
1991 10 15.59	S	9.3	AC	20	L	6	58	4.5	6		265	NAK01

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 15.82	S	10.0	VN	20	L	4	45	2	6			PEA
1991 10 16.82	S	9.9	VN	20	L	4	45	2	6			PEA
1991 10 17.25	M	9.7	GA	20.0	L	5	35	1.3	5	0.08	265	MOD
1991 10 17.28	M	9.7	GA	5.0	B		10	& 4.0	4			MOD
1991 10 17.71	S	9.6	AA	20	L	6	48	2	6			YAS
1991 10 17.86	S	9.9	AA	25.2	L	4	70	2.9	4	0.12	253	KOR01
1991 10 18.13	S	9.4	S	25.4	L	6	57		5			VIE
1991 10 18.29	M	9.6	GA	20.0	L	5	35	1.3	6	0.10	265	MOD
1991 10 18.32	M	9.4	GA	5.0	B		10	& 4.0	4			MOD
1991 10 18.68	S	9.2	AC	20	L	6	58	5	7		250	NAK01
1991 10 26.88	S	9.9	AA	25	L	4	53	1.4	6			LOO01
1991 10 28.62	S	9.3	AC	13	L	6	24	4	3			ISH02
1991 10 28.84	S	10.5	A	20.0	T	10	80	& 1.5	3			COM
1991 10 29.06				35.9	L	7	85	0.6	5	0.02	255	MOD
1991 10 29.07	M	10.4	GA	20.0	L	5	35	0.9	4			MOD
1991 10 29.83	S	9.7	AA	25.2	L	4	70	4.8	5			KOR01
1991 10 29.89	S	10.0	A	20.0	T	10	80	& 2	3			COM
1991 10 29.90	S	9.7:	AA	8.0	B		20	4.6	4/	&0.1	321	WES04
1991 10 29.93	S	9.7	AA	25	L	4	53	1.5	5	3	110	LOO01
1991 10 30.04				40	L	7	100	0.70	5	0.02	336	MOD
1991 10 30.07	M	10.4	GA	20.0	L	5	35	1.1	4			MOD
1991 10 30.12	S	9.1	S	25.4	L	6	57		4			VIE
1991 10 30.16	S	8.9	AA	20.0	T	10	64	3	3			SPR
1991 10 30.85	S	9.9:	AA	8.0	B		20	3.8	4	&0.1	318	WES04
1991 10 30.92	S	10.2	A	20.0	T	10	80	& 1.8	3			COM
1991 10 31.96	! S	10.8	PA	20.0	L	4	52	3	4			ZHU
1991 11 01.06	M	9.9	GA	20.0	L	5	35	1.3	5			MOD
1991 11 01.07	M	9.7	GA	8.0	B		11	3.0	3			MOD
1991 11 01.17				40	L	7	100	1.0	5	0.05	280	MOD
1991 11 01.55	S	9.3	AA	20	L	6	48	3.5	5			YAS
1991 11 01.77	M	10.6	PA	20.0	L	4	52	4	5			ZHU
1991 11 01.77	S	10.4	PA	20.0	L	4	52	4	5			ZHU
1991 11 01.89	S	9.5:	AA	10.0	M	10	25		4			PAR03
1991 11 02.65	S	9.2	AA	20	L	6	48	3.5	6			YAS
1991 11 03.01	! S	10.8	PA	20.0	L	4	52	4	5			ZHU
1991 11 03.10	M	9.9	GA	20.0	L	5	35	1.6	5			MOD
1991 11 03.15				40	L	7	100	1.0	5	0.04	280	MOD
1991 11 03.73	S	9.4	AC	13	L	6	44	3	3			ISH02
1991 11 03.87	S	9.4	AA	25.2	L	4	70	3.1	5	0.24	260	KOR01
1991 11 03.87	S	9.5	AA	12.0	R	5	20	4	6			KOR01
1991 11 03.88	S	9.3:	AA	10.0	M	10	25		5			PAR03
1991 11 03.94	S	9.6	A	20.0	T	10	80	& 2	5			COM
1991 11 04.08	M	9.8	GA	20.0	L	5	35	1.7	5			MOD
1991 11 04.49	B	9.7	AC	16	L	6	40	3	4			TOM
1991 11 04.56	S	9.3	AC	13	L	6	44	4	4			ISH02
1991 11 04.61	S	9.2	AA	20	L	6	48	3.0	6			YAS
1991 11 04.75	S	9.3	AC	20	L	6	58	3	6			NAK01
1991 11 04.83	S	10 :	S	25.4	L	6	145	4.5	5	0.5	155	DAN01
1991 11 05.31	M	9.8	GA	20.0	L	5	35	1.6	5			MOD
1991 11 05.42	M	9.8	AA	25.4	L	4	71	3	7			SEA
1991 11 05.55	S	9.2	AC	13	L	6	24	4	4			ISH02
1991 11 05.87	S	10.0:	S	25.4	L	6	45	5	5			DAN01
1991 11 05.87	S	10.0:	S	25.4	L	6	145	4	6	0.3	160	DAN01
1991 11 05.93	S	9.7	A	20.0	T	10	80	2	5			COM
1991 11 06.17	S	8.9	AA	20.0	T	10	64	3	3			SPR
1991 11 06.54	M	10.1	AC	16	L	6	40	3	4			TOM
1991 11 06.62	S	9.2	AA	20	L	6	48	3.0	6			YAS
1991 11 06.89	S	9.5	V	15.0	L	6		5	5	0.1	165	AND01
1991 11 06.90	S	10.5:	S	14.0	S	4	56	2.5	5			WAR01

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 11 07.78	S	9.4	S	25.4	L	6	45	6	6	0.2	160	DAN01
1991 11 07.79	S	9.6:	S	25.4	L	6	145	5	6	0.3	155	DAN01
1991 11 07.79	S	10 :	S	8.0	B	4	20	4	5			DAN01
1991 11 08.47	M	9.7	AA	25.4	L	4	71		6			SEA
1991 11 08.48	S	9.4	AA	8.0	B		15					SEA
1991 11 08.73	S	9.2	AC	13	L	6	24	4	4			ISH02
1991 11 08.80	S	9 :	S	8.0	B	4	20	6	3			DAN01
1991 11 08.81	S	9.0	S	25.4	L	6	45	5	4			DAN01
1991 11 08.81	S	9.1	S	25.4	L	6	145	4	4			DAN01
1991 11 08.89	S	9.9	A	20.0	T	10	80	& 1.5	3/			COM
1991 11 09.17	S	9.3	AA	20.0	T	10	64	2.5	2			SPR
1991 11 09.50	S	9.3	AA	20	L	6	48	3.5	6			YAS
1991 11 09.62	B	10.1	AC	16	L	6	40	3	4			TOM
1991 11 09.77	S	9.1	S	25.4	L	6	45	6	4			DAN01
1991 11 09.77	S	9.1	S	25.4	L	6	145	4	4	0.1	170	DAN01
1991 11 09.87	S	9.6:	S	41	L	5	70	5	5	0.05	160	AND01
1991 11 09.87	S	10.3	V	20.3	L	10	80	1.3	6			BJO
1991 11 10.18	M	9.9	GA	20.0	L	5	35	1.2	5			MOD
1991 11 10.24	M	9.6	GA	5.0	B		10	& 3.0	3			MOD
1991 11 10.44	S	9.3	AC	20	L	6	46	4	6/			NAK01
1991 11 10.60	S	9.2	AC	13	L	6	24	3.5	4			ISH02
1991 11 10.75	S	9.3	S	25.4	L	6	145	4	4			DAN01
1991 11 10.95	S	9.5:	AA	10.0	M	10	25		2			PAR03
1991 11 11.57	B	10.1	AC	16	L	6	40	3	5			TOM
1991 11 11.89	S	9.2	S	25.4	L	6	45	6	5			DAN01
1991 11 11.90	S	9.2	S	25.4	L	6	145	4	5	0.4	160	DAN01
1991 11 11.90	S	9.4	S	25.4	L	6	290	3	4	0.2	160	DAN01
1991 11 12.29	M	9.6	GA	20.0	L	5	35	1.4	5			MOD
1991 11 12.53	S	9.1	AC	20	L	6	46	4.5	6/			NAK01
1991 11 12.54	S	9.2	AC	13	L	6	24	3	4			ISH02
1991 11 13.49	S	9.3	AA	20	L	6	48	3.5	6			YAS
1991 11 13.57	S	9.2	AC	13	L	6	24	4	4			ISH02
1991 11 13.92	S	9.6	A	20.0	T	10	77	> 1.5	4			COM
1991 11 14.24	M	9.7	GA	20.0	L	5	35	1.3	5			MOD
1991 11 14.28	M	9.4	GA	5.0	B		10	& 4.0	3			MOD
1991 11 14.87	S	9.6	AA	25.2	L	4	70	4	6	0.11	283	KOR01
1991 11 15.17	S	9.4	AA	20.0	T	10	64	2.5	3			SPR
1991 11 15.67	S	9.3	AC	20	L	6	46	5	6/			NAK01
1991 11 15.70	S	9.1	AC	13	L	6	24	4	3			ISH02
1991 11 16.00	S	9.5	AA	8.0	B	4	20	2				DAN01
1991 11 20.58	S	9.3	AC	13	L	6	44	3	3			ISH02
1991 11 21.55	S	9.4	AC	13	L	6	62	3	3			ISH02
1991 11 24.58	S	9.3	AC	13	L	6	44	3.5	4			ISH02
1991 11 24.83	S	10.3	AC	25	L	4	53	1	6			LOO01
1991 11 25.43	S	9.4	AC	13	L	6	44	3	4			ISH02
1991 11 26.53	S	9.5	AC	13	L	6	44	3	3			ISH02
1991 11 26.84	S	9.7	AA	25.2	L	4	70	4.3	5	0.11	276	KOR01
1991 11 27.08				40	L	7	100	1.2	5	0.02	20	MOD
1991 11 27.11	M	9.9	GA	20.0	L	5	35	1.9	5			MOD
1991 11 27.15	M	9.7	GA	5.0	B		10	& 3.0	2			MOD
1991 11 28.18	S	9.6	AA	20.0	T	10	64	2.5	2			SPR
1991 11 29.18	S	9.7	AA	20.0	T	10	64	2	1			SPR
1991 11 29.98	S	9.8	AC	25	L	4	53	1.2	5			LOO01
1991 11 30.51	S	10.2	AC	20	L	6	48	2.5	4			YAS
1991 12 02.56	S	9.8	AC	20	L	6	46	5	6			NAK01
1991 12 02.57	S	10.5	AC	16	L	6	40	2	4			TOM
1991 12 02.89	S	9.4	AA	25.2	L	4	70	4	5/	0.18	274	KOR01
1991 12 03.58	S	9.6	AC	13	L	6	44	3	3			ISH02
1991 12 03.89	S	9.5	AA	25.2	L	4	70	4	5/	0.15	272	KOR01

Periodic Comet Faye (1991n) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 04.50	S	10.5	AC	20	L	6	67	3	3			YAS
1991 12 05.56	S	9.7	AC	13	L	6	62	2.5	3			ISH02
1991 12 05.77	S	10.6	A	20.0	T	10	77	& 1	3			COM
1991 12 07.59	S	10.4	AC	20	L	6	58	4	5/			NAK01
1991 12 08.58	S	9.7	AC	13	L	6	24	3	3			ISH02
1991 12 08.85	S	10.5:	AA	10.0	M	10	25		1			PAR03
1991 12 09.46	S	10.4:	AA	25.4	L	4	71					SEA
1991 12 09.53	S	9.8	AC	13	L	6	24	3	3			ISH02
1991 12 09.87	S	10.6	A	20.0	T	10	77	& 1	2/			COM
1991 12 10.50	S	10.3	AC	20	L	6	67	2.5	3			YAS
1991 12 10.81	S	10.4	A	30.0	L	5	58	& 4	6			SCH04
1991 12 10.88	S	10.6	A	20.0	T	10	77	& 1.5	2/			COM
1991 12 11.14	M	10.0	GA	20.0	L	5	35	1.5	3			MOD
1991 12 11.19				40	L	7	100	1.1	4	0.01	10	MOD
1991 12 12.54	S	10.0	AC	13	L	6	44	3	3			ISH02
1991 12 13.58	S	10.0	AC	13	L	6	44	3.5	3			ISH02
1991 12 14.58	S	10.2	AC	13	L	6	62	2	3			ISH02
1991 12 15.87	S	9.7	AA	25.2	L	4	70	3.2	4			KOR01
1991 12 24.04	M	11.7	GA	20.0	L	5	68	1.3	3			MOD
1991 12 26.12	M	11.9	GA	20.0	L	5	68	1.2	3			MOD
1991 12 27.15	M	11.8	GA	20.0	L	5	68	1.1	3			MOD
1991 12 27.15	S	11.6	GA	20.0	L	5	68					MOD
1991 12 27.17	M	11.9	GA	35.9	L	7	85	1.1	4			MOD
1991 12 27.75	S	10.8	A	20.0	T	10	77	& 1	2			COM
1991 12 28.08	M	11.9	GA	35.9	L	7	85	0.9	4			MOD
1991 12 28.15	M	11.8	GA	20.0	L	5	68	1.1	3			MOD
1991 12 28.41	S	10.7	AC	20	L	6	58	2.6	5			NAK01
1991 12 28.82	S	11.6	AC	20.3	T	10	85	1.1	2			HAS02
1991 12 29.87	S	10.1	PC	25.2	L	4	70	3.0	4			KOR01
1991 12 30.50	S	10.4	AC	13	L	6	44	3	2			ISH02
1991 12 30.87	S	10.1	PC	25.2	L	4	70	2.8	4			KOR01
1991 12 31.11	S	9.8:	S	25.7	L	4	46		3			VIE
1991 12 31.86	S	10.2	PC	25.2	L	4	70	2.7	4			KOR01
1992 01 01.15	M	11.7	GA	20.0	L	5	68	1.3	3			MOD
1992 01 01.18	M	11.8	GA	35.9	L	7	85	1.2	4			MOD
1992 01 01.74	S	11.1	AC	20.3	T	10	133	1.1	4			DAH
1992 01 04.41	S	11.3	AC	20	L	6	58	2.7	6			NAK01
1992 01 04.71	S	11.5	AC	15.2	L	5	44	3.5	1			MOE
1992 01 04.86	S	11.4	AC	15.2	L	5	44	3	1			MOE
1992 01 05.13	S	11.1:	AA	20.0	T	10	64	1.5	1			SPR
1992 01 05.84	S	10.5:	S	15.0	L	5	117					WAR01
1992 01 06.13	S	10.9	AA	20.0	T	10	64	1.5	2			SPR
1992 01 09.11	S	10.7	AC	35.6	T	11	112		3			VIE
1992 01 09.84	S	11.8	AC	15.2	L	5	44	2.5	1			MOE
1992 01 10.41	S	11.4	AC	20	L	6	58	2.6	4/			NAK01
1992 01 10.75	S	11.7	AC	15.2	L	5	44	2.5	2			MOE
1992 01 25.68	S	11.2:	PC	25.2	L	4	140	& 1.7	2			KOR01
1992 01 30.76	S	11.4	PC	25.2	L	4	140	1.5	2			KOR01
1992 01 31.77	S	11.5	PC	25.2	L	4	140	1.5	2			KOR01
1992 02 01.44	S	12.4	AC	20	L	6	106	1.0				NAK01
1992 02 02.43	S	12.4	AC	20	L	6	106	1.4	3			NAK01
1992 02 03.16	M	12.8	GA	35.9	L	7	164	0.45	2			MOD
1992 02 04.03	M	12.8	GA	35.9	L	7	85	0.55	3			MOD
1992 02 06.09	M	12.8	GA	35.9	L	7	85	0.70	4			MOD
1992 02 08.49	S	12.4	AC	20	L	6	106	1.5	4			NAK01
1992 02 11.62	S	12.1	PC	30.3	C	15	225	1.4	2			KOR01
1992 02 12.63	S	12.1	PC	30.3	C	15	225	1.3	1/			KOR01
1992 02 14.63	S	12.3	PC	30.3	C	15	160	1.2	1/			KOR01
1992 02 24.87	S	13.2	AC	35.5	T	11	80	& 2	3			MIK
1992 03 01.10	M	13.2	GA	35.9	L	7	85	0.60	3			MOD

Periodic Comet Metcalf-Brewington (1991a)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 02 01.63	B	10.8	A	6.3	R	13	52	1	1			KOS

Periodic Comet Kowal 2 (1991f1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 12 27.96	C	14.4	S	19.0	T	4		0.5	8	&0.02	280	MIK
1992 01 06.91	C	13.7	S	19.0	T	4		0.33	8	&0.03	220	MIK
1992 01 27.84	S	12.8:	PC	25.2	L	4	140	& 1.5	4/			KOR01
1992 01 31.83	S	12.9:	PC	25.2	L	4	140	1.2	4			KOR01
1992 02 07.90	C	13.6	AA	19.0	T	4		0.6	8	&0.02	60	MIK
1992 02 08.94	C	13.7	AA	19.0	T	4		0.5	8	&0.03	320	MIK

Periodic Comet Shoemaker 1 (1991p)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 10 11.06	S[	13.4	GA	35.9	L	7	164	! 0.5				MOD
1991 10 29.01	S[	14.0	GA	35.9	L	7	164	! 0.5				MOD
1991 10 30.01	S[	14.2	GA	40	L	7	190	! 0.5				MOD
1991 11 01.01	S[	14.0	GA	35.9	L	7	164	! 0.5				MOD
1991 11 26.98	S[	14.4	GA	40	L	7	190	! 0.5				MOD
1991 12 11.03	S[	13.8	GA	40	L	7	190	! 0.5				MOD
1991 12 24.99	S[	13.9	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Shoemaker-Levy 6 (1991b1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 11 12.20	M	13.0	GA	40	L	7	100	0.9	2			MOD
1991 11 13.93	S	10.9	A	20.0	T	10	66	> 4	0/			COM
1991 11 14.23	M	13.2	GA	40	L	7	100	0.70	3			MOD
1991 11 14.99	S	11.0	A	20.0	T	10	66	> 4	0/			COM
1991 11 27.04	M	13.9	GA	40	L	7	100	0.65	3			MOD
1991 11 29.98	S	12.5	AC	20	T	10	222		7			TOM01
1991 12 11.11	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 12 26.17	S[	14.4	GA	40	L	7	190	! 0.5				MOD
1991 12 27.19	S[	14.6	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Chernykh (1991o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 09 07.31	S[	14.3	GA	40	L	7	190	! 0.5				MOD
1991 09 29.08	S[	14.3	GA	40	L	7	190	! 0.7				MOD
1991 09 30.95	S	12.8:	A	20.0	T	10	80	< 1	1			COM
1991 10 08.21	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 10 14.17	S[	14.5	GA	35.9	L	7	164	! 0.5				MOD
1991 10 29.04	S[	14.5	GA	35.9	L	7	164	! 0.5				MOD
1991 10 30.02	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 11 01.03	S[	14.4	GA	35.9	L	7	164	! 0.5				MOD
1991 11 03.12	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 11 10.13	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 11 12.11	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 11 27.10	S[	14.5	GA	40	L	7	190	! 0.5				MOD
1991 12 11.08	S[	14.4	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Brorsen-Metcalf (1989 X)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 08 28.16	S	6.0	SC	15.0	L	8	9	5		<0.5	10	WAR01

Periodic Comet Schwassmann-Wachmann 1 (1989 XV)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 21.07	S	12.8	A	28.0	T	10	88	> 1.5	0/			COM
1991 10 05.21	S	[13.0	GA	35.9	L	7	45	! 1.0				MOD
1991 10 08.28	S	[14.0	GA	40	L	7	100	! 1.0				MOD
1991 10 14.23	S	[14.6	GA	35.9	L	7	164	! 0.5				MOD
1991 10 17.37	S	[14.3	GA	40	L	7	100	! 1.0				MOD
1991 10 18.35	S	[14.3	GA	40	L	7	100	! 1.0				MOD
1991 10 30.17	S	[14.7	GA	40	L	7	190	! 0.5				MOD
1991 11 01.29	M	14.4	GA	40	L	7	190	0.45	4			MOD
1991 11 03.16	S	[14.7	GA	40	L	7	190	! 0.5				MOD
1991 11 05.36	S	[14.5	GA	40	L	7	190	! 0.5				MOD
1991 11 10.32	S	[14.4	GA	35.9	L	7	164	! 0.5				MOD
1991 11 12.35	S	[14.3	GA	40	L	7	190	! 0.5				MOD
1991 11 14.32	M	14.2	GA	40	L	7	190	0.70	4			MOD
1991 11 17.35	M	14.5	GA	40	L	7	190	0.50	4			MOD
1991 11 27.14	S	[14.7	GA	40	L	7	190	! 0.5				MOD
1991 12 11.24	M	14.3	GA	40	L	7	190	0.35	2			MOD
1991 12 11.91	S	13.4:	A	28.0	T	10	187	< 1	7			COM
1991 12 26.21	S	[14.3	GA	40	L	7	190	! 0.5				MOD
1991 12 28.20	S	[14.5	GA	40	L	7	190	! 0.5				MOD
1991 12 31.30	S	[13.5	GA	40	L	7	190	! 0.5				MOD
1992 01 12.22	S	[14.3	GA	40	L	7	190	! 0.5				MOD
1992 02 04.09	S	[14.3	GA	35.9	L	7	164	! 0.5				MOD
1992 02 06.13	S	[14.3	GA	35.9	L	7	164	! 0.5				MOD
1992 02 24.82	I	[14.5	AC	35.5	T	11	80					MIK
1992 02 29.78	I	[14.5	AC	35.5	T	11	80					MIK
1992 03 01.12	S	[14.0	GA	35.9	L	7	164	! 0.5				MOD
1992 03 02.08	S	[14.5	GA	40	L	7	190	! 0.5				MOD
1992 03 05.08	S	[14.2	GA	35.9	L	7	164	! 0.5				MOD
1992 03 28.05	S	[13.7	GA	40	L	7	190	! 0.5				MOD

Periodic Comet Van Biesbroeck (1989h1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 05 26.91	S	13.9	VN	41	L	4	200	0.4	2			PEA
1991 07 15.39	S	13.5	NP	25.6	L	4	111	0.8	3			PEA

Periodic Comet Levy (1991q)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 06 17.86	S	8.5	AA	8.0	B		20	3.5	4/			PEA
1991 06 20.89	S	8.7	AA	8.0	B		20	4	4			PEA
1991 06 21.88	S	8.7	AA	8.0	B		20	3.5	4/			PEA
1991 07 08.64	S	8.5	AA	10.0	B		20	3	3			ISH02
1991 07 11.46	S	8.4	AC	10	L	6	25	6	5			NAK01
1991 07 15.47	S	8.5	AA	8.0	B		20		6/	0.5	295	PEA
1991 07 16.28	B	8.5	AA	10.0	B	4	20	3	2			NOW
1991 07 17.01	S	8.1	SC	25	L	4	53	2.5	3			LOO01
1991 07 18.74	S	8.3	AC	20	L	6	46	4	5/			NAK01
1991 07 21.75	S	8.3	AC	20	L	6	46	4	6			NAK01
1991 07 22.06	S	8.2	AA	11.0	L	7	32	3	7			SCH04
1991 07 23.07	S	8.3	AA	25	L	4	53	2.5	4			LOO01
1991 07 23.74	S	8.1	AC	20	L	6	46	5	5			NAK01
1991 07 24.77	S	8.5	AA	10.0	B		20	4	4			ISH02
1991 08 08.75	S	8.8	AA	10.0	B		20	4	4			ISH02
1991 08 09.05	S	9.2:	A	11.0	L	7	32	& 4	0/			SCH04
1991 08 09.06	S	8.8	AA	25	L	4	53		6			LOO01
1991 08 11.35	M	9.7	GA	20.0	L	5	35	1.9	2			MOD
1991 08 12.75	S	9.3	AC	20	L	6	46	3	4			NAK01
1991 08 13.74	S	9.2	AC	20	L	6	46	3.5	3			NAK01

Periodic Comet Levy (1991q) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1991 08 18.07	S	8.8	AA	25	L	4	53	2.7	7			LOO01
1991 08 19.10	S	9.2	AA	25	L	4	53	1.5	7			LOO01
1991 08 21.10	S	9.6	A	28.0	T	10	88	> 1	1/			COM
1991 08 22.40	M	10.3	GA	20.0	L	5	35	1.8	2			MOD
1991 09 06.76	S	9.6	AC	20	L	6	58	4.5	1/			NAK01
1991 09 09.77	S	10.0	AC	10.0	B		20	3	3			ISH02
1991 09 13.12	S	10.9	AC	25	L	4	53	1	2			LOO01
1991 09 14.12	S	10.9	A	28.0	T	6	56	& 2	1			COM
1991 09 18.13	S	11.1	A	28.0	T	6	56	& 1.8	1			COM
1991 09 19.12	S	11.2	A	28.0	T	10	88	> 2	0/			COM
1991 09 19.77	S	10.5	AC	20	L	6	58	3.5	1			NAK01
1991 10 08.39	S	12.8	GA	35.9	L	7	85	1.5	1			MOD
1991 10 09.78	S	10.9	AC	13	L	6	62	3	1			ISH02
1991 10 13.37	S	13.0	GA	35.9	L	7	85	1.5	1			MOD
1991 10 17.41	S	13.3	GA	35.9	L	7	85	1.0	0			MOD
1991 11 05.38	S	13.9	GA	40	L	7	100	0.8	1			MOD
1991 11 10.39	S	14.4	GA	40	L	7	100	0.60	1			MOD
1991 11 17.38	S[	14.6	GA	40	L	7	190	! 0.5				MOD
1991 12 11.33	S[	14.6	GA	40	L	7	190	! 0.5				MOD
1992 01 12.25	S[	14.5	GA	40	L	7	190	! 0.5				MOD

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RECENT NEWS AND RESEARCH CONCERNING COMETS

In my last column (Oct. 1991 issue), I mentioned four new comets discovered by Carolyn Shoemaker — P/Shoemaker-Levy 5 (1991z), Shoemaker-Levy 1991a_1, P/Shoemaker-Levy 6 (1991b_1), and P/Shoemaker-Levy 7 (1991d_1). She has now passed Pons' mark with her discovery of P/Shoemaker-Levy 8 (1992f), giving her 27 discoveries in which the comets are named 'Shoemaker'. David H. Levy of Tucson (visual discoverer of 7 comets himself) has continued to assist Eugene and Carolyn Shoemaker in their program of searching photographically for near-Earth asteroids (and also comets!) with the 18-inch Schmidt telescope at Palomar. Comets 1991a_1 and 1991b_1 have been bright enough to have been followed visually by amateur observers (see the tabulated data in this issue). Eleanor Helin and Jeff Alu found comet 1992a on films exposed with the same telescope at Palomar in January; this long-period comet has perihelion in 1992 July (q = 3.0 AU). Also at Palomar, using the 48-inch Oschin Schmidt telescope, Jean Mueller has found two new comets on plates taken in the course of the second Palomar Sky Survey — comets Mueller 1991h_1 and P/Mueller 4 (1992g). Comet 1991h_1 brightened as it approached perihelion on 1992 March 21 (q = 0.20 AU) and was followed visually into early March, but it evidently disintegrated in mid-March; T. Seki (Geisei, Japan) could not find any image brighter than mag 17-18 on photographs taken April 10-11. P/Mueller 4 has an orbital period just over 9 years (q = 2.6 AU).

Masao Ishikawa (Fukaya, Saitama, Japan) reported the photographic discovery of a 14th-magnitude comet in December that turned out to be P/Kowal 2 (1991f_1), which was off of the predicted time of perihelion by some 54 days (*IAUC* 5406)! The identity of the comet was noticed before the name 'Ishikawa' was assigned to the comet. William A. Bradfield of Southern Australia found his fifteenth and sixteenth comets on Jan. 31 (1992b) and May 3 (1992i), both being 10th-magnitude objects that faded (disintegrated?) after discovery.

In December, Mauro V. Zanotta of Italy and Howard Brewington of the U.S.A. visually co-discovered comet 1991g_1, a long-period comet that has been well observed visually, reaching perihelion about a month later. Don Machholz of California and Zenichi Tanaka of Japan independently discovered comet 1992d in late March, this being another long-period with perihelion in 1992 April that is observable in binoculars.

Jim Scotti, working with the Spacewatch scanning telescope at Kitt Peak in southern Arizona, was involved in the recoveries of three comets recently: P/Tsuchinshan 2 (1991e_1), P/Howell (1992c), and P/Singer Brewster (1992e). Steve Larson (University of Arizona) obtained the first recovery observations of P/Howell (*IAUC* 5472). All three comets were close to mag 21 upon recovery. The Spacewatch team also found a new long-period comet on May 1, an object of mag $\sim$ 18.5 that will not reach perihelion until September 1993 (q = 3.2 AU). The biggest recent find by the Spacewatch team has been the discovery in early January of a minor planet in an odd Chiron-like orbit (*IAUC* 5434, 5462): 1992 AD, which has been numbered (5145), was near magnitude V = 17 upon discovery and orbits the sun in some 92 years (with perihelion having just occurred in late September 1991 at q = 8.69 AU). Observers at various locations have failed to detect any coma for object (5145), whose path crosses the orbits of Saturn, Uranus, and Neptune!

In December, I distributed to *ICQ* subscribers a prediction of an occultation of P/Schwassmann-Wachmann 1 for January 1. Unfortunately, the path apparently ran across the very southern part of North America, and numerous reports received from North American observers stated only negative results. Jane Luu and David Jewitt reported last September that P/Chernykh (1991o) had split into two components (*IAUC* 5347, 5391). — D. W. E. Green