

THE INTERNATIONAL

COMET

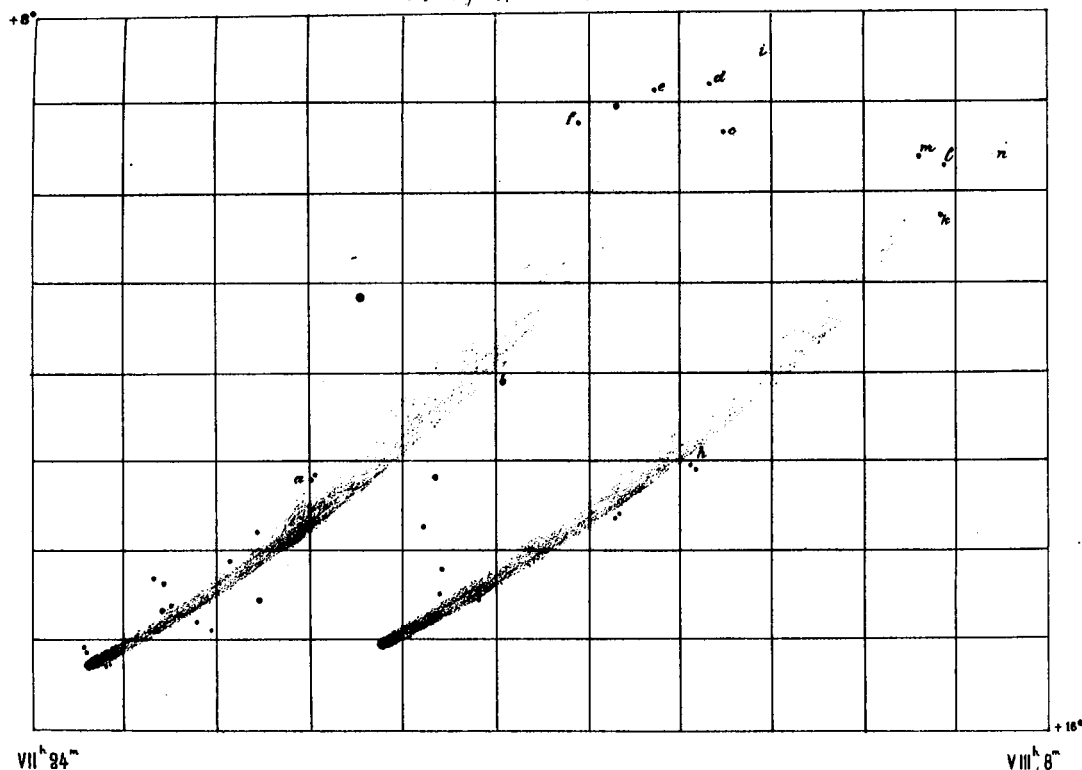
QUARTERLY

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*Comet Wells on June 19 and 20, 1882, at 6^h 30^m Cape m. t.
obs. by Dr. W. L. Elkin*



Th. Bredichin produced this drawing of Comet Wells 1882 I in the Moscow Observatory *Annals*, Volume IX (1883). The observations were made by W. Elkin at the Cape of Good Hope on 1882 June 19 and 20, when the comet was in Gemini.

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The *International Comet Quarterly* (ICQ) is a non-profit journal devoted to news and observation of comets. Regular issues are published 4 times per year (January, April, July, and October), with an annual *Comet Handbook* of ephemerides published as a special fifth issue in the second half of the year. The ICQ is published in part by the Department of Physics and Astronomy at Appalachian State University in Boone, North Carolina. An index to each volume is published in the January issue of the following volume; 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\$18.00 per year, or US\$20.00/year outside North America (rates are \$10.00 and \$12.00, respectively, 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 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 the *Comet Handbook*, which is available for \$10.00 (\$8.00 to subscribers if ordered with their ICQ subscription; see above).

Manuscripts will be reviewed for possible publication (send 2 copies of 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 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 via floppy disks, or through mail via the computer networks BITNET (GREEN@CFA) or SPAN (CFAPS2::GREEN)], and should contact the Editor for further information.

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— ROMAN NUMERAL DESIGNATIONS OF COMETS IN 1987 —

The following tabulation is from MPC 13925.

Comet	T	Name	Year/letter	Ref.
1987 I	Jan. 1.6	P/Forbes	1986g	IAUC 4229
1987 II	Mar. 9.7	Sorrells	1986n	MPC 12454
1987 III	Mar. 17.3	Nishikawa-Takamizawa-Tago	1987c	MPC 12009
1987 IV	Mar. 19.9	Shoemaker	1988b	MPC 13458
1987 V	Apr. 10.3	Torres	1987j	MPC 13459
1987 VI	Apr. 14.5	P/Howell	1987h	IAUC 4335
1987 VII	Apr. 20.8	Wilson	1986l	MPC 13596
1987 VIII	May 24.6	P/Jackson-Neujmin	1987t	IAUC 4438
1987 IX	June 14.0	P/du Toit-Hartley	1986q	IAUC 4293
1987 X	June 18.0	P/Grigg-Skjellerup	1986m	IAUC 4255
1987 XI	July 4.3	P/Russell 2	1987q	IAUC 4415
1987 XII	July 15.9	P/Hartley 3	1988d	MPC 13459
1987 XIII	July 17.4	P/Encke		MPC 10520
1987 XIV	July 22.6	P/Klemola	1987i	IAUC 4349
1987 XV	July 27.3	P/West-Kohoutek-Ikemura	1987x	MPC 12454
1987 XVI	Aug. 10.2	P/Gehrels 1	1987v	MPC 12201
1987 XVII	Aug. 12.1	P/Helin	1987w	MPC 13459
1987 XVIII	Aug. 18.7	P/Comas Solá	1986j	IAUC 4239
1987 XIX	Aug. 30.5	P/Schwassmann-Wachmann 2	1986h	IAUC 4231
1987 XX	Sept. 1.1	P/Wild 3	1987e	MPC 12200
1987 XXI	Sept. 9.2	Levy	1987y	MPC 12575
1987 XXII	Oct. 6.1	(SMM 1)		IAUC 4621
1987 XXIII	Oct. 9.5	Rudenko	1987u	MPC 13597
1987 XXIV	Oct. 16.5	P/Brooks 2	1987m	IAUC 4372
1987 XXV	Oct. 18.0	(SMM 2)		IAUC 4621
1987 XXVI	Oct. 25.7	P/Reinmuth 2	1987l	IAUC 4369
1987 XXVII	Oct. 30.1	P/Kohoutek	1986k	MPC 13597
1987 XXVIII	Oct. 31.8	P/Harrington	1987n	IAUC 4383
1987 XXIX	Nov. 7.3	Bradfield	1987s	MPC 13597
1987 XXX	Nov. 29.9	Levy	1988e	MPC 13452
1987 XXXI	Dec. 4.1	P/Mueller	1987a1	MPC 13459
1987 XXXII	Dec. 11.9	McNaught	1987b1	MPC 13597
1987 XXXIII	Dec. 18.3	P/Borrelly	1987p	IAUC 4404
1987 XXXIV	Dec. 19.5	P/Bus	1987f	IAUC 4310
1987 XXXV	Dec. 26.8	Maury-Phinney	1988c	MPC 13042

PERIODIC COMETS FOR THE VISUAL OBSERVER IN 1989

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Barring any unexpected bright comets, the chief attraction for visual comet observers in 1989 should be the long-awaited return of Periodic Comet Brorsen-Metcalf, which may become faintly visible to the naked eye during the northern hemisphere's late summer. A handful of fainter telescopic comets should keep observers busy during the remaining portions of the year.

P/Tempel 2 1987g

After being intensely studied during its perihelion passage in late 1988, this comet should still be within range of visual observers for the first two or three months of 1989. The post-perihelion brightness formula determined by Bortle (1984) from the comet's previous return in 1983 suggests that it should still be 11th or 12th magnitude at the beginning of the year, fading to $m_1 \sim 14$ by the time it enters the solar glare sometime in March.

P/Tempel 1 1987e₁

Although the current return of this comet ($P = 5.5$ years) is only moderately favorable, observers in the southern hemisphere may possibly pick it up in the morning sky at a small elongation about the beginning of February ($m_1 \sim 12$). The elongation slowly increases as the comet fades during the next few months; the comet will probably be too faint for visual detection after about April. Unfortunately, there is almost no possibility for visual observations from the northern hemisphere. Perihelion passage occurs on January 4.4, at $q = 1.50$ AU.

P/Pons-Winnecke

This famous comet ($P = 6.4$ yr), which achieved naked-eye visibility during close approaches to the earth during the early 20th century, had at one time been suggested by some researchers as having exhibited a significant secular brightness decrease during recent decades (cf. Vsekhsvyatskii 1964). At the comet's previous return in 1983 Bouma (1983) suggested that this apparent brightness decrease was simply due to a lack of visual observations, and predicted the comet would reach 12th magnitude at that return. The comet was subsequently observed by a handful of southern hemisphere observers at approximately the same brightness as predicted by Bouma. Using these observations and assuming $n = 4$, Bortle (1983) derived an absolute magnitude of 9.9, similar to that obtained during returns earlier in the century.

The 1989 return ($T = \text{August } 19.9$, $q = 1.26$ AU) is even more favorable than that of 1983, and observers are encouraged to monitor this comet closely in order to determine accurately its brightness behavior. The brightness law determined by Bortle suggests it may become visually observable at $m_1 \sim 13$ as early as April, brightening to $m_1 \sim 11$ around the time of perihelion passage, and fading back to 13th magnitude by about November. Northern-hemisphere observers will be favored before perihelion, those in the southern hemisphere afterward. It

is conceivable that this comet will exhibit an asymmetric light curve with respect to perihelion similar to that of some other short-period comets (notably P/d'Arrest and P/Tempel 2); hence observers should continue to monitor the comet until at least the time of perihelion even if earlier observations are negative.

P/Brorsen-Metcalf

Previously observed in 1847 and 1919, this comet (current period: $P = 70.6$ yr) makes its first predicted return to perihelion in 1989. The most recently published prediction, by Yeomans (1987), has perihelion occurring on September 27.6 UT, at $q = 0.48$ AU. The following comments are based upon this prediction, as well as upon the brightness parameters determined by Vsekhsvyatskii (1964) and by Morris (1989) for the comet's 1919 return, but since the comet has not been recovered as of this writing they should be considered as somewhat tentative.

The comet may first become accessible to visual observers in late June, at $m_1 \sim 13$ in the morning sky. Traveling rapidly northward, it may reach 9th magnitude by the end of July, and perhaps 6th magnitude by the end of August. The comet's maximum northern declination ($+53^\circ$) will be reached about August 23, at which time it will be just past its closest approach to the earth ($\Delta = 0.40$ AU). It then travels rapidly southward, remaining in the morning sky, and perhaps becoming as bright as 5th magnitude around the time of perihelion passage. The solar elongation at that time will be just under 30° ; a minimum of 23° will be reached in mid-October. Visibility after this point will probably be limited to the southern hemisphere, as the comet continues its southward motion and fades rapidly. By mid-November it is unlikely to be any brighter than 11th magnitude, and will probably fade to $m_1 \sim 13$ by year's end.

P/Lovas 1

Discovered in 1980, this comet ($P = 9.1$ yr) makes its first predicted return in 1989. Perihelion passage is expected on October 10.7, at $q = 1.68$ AU. Since the 1980 discovery was not made until three months after perihelion and since no known visual observations were made or attempted, no conclusive brightness predictions can be made for 1989. The return is a favorable one, however, and it is possible the comet might reach 14th magnitude around the time of perihelion or shortly thereafter.

P/Gunn

This annual comet ($P = 6.8$ yr) passes perihelion on September 25.0 ($q = 2.47$ AU). Visual observations by the author at the comet's previous return in 1982 suggest that the brightness should be at least as bright as 13th magnitude around the time of opposition in early May, with only a slight fading over the next few months. The comet will disappear in the solar glare about October but by then will probably have faded to $m_1 \sim 14$.

P/Tuttle-Giacobini-Kresák

This comet ($P = 5.5$ years) is expected to pass perihelion on 1990 February 8.2, at $q = 1.07$ AU, but will be moderately well-placed for observation during the last few months of 1989. The comet's brightness is difficult to predict; ordinarily, a magnitude of about 13-14 might be expected for near the end of 1989, brightening perhaps a half magnitude by the time of perihelion passage. During its 1973 return, however, the comet underwent a dramatic 10-magnitude outburst (from ~ 14 th magnitude to 4th) a few days before perihelion passage. After settling back down to its pre-outburst brightness, a similar increase occurred about 6 weeks later. No such activity was observed at the comet's rather unfavorable 1978 return, and the comet was not even recovered during its very unfavorable return in 1984. Observers may want to keep a watch for a repeat of any unusual activity at this return; while any outbursts might normally be expected around the time of perihelion, it is not out of the question that one (or more) might occur a few months earlier.

P/Schwassmann-Wachmann 1

This well-known annual comet passes perihelion on October 26.7, at $q = 5.77$ AU. The 1988 viewing season extends through January 1989, after which the comet is lost in the solar glare; the new viewing season begins around

April and will extend through February 1990. During most of this period the comet will remain about 10° south of the "Great Square" of Pegasus. Opposition occurs at the time of the September equinox.

After several years of relative quiescence, the comet is showing some indication of returning to the high level of activity which it exhibited during the late 1970s and early 1980s. Two outbursts were observed in 1987 (one in April, the other in October); additional ones were observed in May and August 1988. Although these were slightly fainter than the "typical" outburst ($m_1 \sim 13-14$ as opposed to $m_1 \sim 12$), they may indicate that more vigorous activity is on the way, and observers are encouraged to keep a careful watch for this comet.

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Bortle, J. E. (1983). *Sky Telesc.* **66**, 473.
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Bouma, R. J. (1983). *Bull. Australian Comet Sect.* **83**-R2, 11.
Morris, C. S. (1989). in *1989 Comet Handbook, ICQ 10*.
Vsekhsvyatskii, S. K. (1964). *Physical Characteristics of Comets* (NASA TT F-80, OTS 62-11031), Israel Program for Scientific Translations, Jerusalem.
Yeomans, D. K. (1987). *Minor Planet Circ.* 11523.

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TABULATION OF COMET OBSERVATIONS

Key to observers with observations published in this issue, with 2-digit numbers between Observer Code and Observer's Name indicating source [05 = A.L.P.O. Comets Section, 17 = Kiev Comet. Tsirk., 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
AMO		Mauro Amortti, Italy	MEZ	05	Csaba Mezosi, Hungary
BAR		Sandro Baroni, Italy	MID	05	Tom Middlebrook, TX, U.S.A.
BEN	05	Jack C. Bennett, South Africa	MIL	05	Dennis Milton, MA, U.S.A.
BOA		Andrea Boattini, Italy	*MIL03	05	Martin P. Miller, CA, U.S.A.
BOE	05	Leo Boethin, The Philippines	MIN	05	R. B. Minton, AZ, U.S.A.
BOH	05	Dennis Bohn, WI, U.S.A.	MOR		Charles S. Morris, U.S.A.
BOR	05	John E. Bortle, NY, U.S.A.	MUH	05	Wolfgang Muehle, West Germany
CAM		J. da S. Campos, South Africa	NAK01	06	Akinasa Nakamura, Japan
*CHE03	17	K. T. Chernis, U.S.S.R.	*NES	17	Yu. V. Nesterov, U.S.S.R.
COL	05	Peter L. Collins, MA, U.S.A.	NIK	09	B. Nikolau, New Zealand
CON	05	Darrell Conger, WV, U.S.A.	OHA	05	Thomas O'Hara, CA, U.S.A.
COS	05	Daniel Costanzo, VA, U.S.A.	OME	05	Stephen O'Meara, MA, U.S.A.
*DAL01	18	Grzegorz Dalek, Poland	*PAC01	05	Walter D. Pacholka, CA, U.S.A.
DEA		V. F. de Assis Neto, Brazil	*PAR03	18	Mieczyslaw Paradowski, Poland
DEL	05	Kenneth J. Delano, MA, U.S.A.	PEA	14	Andrew R. Pearce, Australia
*DES01		Jose Guilherme de Souza Aguiar, Brazil	PER01		Alfredo Pereira, Portugal
DIL	05	William G. Dillon, VA, U.S.A.	*PLE01	18	Janusz Pleszka, Poland
*DZI	18	Wilhelm Dziura, Poland	POR	05	Alain Porter, RI, U.S.A.
*EAS	05	George East, MA, U.S.A.	PRY		Jim Pryal, WA, U.S.A.
*FLI	05	David M. Fliss, NY, U.S.A.	*RAD01	17	Veselka Radeva, U.S.S.R.
GAR02		Stephane Garro, France	*RAF	18	Jerzy Rafalski, Poland
GIB		James Gibson, Palomar Obs., U.S.A.	*RIC	05	Charles L. Ricker, MI, U.S.A.
*GLI01	05	George W. Gliba, OH, U.S.A.	RIM	05	Logan Rimes, TX, U.S.A.
GOO	09	Dennis Goodman, New Zealand	*RZE	18	Zbigniew Rzepka, Poland
*GOR01	18	Dariusz Gora, Poland	SAB	05	John D. Sabia, PA, U.S.A.
*GRA03	05	Bill Grady, WV, U.S.A.	*SAN01	05	Jeffery Sandel, SC, U.S.A.
GRE		Daniel W. E. Green, U.S.A.	*SAS	05	Emilio Sassone-Corsi, Italy
*GRO01	05	Roger Grossenbacher, OH, U.S.A.	*SAS01	05	Paolo Sassone-Corsi, Italy
*HAA	05	Walter H. Haas, NM, U.S.A.	SEA	14	David A. J. Seargent, Australia
HAL		Alan Hale, NM, U.S.A.	*SES	05	Michael Seslar, FL, U.S.A.
JAC01		Eric A. Jacobson, MN, U.S.A.	SIM	05	Karl Simmons, FL, U.S.A.
JAH		Jost Jahn, West Germany	*SLO	05	Robert B. Slobins, MA, U.S.A.
*JAN01	18	Piotr Janczewski, Poland	SMI	05	Horace A. Smith, CT, U.S.A.
JON		Albert F. Jones, New Zealand	SMI01	05	Doug Smith, U.S.A.
JON01	05	Merv V. Jones, Australia	*SPE01	18	Jerzy Spell, Poland
KAM01		Andreas Kammerer, West Germany	STE	09	M. Stewart, New Zealand
KAN	06	Kiyotaka Kanai, Japan	STE01	05	Chris Stephan, OH, U.S.A.
*KEE03	05	Billy Keel, TN, U.S.A.	STE02	05	Paul E. Stegmann, NJ, U.S.A.
*KLE01	05	Thomas Kleine, West Germany	*STE09	17	Plamen Stefanov, U.S.S.R.
KOR		Stefan Korth, West Germany	SUM	05	Bruce Sumner, Australia
*KOS01	18	Janusz Kosinski, Poland	*SUT	05	David A. Sutherland, VA, U.S.A.
*KOS02	18	Witold Kosiek, Poland	SZE	05	Bela Szentmartoni, Hungary
*LUG	18	Marek Luga, Poland	*SZU	18	Mieczyslaw Szulc, Poland
LUK	05	Rainer Lukas, West Germany	*TAY03	05	Lee Roger Taylor, Jr., NC, U.S.A.
MAL	05	Paul Maley, TX, U.S.A.	THO	14	Gregg D. Thompson, Australia
*MAL03	05	Anthony D. Mallama, OH, U.S.A.	*TOT	05	Sa'ndor To'th, Hungary
MAT01	05	Vic L. Matchett, Australia	TRU	05	Joseph Truxton, CA, U.S.A.
MAT02	05	Leonard Matuszewski, NJ, U.S.A.	*UJV	05	Antal Ujva'rosy, Hungary
*MAT05	05	Michael Mattei, MA, U.S.A.	*URB	18	Piotr Urbanski, Poland
MAY	05	Marvin J. Mayo, CA, U.S.A.	*VEL02	17	Valentin Velkov, U.S.S.R.
MCC03	05	Michael McCants, TX, U.S.A.	WAL	05	Derek Wallentinsen, NM, U.S.A.
MCE	05	Claude McEldery, MI, U.S.A.	WEI	05	David D. Weier, WI, U.S.A.
*MCI02	05	Patrick McIntosh, CO, U.S.A.	WES	05	John West, TX, U.S.A.
MCM	05	Simon C. McMillan, Australia	WIL01	05	Thomas R. Williams, TX, U.S.A.
*MCM01	05	James H. McMahon, CA, U.S.A.	*WOO01	05	Wayne Wooten, FL, U.S.A.
MCN		R. H. McNaught, Australia	YOU	05	James W. Young, CA, U.S.A.
MEI01	05	David D. Meisel, NY, U.S.A.			

NOTE: UJV is a new designation, but we have previously published observations by Antal Ujva'rosy under the codes AUS (ICQ 30) and USV (ICQ 39). The observations in the ICQ archive have been changed to use the new code UJV.

Comet Mitchell-Jones-Gerber 1967 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1967 07 03.28	S	5.2	SC	4.5	R	6	13					JON
1967 07 06.28	S	6.1	SC	4.5	R	6	13					JON
1967 07 08.30	S	6.3	SC	4.5	R	5	7					JON
1967 07 09.29	S	5.1	SC	2.3	B		2					JON
1967 07 11.29	S	7.4	SC	4.5	R	6	13					JON
1967 07 12.30	S	6.8	SC	4.5	R	6	13					JON
1967 07 15.30	S	7.0	SC	4.5	R	6	13					JON
1967 07 16.38	S	7.5	SC	4.5	R	6	13					JON
1967 07 16.38				31.7	L	5	86		6	0.2	120	JON
1967 07 22.30	S	8.8	S	7.8	R	8	30				115	JON
1967 07 23.29	S	8.6	S	7.8	R	8	30		5			JON
1967 07 24.29	S	8.3	SC	7.8	R	8	30					JON
1967 07 29.30	S	8.0	S	7.8	R	8	30					JON
1967 08 05.30	* S	9.0	HD	7.8	R	8	30					JON
1967 08 05.30				31.7	L	5	86		4	0.1	100	JON
1967 08 06.30				31.7	L	5	62	1.5	4		105	JON
1967 08 06.30	S	9.9	S	7.8	R	8	30					JON
1967 08 07.31	S	9.9	S	7.8	R	8	30					JON
1967 08 13.33	S	9.2	S	31.7	L	5	86		3			JON

Comet Ikeya-Seki 1968 I

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 01 12.53		9.0	S	20.3	L		50	1.2	5			MIN
1968 01 13.51		9.1	S	25.4	L			5	6/			MCC03
1968 01 13.51		8.8	S	5.1	R							MCC03
1968 01 14.52		8.5	AC	20.3	L		45	0.67	1			PAC01
1968 01 14.52		8.6	S	20.3	L		45					PAC01
1968 01 18.58		8.4	S	20.3	L		46	0.75	2			PAC01
1968 01 22.41		8.4	AC	15.2	L	8	21	& 3	6			SMI01
1968 01 24.55		8.5	S	20.3	L		46	0.75	3			PAC01
1968 01 25.47		8.8	S	25.4	L		50	5	6			MCC03
1968 01 25.55		8.6	S	10.8	L		15	& 1.2	0			SIM
1968 01 26.48		8.1	AC	20.3	L		55	3	6/			MID
1968 01 27.35		8.5	AC	15.2	L	8	21	& 3.5	8			SMI01
1968 01 31.55		8.5	S	10.8	L		15	& 1.9	0			SIM
1968 02 02.47		8.2	AC	20.3	L		120	6	6/	&0.08	270	MID
1968 02 03.46		8.0	AC	20.3	L		120	5	6/	0.07	270	MID
1968 02 03.54		8.3	S	10.8	R			2.5	4			SIM
1968 02 06.46		7.8	AC	20.3	L		120	5	6/	&0.06	270	MID
1968 02 07.24		8.8	S	30.5	L		45					MAT01
1968 02 07.35		8.3	S	6.0	R		32	4	4			GRA03
1968 02 20.51		7.5	S	10.8	L		40	3	4			SIM
1968 02 23.42	O	7.5	AC	4.0	B		10					DEL
1968 02 24.36		7.3	S	31.8	L		37	5	6	&0.42	260	SIM
1968 02 26.41	O	7.5	AC	4.0	B		10					DEL
1968 03 04.41	O	7.6	AC	4.0	B		10					DEL
1968 03 06.52	O	7.2	S	10.8	L		14					MIN
1968 03 07.22	O	7.5	AC	4.0	B		10					DEL
1968 03 12.33	O	7.6	AC	4.0	B		10					DEL
1968 03 12.33				31.8	L		50	5	7			DEL
1968 03 15.17	O	7.5	AC	4.0	B		10					DEL
1968 03 18.14				6.1	R		20	& 3.5	2/			CON
1968 03 18.14	O	7.1	S	5.0	B		7					CON
1968 03 19.25	O	7.4	S	10.8	L		14					MIN
1968 03 20.13	O	7.2	S	5.0	B		7	& 1	5/			WOO01
1968 03 23.29		7.5	S	10.8	L		40	& 3	3			SIM
1968 03 24.17	S	7.2	NS	5.0	B		7					BOR
1968 03 24.21		7.6	S	5.0	B		7	< 1	3			SIM

Comet Ikeya-Seki 1968 I [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 03 25.02	O	8.0	AC	4.0	B		10					DEL
1968 03 25.04		8.5	S	10.2	L							MIL
1968 03 25.11	O	8.5:	S	6.1	R		20	3	6/			CON
1968 03 25.18	S	7.3:	NS	5.0	B		7					BOR
1968 03 26.06	O	7.9	AC	4.0	B		10					DEL
1968 03 26.15	S	7.5	NS	5.0	B		7					BOR
1968 03 26.18		8.8	S	10.8	L		14	& 2.5	3			SIM
1968 03 27.12	O	8.2:	S	6.1	R		20	& 3.5	5/	?		CON
1968 03 27.22		8.8	NS	10.8	L		17					SIM
1968 03 27.22		8.8	S	10.8	L		17	2	0			SIM
1968 03 28.04		7.9	AC	4.0	B		10					DEL
1968 03 28.08	O	8.3:	S	6.1	R			3	6/			CON
1968 03 28.10		8.7	NS	10.2	L			& 4.5				MIL
1968 03 28.16	S	7.6	NS	5.0	B		7					BOR
1968 03 28.22		8.7	NS	10.8	R		14					SIM
1968 03 28.22		8.9	S	10.8	R		14	& 2	2			SIM
1968 03 29.23		9.8	NS	10.8	R		14					SIM
1968 03 29.23		9.3	S	10.8	R		14	2	2			SIM
1968 03 30.23		10.3	NS	10.8	R		55					SIM
1968 03 30.23		9.6	S	10.8	R		55	2	0			SIM
1968 03 31.05				31.8	L		150	& 2	7			DEL
1968 03 31.05	O	7.9	AC	4.0	B		10					DEL
1968 03 31.15		8.1	NS	15.2	L							MIL
1968 03 31.15	O	8.2	S	6.1	R			& 3.5	6/			CON
1968 03 31.15		8.2	NS	10.8	R		55					SIM
1968 03 31.15		8.3	S	10.8	R		55	& 3.5	2			SIM
1968 03 31.26		7.4	NS	3.5	B		7					MIL
1968 04 02.07		8.1	S	5.0	B		7					SMI01
1968 04 02.08	O	7.9	AC	4.0	B		10	1.88				DEL
1968 04 02.20		8.8	S	10.8	R		275	& 3	4	&0.07	255	SIM
1968 04 02.20		9.4	NS	10.8	R		275					SIM
1968 04 02.20	O	8.5	S	10.8	L		14					MIN
1968 04 03.15		9.0	NS	10.2	L							MIL
1968 04 04.17		9.3	S	10.8	R		55					SIM
1968 04 04.17		9.9	NS	10.8	R		55	& 2.2	3	0.05	240	SIM
1968 04 05.16		8.8	NS	10.8	R		55					SIM
1968 04 05.16		8.8	S	10.8	R		55	& 2	0	?0.06	230	SIM
1968 04 06.16		9.2	S	10.8	R		55	& 1.2	0			SIM
1968 04 06.17	O	8.0	AC	4.0	B		10					DEL
1968 04 06.17				31.8	L		150	1	7			DEL
1968 04 06.21		8.9	NS	10.2	L			& 4.5				MIL
1968 04 06.25		9.5	S	10.8	R		55		0			SIM
1968 04 07.12		9.4	NS	10.8	R		55					SIM
1968 04 07.12		9.2	S	10.8	R		55	1.15	0			SIM
1968 04 08.25		9.1	S	10.8	R		55	1.30	2			SIM
1968 04 09.20		9.8	S	10.8	R			2	4			SIM
1968 04 13.20		8.3:	S	15.2	L	8	38	& 3				SMI01
1968 04 13.24		9.2	S	10.2	L							MIL
1968 04 15.19		9.3	S	10.8	R		55	& 1.5	1			SIM
1968 04 18.10	O	8.3	AC	4.0	B		10					DEL
1968 04 18.10				31.8	L		150	2	7			DEL
1968 04 18.17		9.4	S	10.8	R		55	1.5	1			SIM
1968 04 19.31		9.3	S	10.8	R		55	1.5	1			SIM
1968 04 20.14		9.4	S	10.8	R		55	& 2	0			SIM
1968 04 22.12		9.1	S	10.8	R		55					SIM
1968 04 22.12		9.5	AC	10.8	R		55	2	0			SIM
1968 04 24.14		9.8	S	10.8	R		55	1.5	2			SIM
1968 04 24.31		9.6	AC	10.8	R		55	1.5	2			SIM
1968 04 25.15		10.0	AC	10.8	R		55	& 1.3	3			SIM

Comet Ikeya-Seki 1968 I [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 04 26.06				31.8	L		150	1.5	7			DEL
1968 04 26.06	O	8.4	AC	4.0	B		10					DEL
1968 04 26.15		10.0	AC	10.8	R		55	1.5	2			SIM
1968 04 28.13	O	8.9	AC	25.4	L		98					RIC
1968 04 28.13				25.4	L		208	3	3		220	RIC
1968 04 28.14		8.5	AC	5.0	B		7					SIM
1968 04 28.14				31.8	L		60	4	8/	0.13	85	SIM
1968 04 29.06	O	8.4	AC	4.0	B		10					DEL
1968 04 29.06				31.8	L		150	1.5	8			DEL
1968 04 29.14		9.8	AC	10.8	R			1.5	2			SIM
1968 05 04.15		10.2:	AC	10.8	R			1.5	3			SIM
1968 05 16.16	O	9.5	AC	31.8	L			1	4			DEL
1968 05 19.18		10.2:	UX	25.4	L		50	2	3			MCC03
1968 05 20.20		8.7	S	15.2	L			2	7			MIL03
1968 05 22.17		10.2	AC	10.8	R		55	< 1	0			SIM
1968 05 23.16		9.2	AC	10.8	R		55	2	0			SIM
1968 05 24.16		10.2	AC	10.8	R			2	0			SIM
1968 05 26.15		9.4	AC	10.8	R			1.5	0			SIM
1968 05 27.17		9.6	AC	10.8	R			1.5	0			SIM
1968 05 28.15		9.6	AC	10.8	R			& 1.0	0			SIM
1968 05 29.16		9.2:	AC	10.8	R		55	& 2	0			SIM
1968 05 30.15		9.2	AC	10.8	R			2	0			SIM
1968 05 31.17		9.6	AC	10.8	R			& 1	0			SIM
1968 06 01.15		9.4	AC	10.8	R			2	0			SIM
1968 06 08.07		9.5	AC	20.3	L			& 1	0			SIM

Comet Fujikawa 1969 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 08 14.74		11.5:		30	L			& 3				MAT01
1969 09 08.52		8.7	S	20.3	L	6		& 1.2	3			PAC01
1969 09 13.39				40.6	C	18		1.5	5	0.07	270	MIL
1969 09 13.40		9.0	AC	15.2	L				2			WOO01
1969 09 21.45		8 :	AC	20.3	L		45	& 2.8	4/			MID
1969 09 22.40	O	7.6	S	5.0	B		7		5/			CON
1969 09 22.51		6.9	AC	15.2	L			5	8			MIL03

Comet Kohoutek 1970 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 10 08.12		13.5	AC	31.8	L	6	150		8		112	RIM
1969 11 05.08		12.6	AC	31.8	L	6	150	0.42	5			RIM
1969 11 07.08		12.5	AC	31.8	L	6	150		9	0.83	238	RIM
1970 02 05.06		11.6	AC	31.8	L	6	150	1	6/			RIM

Comet Toba 1971 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1971 03 21.39		9.0	S	40.6	L		51	4.5	2			SUT
1971 03 24.38		9.3	S	16.5	R							MAT05
1971 03 26.39		9.3	S	16.5	R							MAT05
1971 03 28.41		9.7	AC	10.0	B		14					SIM
1971 04 01.38		9.0	S	16.5	R							MAT05
1971 04 04.38		9.0	S	10.2	L							MIL
1971 04 19.38		8.4	S	40.6	L		50	6	2			SUT
1971 04 21.36		8.8	S	40.6	L		50	5.1	2			SUT
1971 04 22.35		9.1	S	40.6	L		50	3.1	2			SUT
1971 04 24.36		8.3	S	40.6	L		50	4	2			SUT
1971 04 25.32		8.3	S	40.6	L		50	5.3	2			SUT

Comet Toba 1971 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1971 05 02.30		7.6	AC	12.7	R	5	17	8	4			SES
1971 05 29.38		7.6	AC	3.5	B		7		7			KEE03

Comet Bradfield 1972 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 05 02.73		8.6	S	12	R		21					BEN
1972 05 04.39		9.5:	S	30	L		40					MAT01
1972 05 05.75		9.2		12	R		21					BEN
1972 05 06.40		9.5:	S	30	L		40					MAT01
1972 05 07.40		8.8	S	30	L		40					MAT01
1972 05 09.72		9.0	S	12	R		21					BEN
1972 05 10.75		9.2:		12	R		21					BEN
1972 05 11.71		9.5		12	R		21					BEN

Comet Heck-Sause 1972 VIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 02 27.15	S	11.8	AC	61.0	C	14		1	3/	>0.02	175	MOR
1973 02 28.13	S	11.7	AC	61.0	C	14		1	5	&0.02	175	MOR
1973 03 07.23	S	11.9	AC	61.0	C	14		0.75	4	?	170	MOR
1973 03 08.10	S	12.1	AC	61.0	C	14		0.75	3/			MOR
1973 03 09.15	S	12.4	AC	61.0	C	14		0.75	3			MOR
1973 03 27.16	S	12.9	AC	61.0	C	14		0.8	2	0.05	135	MOR
1973 03 28.15	S	13.0	AC	61.0	C	14		1	1/	&0.02	135	MOR

Comet Kojima 1973 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 12 02.20		11.5:	AC	15.2	L	8	48	3	0			SIM
1972 12 11.27	O	10.6	AC	12.7	R	5		& 3	6			SES
1972 12 28.23		11.0	AC	20.3	L	5	96		6	0.05	80	SIM
1973 01 30.05	S	13.4	AC	61.0	C	14		& 0.5	2	0.02	90	MOR

Comet Kohoutek 1973 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 09 29.50		10.7:	AC	15.2	R	15	60					YOU
1973 09 30.42		10.2	AC	20.3	L	8	80	2.0	0			SIM
1973 10 05.44	! S	10.0	AC	32	L	6	52	& 1.5	2			MOR
1973 10 06.44	! S	9.9	AC	32	L	6	52	& 1.5	2			MOR
1973 10 14.44	! S	9.6	AC	32	L	6	52	1.5	1	&0.02	270	MOR
1973 10 15.44	! S	9.5	AC	32	L	6	52	1.5	1	0.02	270	MOR
1973 10 16.44	! S	9.5	AC	32	L	6	52	2	2/			MOR
1973 10 18.47	O	9.5	S	25.4	L	4	64	2.6	0			MAL
1973 10 19.44	S	9.3	S	32	L	6	52	2.5	3/	<0.02	290	MOR
1973 10 20.45	S	9.1	S	32	L	6	52	2.5	4			MOR
1973 10 21.44	S	9.1	S	32	L	6	52	2.5	3/			MOR
1973 10 21.47	O	9.5	S	25.4	L	4	64		0			MAL
1973 10 22.51	O	8.8	S	12.0	R	5	20					MCM01
1973 10 25.42	B	8.6	S	7.6	L		20		5			MEI01
1973 10 26.46		8.3	S	31.8	L	6	50	3	7	0.02	315	RIM
1973 10 26.48	O	9.3	S	25.4	L	4	64		0			MAL
1973 10 26.52	S	8.8:	S	12.0	R	5	20					MCM01
1973 10 28.42	T	8.8	S	40.6	L	4		2	5	0.12	243	SUT
1973 10 28.50	B	8.5	S	11	L	10	40	& 6	2/			WAL
1973 10 29.44		7.8	S	15.2	L		35					WOO01
1973 10 29.47	O	8.2	S	25.4	L	7	67	& 3	1/	&0.08	275	WES
1973 10 29.48	O	8.8	S	25.4	L	4	63	3.4	6		290	MAL

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 10 29.49	B	8.5	S	11	L	10	40	4	2			WAL
1973 10 30.47	O	8.5	S	25.4	L	4	63		5		295	MAL
1973 10 31.42	T	8.3	S	5.1	R	4		5	5	0.15	286	SUT
1973 10 31.48	O	8.6	S	25.4	L	4	63	& 3.6	0		290	MAL
1973 11 01.42		8.0:	S	5.1	R	4	6	7.5	5	0.27	290	SUT
1973 11 01.46	O	8.0	S	25.4	L	4	90	3.6	5		290	MAL
1973 11 01.46	O	8.3	S	20.3	L	7	55	3	3/	0.05	285	MID
1973 11 02.42		8.0:	S	5.1	R	4	6	6.25	5	0.18	283	SUT
1973 11 02.48	O	8.5	S	25.4	L	4	63	& 3.5	2		290	MAL
1973 11 03.44	S	7.9	S	15	L	4	24	5	5	0.25	270	MOR
1973 11 03.44	B	8.0	S	15	L	4	24					MOR
1973 11 04.40		8.4	S	10.0	B		14	5	2			SIM
1973 11 04.42	E	8.0	S	6.3	B		9		2	&0.06	302	WIL01
1973 11 04.52	S	8.0:	S	12.0	R	5	20					MCM01
1973 11 05.49	B	8.3	S	11	L	10	40	4	2/			WAL
1973 11 06.45	S	7.9	S	15	L	4	24	5	5/	&0.29	280	MOR
1973 11 06.45	B	8.3	S	15	L	4	24					MOR
1973 11 08.42		8.1:	S	40.6	L	4	50	2.5	5	0.17		SUT
1973 11 08.42		7.6:	S	5.1	R	4	6					SUT
1973 11 11.50	O	7.1	S	25.4	L		67	& 7	3		290	WES
1973 11 13.47	O	7.8	S	25.4	L	4	63	> 3.6	5	>0.5	278	MAL
1973 11 14.48	O	7.8	S	25.4	L	4	63	3.6	5	>0.15	275	MAL
1973 11 14.51	O	7.8:	S	15.2	L	8	44	4	2	0.17	290	MCI02
1973 11 15.50	O	7.0	S	5.0	B		7	& 4.5	2	0.25	275	MCI02
1973 11 16.48	O	7.1	S	25.4	L	4	63		2	0.17	290	MAL
1973 11 17.42	E	6.9	S	6.3	B		9	& 5.5	4	0.28	284	WIL01
1973 11 17.48	O	6.8	S	25.4	L	4	63		6	0.17	278	MAL
1973 11 19.50	B	6.8	AC	3.5	B		7					WAL
1973 11 20.46	O	8.0:	S	10.2	R	15	54	2.75	1		300	FLI
1973 11 20.48	O	6.7	S	25.4	L	4	63	& 3.7	5	>0.12	278	MAL
1973 11 21.48	O	6.8	S	25.4	L	4	63	& 3.8	6	&0.42	272	MAL
1973 11 22.42		7.2:		6.1	R	10	36		1/	0.2	200	GRE
1973 11 22.44	B	6.5	UX	5.0	B		7					MEI01
1973 11 22.44	S	6.3	UX	5.0	B		7					MEI01
1973 11 22.45	O	6.3	S	5.0	B		7	5	5/	0.5	280	CON
1973 11 22.45	S	6.3	S	5.0	B		12	&10	6			MOR
1973 11 22.45	B	6.4	S	5.0	B		12					MOR
1973 11 22.56	B	6.5	AC	3.5	B		7					WAL
1973 11 23.43	B	6.2:	S	15.2	L	4	20		5	0.18	290	SMI01
1973 11 23.43	B	6.2		5.0	B		7					MEI01
1973 11 24.52	Q	6.5	Y	5.0	B		7					MCM01
1973 11 25.43	B	5.7	SP	5.0	B		7			0.5	280	SIM
1973 11 26.40	B	6.0	S	15.2	L	4	20					SMI
1973 11 26.46	S	5.8	S	5.0	B		20					WES
1973 11 27.50	B	5.9	AC	3.5	B		7			&0.6		WAL
1973 11 28.47	B	6.6	S	25.4	L	4	63	3.8	9	0.33	283	MAL
1973 11 28.51	S	5.8	S	3.5	B		7					HAA
1973 11 29.45		6.4	SP	3.0	B		8				244	COS
1973 11 29.46	O	6.6	S	25.4	L	4	63		9	0.33	283	MAL
1973 11 29.48		5.4	SP	5.0	B		10	& 5	8	0.83	285	RIM
1973 11 29.52	S	5.9	S	3.5	B		7					HAA
1973 11 30.44		5.8	AT	5.0	B		7			&0.25	295	GLI01
1973 11 30.44		5.4	SP	5.0	B		7	&30	4	&0.75	272	WOO01
1973 11 30.45	O	6.0:		6.1	R	10	36	&10		0.62	30	GRE
1973 11 30.49	B	6.2	S	25.4	L	4	63		9	>0.67	278	MAL
1973 11 30.72		6.6	S	5.0	B		7					MAT01
1973 12 01.42	B	5.5	AC	5.0	B		7		7/	0.70	270	SIM
1973 12 01.46		5.9:	SP	5.0	B		7					MAL03
1973 12 01.46		5.8	SP	3.5	B		7					GRO01

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 12 01.47	S	5.6	Y	5.0	B		12	&10	7			MOR
1973 12 01.48	B	5.8	S	12.7	R	5	20		9	0.75	274	MAL
1973 12 01.50	O	5.8	S	3.5	B		7					HAA
1973 12 01.74		5.5	S	30.0	L		72			>0.28		JON01
1973 12 02.44	O	5.2	Y	3.5	B		7			0.5		MIL
1973 12 02.45	O	5.6	UX	6.1	R	10	36	& 6.5		0.53	305	GRE
1973 12 02.46	S	5.6	Y	5.0	B		12	& 8	7	1.5	290	MOR
1973 12 02.46	B	5.7	Y	5.0	B		12					MOR
1973 12 02.47	B	5.9	S	12.7	R	5	20	> 3.9	9	1.2	285	MAL
1973 12 02.55		5.6	Y	5.0	B		10		6	1.5		MAY
1973 12 03.43	B	5.4	SP	5.0	B		7			0.87	280	SIM
1973 12 03.45	B	5.6	Y	5.0	B		7	3	7/	1.5		MEI01
1973 12 03.51		6.1	S	3.5	B		7					HAA
1973 12 04.47	B	5.5	SP	5.0	B		20					WES
1973 12 04.47	S	5.3	SP	5.0	B		20			&0.5	291	WES
1973 12 04.48	B	5.2	S	3.5	B		7					MAL
1973 12 04.53	O	5.6	S	3.5	B		7					HAA
1973 12 04.55	Q	5.5	Y	3.5	B		7					MCM01
1973 12 04.56		5.4	Y	5.0	B		10					TRU
1973 12 04.56		5.3	Y	5.0	B		10		6/	2	280	MAY
1973 12 05.08		5.2	S	3.5	B		7			>1		BEN
1973 12 05.48	B	5.1	S	3.5	B		7					MAL
1973 12 06.49	B	5.2	S	3.5	B		7		9	>1.2	279	MAL
1973 12 07.07		4.9	S	3.5	B		7			>1.5	279	BEN
1973 12 07.45		5.1	AT	3.0	B		8			1	279	COS
1973 12 07.46		5.1	Y	5.0	B		7					DIL
1973 12 07.49	B	4.9	S	3.5	B		7					MAL
1973 12 07.52	O	5.5	S	3.5	B		7					HAA
1973 12 07.74		5.4	S	5.0	B		7			2.5	297	JON01
1973 12 08.49	B	4.5	S	3.5	B		7		7	1.6	278	MAL
1973 12 08.53	B	3.5	SP	0.0	E		1					WAL
1973 12 08.56	Q	5.0	Y	3.5	B		7					MCM01
1973 12 09.56		4.9	SP	5.0	B		10		7	2.5		MAY
1973 12 10.45		5.5	SP	3.0	B		8					COS
1973 12 10.49	B	4.2	S	3.5	B		7					MAL
1973 12 11.01		4.2	AT	5.0	B		7					COS
1973 12 11.49	B	3.9	S	3.5	B		7					MAL
1973 12 11.53		5.1	S	3.5	B		7			&2.5	275	HAA
1973 12 11.57		4.4	SP	5.0	B		10		7	2.5		MAY
1973 12 11.57		4.2	Y	5.0	B		10					MAY
1973 12 12.46		4.5:	Y	6.3	B		9			2.2	275	WIL01
1973 12 13.53		5.1	S	3.5	B		7			&4	275	HAA
1973 12 14.51	B	3.2	S	12.7	R	5	20		8	>1.2		MAL
1973 12 15.08		4.3	S	3.5	B		7					BEN
1973 12 15.57		4.3	SP	5.0	B		10		7	2.5		MAY
1973 12 16.51	B	3.2	S	3.5	B		7					MAL
1973 12 16.58		4.2	SP	5.0	B		10		7	3		MAY
1973 12 17.51	B	4.0	S	12.7	R	5	20		7	0.8	274	MAL
1973 12 17.53		4.8	S	3.5	B		7					HAA
1973 12 17.58		4.1	SP	5.0	B		10		7	>1	272	MAY
1973 12 18.59		4.0	SP	5.0	B		10		8	&0.75		MAY
1973 12 19.59		3.9	SP	15.2	L	4	30		8	>0.5		MAY
1973 12 22.11	!	1.6:	Y	3.5	B		7					BEN
1974 01 03.05	O	3.7	S	3.5	B		7			2	60	HAA
1974 01 04.05	B	4.1	AT	3.5	B		7			&4.5	60	WAL
1974 01 04.06		3.4	Y	3.5	B		7		6/	&3		MIN
1974 01 04.94		3.2	Y	3.5	B		7			&1.7		MIL
1974 01 04.95	B	3.3	Y	5.0	B		7					MEI01
1974 01 04.96		4.0	Y	12.7	R	5	17					GLI01

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 01 04.96		4.4	Y	12.7	R	5	17					MAL03
1974 01 04.98	E	3.0	Y	5.0	B		12					MOR
1974 01 04.98	S	3.1	Y	5.0	B		12		6	3	75	MOR
1974 01 04.98	B	3.2	Y	5.0	B		12					MOR
1974 01 05.05	O	3.8	S	3.5	B		7			&1.8	60	HAA
1974 01 05.94	O	2.8	AT	4.0	B		10			0.5		DEL
1974 01 05.95		3.6	Y	3.5	B		7			&1.7		MIL
1974 01 05.99	B	4.4	AT	5.0	B		7			3		SIM
1974 01 06.05	B	3.6	SP	3.5	B		7			5	65	WAL
1974 01 06.05	O	4.3	S	3.5	B		7		6	&3.5	60	HAA
1974 01 07.03	B	3.5	S	3.5	B		7		7	>6	60	MAL
1974 01 07.04	S	3.8	AT	5.0	B		20		1	&2	87	WES
1974 01 07.06	O	4.4	S	3.5	B		7			&2.5	63	HAA
1974 01 07.94		4.3	Y	3.5	B		7					MIL
1974 01 07.95	B	3.5	Y	5.0	B		7					MEI01
1974 01 07.96		3.3	AT	12.7	R	5	16		7	1	25	GLI01
1974 01 07.96	E	4.3	AT	6.3	B		9	& 4	7/	3.37	68	WIL01
1974 01 07.96		3.5	AE	5.0	B		7			1.2	60	DIL
1974 01 08.00	B	4.0	AT	5.0	B		7			3		SIM
1974 01 08.94		4.1	Y	3.5	B		7			4		MIL
1974 01 08.96		4.1	S	3.5	B		7		6		40	POR
1974 01 08.99	B	3.9	AT	5.0	B		7			2		SIM
1974 01 09.06	O	4.4	S	3.5	B		7		7	4	61	HAA
1974 01 09.11		3.9	Y	5.0	B		10		9	7		MAY
1974 01 09.97	O	3.2	AT	4.0	B		10			6		DEL
1974 01 09.98	B	4.0	AT	5.0	B		7			2		SIM
1974 01 09.99		4.0	AT	5.0	B		7		8	5.1	65	COS
1974 01 10.06	B	3.3	AT	3.5	B		7			6	65	WAL
1974 01 10.06	O	4.4	S	3.5	B		7			6.9	59	HAA
1974 01 10.99	B	3.6	AT	5.0	B		7					SIM
1974 01 11.06		3.1	SP	5.0	B		7			10		MIN
1974 01 11.06	O	4.5	S	3.5	B		7			5.0	65	HAA
1974 01 11.06	B	3.7	AT	3.5	B		7			5	65	WAL
1974 01 12.02	I	8.5:	UM	20.3	L	6	68	& 4		&0.38		GRE
1974 01 12.05		4.5	Y	5.0	B		7	& 3.5	4	6	55	MCI02
1974 01 12.05		4.6	S	5.0	B		7					MCI02
1974 01 12.07	O	4.5	S	3.5	B		7			3	63	HAA
1974 01 12.97		5.4	SP	3.5	B		7		3	8	42	POR
1974 01 12.98		4.9	Y	5.0	B		7			3	61	DIL
1974 01 12.99		4.7	AT	5.0	B		10			3.5	50	TAY03
1974 01 12.99		4.1	AT	0.0	E		1		9	6	65	SMI01
1974 01 13.00	! S	4.2:	Y	5.0	B		12		8	7	65	MOR
1974 01 13.00	! B	4.2	Y	5.0	B		12					MOR
1974 01 13.01	P	4.1	AT		A					6.9	64	COS
1974 01 13.02	O	4.3	AT	5.0	B		7	15	7	6	60	CON
1974 01 13.02	O	3.6	AT	0.0	E		1			4		MAL03
1974 01 13.03	S	4.2	AT	5.0	B		20					WES
1974 01 13.05	O	4.7	S	3.5	B		7			3.5	62	HAA
1974 01 13.08	B	4.3	S	3.5	B		7		7	7.3	60	MAL
1974 01 13.78	! B	4.6	SP	4.0	B		8					MUH
1974 01 13.78	B	4.5	SP	4.0	B		8		7	&4.5	60	MUH
1974 01 13.95		4.8	AT	3.5	B		7			3		MIL
1974 01 13.95	B	4.8	Y	5.0	B		7			6		MEI01
1974 01 13.96	E	4.8	NO	5.0	B		7			4.1	65	WIL01
1974 01 13.96	S	4.7	SP	5.0	B		7		1			STE02
1974 01 13.97	B	4.3	AT	5.0	B		7			4		EAS
1974 01 13.97	O	3.4	AT	4.0	B		10			1		DEL
1974 01 13.99		4.0	AT	0.0	E		1					SMI01
1974 01 13.99				25.4	L	8	56	& 2.5	9	&3.8	65	SMI01

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 01 14.05	O	5.1	S	3.5	B		7			3.5	62	HAA
1974 01 14.07	O	4.6	S	5.0	B		7	& 3.5	4	7	57	MCI02
1974 01 14.08	B	4.6	S	3.5	B		7		7	5.2	60	MAL
1974 01 14.13		4.1	SP	0.0	E		1		9	&8		MAY
1974 01 14.42	O	4.8	Y	5.0	B		7					THO
1974 01 14.42		5.4	Y	5.0	B		7		4			MCM
1974 01 15.00	B	5.4	SP	5.0	B		7			2		SIM
1974 01 15.04		4.5	AT	5.0	B		7			4	55	RIM
1974 01 15.06	O	5.2	S	3.5	B		7			3.4	69	HAA
1974 01 15.07	B	4.2	AT	3.5	B		7			7	62	WAL
1974 01 15.08	B	4.6	S	3.5	B		7		7	5.5	55	MAL
1974 01 15.12	O	4.1	AT	3.5	B		7					MCM01
1974 01 15.98		4.4	Y	5.0	B		7			3.8	58	DIL
1974 01 16.00	B	5.4	SP	5.0	B		7		7	5	300	SIM
1974 01 16.01	E	4.6	Y	5.2	R		8					MOR
1974 01 16.01	S	4.6	Y	5.2	R		8	4	8	5	73	MOR
1974 01 16.02	O	5.2	S	5.0	B		7	10	7	4	63	CON
1974 01 16.06	O	5.1	S	3.5	B		7			2.6	63	HAA
1974 01 16.08	B	4.6	S	3.5	B		7		7	4.8	62	MAL
1974 01 16.09	B	4.0	AT	3.5	B		7			8	60	WAL
1974 01 17.01	B	5.3	SP	5.0	B		7			0.5		SIM
1974 01 17.06	O	5.6	S	3.5	B		7			2.4	52	HAA
1974 01 17.08	B	5.0	AT	5.0	B		20					WES
1974 01 17.08	S	4.9	AT	5.0	B		20			&2	65	WES
1974 01 17.08	B	4.7	S	3.5	B		7		7	4.5	55	MAL
1974 01 17.71		5.3	SP	3	R							MEZ
1974 01 17.97	O	4.8	AT	4.0	B		10					DEL
1974 01 17.98	S	5.5	SP	5.0	B		7		4			STE02
1974 01 17.98	B	5.4	SP	5.0	B		7			3.5		EAS
1974 01 17.99		4.9	Y	0.0	E		1			&1	65	SMI01
1974 01 17.99		6.2	S	3.5	B		7		2	5	62	POR
1974 01 18.00	O	5.1	S	5.0	B		7	7	6	3.67	60	CON
1974 01 18.00	B	5.5	SP	5.0	B		7					SIM
1974 01 18.04	B	4.9	S	3.5	B		7		6	2.5	55	MAL
1974 01 18.04		4.9	AT	5.0	B		7			2	64	COS
1974 01 18.09	S	5.0	AC	5.0	B		20			&2	62	WES
1974 01 19.01	B	5.2	SP	5.0	B		7					SIM
1974 01 19.04	B	5.1	S	3.5	B		7		6	3.6	60	MAL
1974 01 19.08	O	5.8	S	3.5	B		7			4.1	62	HAA
1974 01 19.96	E	5.3	Y	6.3	B		9	9.3	6	3.93	66	WIL01
1974 01 19.97	O	5.0:	AT	4.0	B		10					DEL
1974 01 19.98	B	5.5	SP	5.0	B		7			1		EAS
1974 01 20.0	B	5.6	Y	5.0	B		7					MEI01
1974 01 20.01	S	5.5	SP	5.0	B		7		5		83	STE02
1974 01 20.02		5.6	SP	5.0	B		7		5	1.4	68	COS
1974 01 20.07	O	6.2	S	3.5	B		7			1.6	52	HAA
1974 01 20.42		5.7	S	5.0	B		7			3.5		JON01
1974 01 20.42		5.5	Y	5.0	B		7					MAT01
1974 01 21.05	B	5.5	S	3.5	B		7		5	3.0	57	MAL
1974 01 21.41		6.1	S	30.0	L		72	5		&3.5	45	JON01
1974 01 21.42	O	5.7	AA	3.0	B		8			1.5		THO
1974 01 22.00		6.0	SP	5.0	B		7		4			COS
1974 01 22.02	B	5.5	AC	5.0	B		7	7	7	4	290	SIM
1974 01 22.04	B	5.8	S	3.5	B		7		5	2.5	65	MAL
1974 01 22.05		6.5:	UM	20.3	L	6	68	& 6.5	5	1.03	95	GRE
1974 01 22.10	B	5.9	AC	5.0	B		20					WES
1974 01 22.10	S	5.8	AC	5.0	B		20			&1.5	59	WES
1974 01 22.72		6.1	Y	3	R							MEZ
1974 01 22.79	B	5.8	SP	4.0	B		8			0.33	50	MUH

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 01 22.99	B	5.8	AC	5.0	B		7			2	300	SIM
1974 01 23.00		6.1	SP	5.0	B		7			1.3	64	COS
1974 01 23.01	O	5.6	Y	3.0	B		8			1.8	95	GRE
1974 01 23.01	O	5.6	Y	20.3	L	6	68	& 9		1.16	95	GRE
1974 01 23.02	O	5.5	S	5.0	B		7	5	5	2.5	64	CON
1974 01 23.09	B	6.0	S	3.5	B		7		4	1.25	62	MAL
1974 01 23.99		5.5	SP	5.0	B		7					DIL
1974 01 23.99		5.5	Y	5.0	B		7			1	55	DIL
1974 01 24.00	B	5.9	AC	5.0	B		7					SIM
1974 01 24.01		6.2	Y	15.2	L	8	48		5			COS
1974 01 24.02	S	5.7	Y	5.2	R		8	8	7/	3	60	MOR
1974 01 24.02	E	5.5	Y	5.2	R		8					MOR
1974 01 24.02	B	5.8	Y	5.2	R		8					MOR
1974 01 24.02	B	5.9	S	3.5	B		7					MAL03
1974 01 24.12		5.7	Y	5.0	B		10		9	&2		MAY
1974 01 24.95	B	5.9	Y	5.0	B		7					MEI01
1974 01 25.00	B	5.6	AC	5.0	B		7			2		SIM
1974 01 25.01		5.7	AC	12.7	R	5	16		3			GLI01
1974 01 25.01		5.8	AC	3.5	B		7		3			STE01
1974 01 25.02	S	5.8	Y	5.2	R		8	6	7/	5	57	MOR
1974 01 25.02	B	5.9	Y	5.2	R		8			1.5	37	MOR
1974 01 25.02	E	5.6	Y	5.2	R		8					MOR
1974 01 25.12	O	6.3:	S	3.5	B		7			&0.8	64	HAA
1974 01 25.12		5.8	Y	5.0	B		10		9	5		MAY
1974 01 25.77	B	6.6	S	7.6	L	10	35	4.3		0.05		MUH
1974 01 25.95	B	6.0	Y	5.0	B		7					MEI01
1974 01 26.01		6.3	S	3.5	B		7	& 9	1	1.5	60	POR
1974 01 26.01	B	6.0	S	3.5	B		7			2		MAL03
1974 01 26.03	B	6.1	Y	5.2	R		8			2	50	MOR
1974 01 26.03	S	6.0	Y	5.2	R		8		7	4	63	MOR
1974 01 26.03	E	5.8	Y	5.2	R		8					MOR
1974 01 26.03		6.5	SP	5.0	B		7		3			STE02
1974 01 26.03	B	5.8	SP	5.0	B		7			3.5	290	SIM
1974 01 26.08		6.4	Y	5.0	B		7					RIM
1974 01 26.11	O	6.2	S	3.5	B		7			&1.2	59	HAA
1974 01 26.12		6.0	Y	5.0	B		10		9	5		MAY
1974 01 26.73	O	5.9	V	5.0	B		7					SZE
1974 01 26.73				19.2	L		50	6	3	0.25	30	UJV
1974 01 26.73	O	5.9	V	5.0	B		7					UJV
1974 01 26.73	O	6.0	V	5.0	B		7					TOT
1974 01 26.75		6.8	S	7.0	B		20	18	5			LUK
1974 01 26.78	B	6.7	S	7.6	L	10	35	4.0		0.07		MUH
1974 01 27.01	B	6.2	SP	5.0	B		7					SIM
1974 01 27.05	B	6.5	S	3.5	B		7		5	3.0	53	MAL
1974 01 27.99		6.2	S	5.0	B		7			&0.75	62	DIL
1974 01 28.00		6.4:	S	15.2	L	4			6	0.3	40	SMI01
1974 01 28.01		6.2:		20.3	L	6	68	& 6.5		&0.63		GRE
1974 01 28.05	B	7.0	S	12.7	R	5	20		5	>1	52	MAL
1974 01 28.17	B	6.2	AC	3.5	B		7			2.5	70	WAL
1974 01 28.17		6.2	SP	5.0	B		10			4		MAY
1974 01 28.77	B	7.0	S	7.6	L	10	35	4.5				MUH
1974 01 29.05	B	7.2	S	12.7	R	5	20		4	>1.5	48	MAL
1974 01 29.17		6.4	SP	5.0	B		10			2		MAY
1974 01 30.07	B	6.6	S	3.5	B		7		4	>1	48	MAL
1974 01 30.12	O	6.3	S	3.5	B		7					HAA
1974 01 30.17		6.7	SP	5.0	B		10		1	2		MAY
1974 01 31.0	B	6.3:	S	5.0	B		7					MEI01
1974 01 31.00		6.3	AC	3.5	B		7		2			STE01
1974 01 31.00		7.3:	S	5.0	B		7					DIL

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 01 31.01		7.0:		20.3	L	6	68	& 5.5				GRE
1974 01 31.02	S	6.7	S	5.2	R		8	8	5	0.83		MOR
1974 01 31.05	B	7.6	S	12.7	R	5	20		4	<1	52	MAL
1974 01 31.13	O	7.0	S	3.5	B		7					HAA
1974 02 01.00	B	7.1	S	5.0	B		7					MEI01
1974 02 01.00	B	7.2	S	12.7	R	5	16		2			GLI01
1974 02 01.02	S	6.8:	S	5.2	R		8	& 8	4/			MOR
1974 02 01.05	B	7.8	S	12.7	R	5	20					MAL
1974 02 01.13	O	6.5:	S	3.5	B		7					HAA
1974 02 01.80	S	7.4	S	7.6	L	10	35	3				MUH
1974 02 02.04		8.0	S	10.8	L	10	24	2	1			DIL
1974 02 02.10		7.0:	S	3.5	B		7					HAA
1974 02 03.00	B	6.8	AC	5.0	B		7					SIM
1974 02 03.06	B	8.0	S	12.7	R	5	20		3	&0.5	60	MAL
1974 02 03.12		7.3:	S	3.5	B		7					HAA
1974 02 04.06	B	8.2	S	12.7	R	5	20		2	>1.1	45	MAL
1974 02 05.02	B	6.8	AC	5.0	B		7					SIM
1974 02 05.10	B	8.4	S	12.7	R	5	20		1/	>1	60	MAL
1974 02 08.07	B	8.6	S	12.7	R	5	20		2			MAL
1974 02 09.02	B	8.0	AC	10.0	B		14					SIM
1974 02 09.07	B	8.6	S	12.7	R	5	20		2	&0.5	65	MAL
1974 02 10.07	B	8.5	S	12.7	R	5	20		2	&1.0	50	MAL
1974 02 10.81	B	8.4	S	17.8	R	15	43	& 5		&0.05	60	MUH
1974 02 11.02		8.6:	S	15.2	L	8	48		0			COS
1974 02 11.06	B	8.7	S	12.7	R	5	20		3	&1	68	MAL
1974 02 11.15	B	7.7	AC	3.5	B		7	& 7.5				WAL
1974 02 11.79	B	8.6	S	7.6	L	9	35	3.3				MUH
1974 02 12.03	B	8.4	S	15	L	4	24					MOR
1974 02 12.03	S	8.3	S	15	L	4	24	& 5	4	<0.08	65	MOR
1974 02 12.03		8.3	S	15.2	L	8	48		0			COS
1974 02 12.03	E	8.2:	S	15	L	4	24					MOR
1974 02 12.07	B	8.8	AC	10.0	B		14					SIM
1974 02 12.07	B	8.7	S	12.7	R	5	20		3	&1.0	58	MAL
1974 02 13.00	B	9.0	AC	10.0	B		14					SIM
1974 02 13.03	S	8.3	S	15	L	4	24	4	3/			MOR
1974 02 13.03	B	8.4	S	15	L	4	24					MOR
1974 02 13.06	B	8.6	S	12.7	R	5	20		3	&1	57	MAL
1974 02 14.02		8.4	S	15.2	L	8	48		0			COS
1974 02 14.07	B	8.8	S	12.7	R	5	20		2	&1	55	MAL
1974 02 16.04	S	8.5	S	15	L	4	24	& 4.5	2			MOR
1974 02 16.04	B	8.5	S	15	L	4	24					MOR
1974 02 16.06	B	8.7	S	12.7	R	5	20		3	>1	53	MAL
1974 02 17.03	B	8.7	S	15	L	4	24					MOR
1974 02 17.03	S	8.6	S	15	L	4	24	5	2			MOR
1974 02 17.06	B	8.8	S	12.7	R	5	20		2	>1	53	MAL
1974 02 18.05	B	8.8	S	15	L	4	24					MOR
1974 02 18.05	S	8.7	S	15	L	4	24	& 7	1/			MOR
1974 02 18.06	B	8.9	S	12.7	R	5	20		2			MAL
1974 02 18.08	S	8.0:	S	5.2	R		8	&12	0	0.50	65	MOR
1974 02 19.06	B	9.0	S	12.7	R	5	20		2			MAL
1974 02 19.13	B	9.5:		11	L	10	90	3.8	0			WAL
1974 02 20.03	B	8.8	S	15	L	4	24					MOR
1974 02 20.03	S	8.6	S	15	L	4	24	8	1			MOR
1974 02 20.05	S	8.0:	S	5.2	R		8	15	0			MOR
1974 02 20.06	B	9.0	S	12.7	R	5	20		1	0.9	50	MAL
1974 02 21.03		8.9	S	15.2	L	8	48		0			COS
1974 02 22.07	B	9.2	S	12.7	R	5	20		0/			MAL
1974 02 23.03		8.6	S	15.2	L	8	48		0			COS
1974 02 23.07	B	9.3	S	12.7	R	5	20		1			MAL

Comet Kohoutek 1973 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 02 25.07	B	9.4	S	12.7	R	5	20		1/			MAL
1974 02 26.04	S	8.8	AC	15	L	4	24	10	0			MOR
1974 02 26.04	B	9.4	AC	15	L	4	24					MOR
1974 02 26.07	B	9.5	S	12.7	R	5	20		1			MAL
1974 03 09.04	B	11.1	AC	20.3	L	5		3				SIM
1974 03 19.06	B	11.3	AC	20.3	L	5		& 1	0			SIM

Comet Bradfield 1974 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 02 19.40	* S	8.5	VN	7.8	R	8	30		5		100	JON
1974 02 25.39				31.7	L	5	86		6	0.08	110	JON
1974 02 25.39	* S	8.5	VN	8.0	B		11					JON
1974 03 19.33	S	4.4	SC	4.9	B		3					JON
1974 04 04.82		6.0	SP	15.2	L	8	30	& 2.6		& 0.12	45	MUH
1974 04 04.82		5.9	SP	4.0	B		8					MUH

Comet Kobayashi-Berger-Milon 1975 IX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 07.96	* S	8.3	S	7.8	R	8	30		4		220	JON
1975 10 08.69	S	7.5	SC	4.5	R	6	13		6			JON
1975 10 16.68	* S	8.0	S	4.5	R	6	13		5			JON
1975 11 13.69		10.3	VN	15.2	L	4	27	5				SUM

Comet Suzuki-Saigusa-Mori 1975 X

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 11 07.39	S	5.3	SC	2.3	B		2					JON
1975 11 07.39				31.7	L	5	86		4			JON
1975 11 11.40				31.7	L	5	86	3.5	6			JON
1975 11 11.40	* S	7.3	SC	4.5	R	6	13					JON
1975 11 12.42	* S	7.8	VN	4.5	R	6	13		4			JON
1975 11 23.43	S	9.2	VN	7.8	R	8	30		4			JON
1975 11 24.48		9.1	S	20.3	L			6				BOE
1975 11 25.48		9.1	S	20.3	L			8				BOE
1975 11 26.49		9.2	S	20.3	L			8				BOE
1975 11 27.50		9.3		20.3	L			8				BOE
1975 11 28.43	S	9.3	VN	7.8	R	8	30		4			JON
1975 11 30.40	S	9.1	VN	7.8	R	8	30		4			JON
1975 11 30.44		9.0	S	20.3	L			1				BOE
1975 12 01.45		9.0	S	20.3	L			6				BOE
1975 12 02.42	S	9.5	VN	7.8	R	8	30		3			JON
1975 12 03.50		9.4	S	20.3	L							BOE
1975 12 06.45	S	8.9	VN	7.8	R	8	30		4			JON
1975 12 07.43	S	8.9	VN	7.8	R	8	30		4			JON
1975 12 09.40	S	9.5	VN	7.8	R	8	30		3			JON
1975 12 10.48				20.3	L			6				BOE
1975 12 22.41	S	12.5	VN	31.7	L	5	86		2			JON
1975 12 23.41	S	12.6	VN	31.7	L	5	86		2			JON
1975 12 28.44	S	12.8	VN	31.7	L	5	86					JON

Comet Bradfield 1975 XI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 11 13.65		8.8	VN	15.2	L	4	27	3				SUM
1975 12 05.62		7.2	S	5.0	B		10	15				GOO
1975 12 06.62		7.5	S	20	L		53	5		0.33	210	NIK
1975 12 06.63		7.0	S	10	L		36	1		0.05	270	STE

Comet Bradfield 1975 XI [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 01 06.94	* B	7.8	S	20.3	L	6	43	& 3	5/			GRE
1976 01 07.00	B	7.7	S	5.0	B		12		8			GRE

Comet Mori-Sato-Fujikawa 1975 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 10 16.69	S	11.8:	VN	31.7	L	5	86		4			JON
1975 11 23.44	S	8.9	S	7.8	R	8	30		6			JON
1975 11 27.83		8.3	S	20.3	L			5				BOE
1975 11 28.74		8.1	S	20.3	L			7				BOE
1975 11 29.50		9.6	S	10.0	R		25	7.5				GOO
1975 11 30.43	S	8.4	S	7.8	R	8	30		6			JON
1975 12 02.39		9.2	S	10.0	R		25	7.5				GOO
1975 12 02.77		8.8	S	20.3	L			11				BOE
1975 12 03.81		8.8	S	20.3	L			10				BOE
1975 12 06.46	S	8.4	VN	7.8	R	8	30		5			JON
1975 12 08.82		8.6	S	20.3	L			10			315	BOE
1975 12 09.41		8.9	S	10.0	R		25	10				GOO
1975 12 10.76		8.6:		20.3	L			&10		&0.03	315	BOE
1975 12 11.41		8.8	S	10.0	R		25	10				GOO
1975 12 13.64	S	8.1	S	4.5	R	6	13		6			JON
1975 12 21.44		8.5	S	5.0	B		10	10				GOO
1975 12 22.41	S	8.9	S	7.8	R	8	30		6			JON
1975 12 22.43		8.2	S	5.0	B		10	10				GOO
1975 12 23.43				31.7	L	5	86		6	0.17	300	JON
1975 12 23.43	S	8.5	S	7.8	R	8	30					JON
1975 12 23.44		8.1	S	5.0	B		10	10				GOO
1975 12 27.42	* S	8.4	VN	4.5	R	6	13					JON
1975 12 27.42	S	8.6	VN	31.7	L	5	86		6	0.17	20	JON
1976 01 05.41	* S	8.5	S	4.5	R	6	13		6			JON
1976 02 22.39	S	8.6	VN	7.8	R	8	30		5			JON
1976 02 24.39	S	8.6	VN	7.8	R	8	30		4			JON
1976 03 03.38	S	9.4	VN	7.8	R	8	30		6			JON
1976 03 23.36	S	10.0	S	31.7	L	5	86		4			JON
1976 04 17.31	S	10.8	S	31.7	L	5	86		3			JON
1976 05 07.65	S	11.4	VN	8.0	B		11					JON
1976 05 07.65	S	12.7	VN	31.7	L	5	86		4			JON
1976 05 09.73	S	12.4	VN	31.7	L	5	86		6			JON
1976 05 10.74	S	12.2	VN	31.7	L	5	86		4			JON
1976 06 22.46	S	13.0	VN	31.7	L	5	86					JON
1976 06 24.39	S	13.2	VN	31.7	L	5	86					JON

Comet Bradfield 1976 IV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 02 20.41	S	10.7	S	31.7	L	5	86		2			JON
1976 02 22.38	S	9.6	S	7.8	R	8	30		2			JON
1976 02 24.39	S	10.3	S	7.8	R	8	30		2			JON
1976 03 03.37	S	9.1	S	7.8	R	8	30		2			JON

Comet West 1976 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 11 25.45		12.7:		20.3	L			4				BOE
1975 11 26.46		12.7:		20.3	L							BOE
1975 12 04.46				20.3	L			8				BOE
1976 02 25.92	*	-2	AE	22.9	R	12	90			1	100	OME
1976 02 29.44	*	-1.5	AE	3.5	B		7					COL
1976 03 01.46		0.2:	Y	5.0	B		7		2/	1.25	335	SAN01

Comet West 1976 VI [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 03 02.46	* I	-0.5:	AE	0.0	E		1		9			GRE
1976 03 03.46	* I	-0.5:	AE	0.0	E		1		9			GRE
1976 03 04.45	*			20.3	L	6	43	& 3	9			GRE
1976 03 04.45	* I	0.5:	AE	0.0	E		1			17.5		GRE
1976 03 04.46	O	1.9:	AE	0.0	E		1					SAN01
1976 03 05.43	B	0.6	Y	5.0	B		7					MEI01
1976 03 06.46	! B	1.4	Y	5.2	R		8	& 2.5	9			MOR
1976 03 06.46	* I	1.0:	Y	0.0	E		1					GRE
1976 03 06.47		1.5	SP	5.0	B		7		7	23		WEI
1976 03 07.41	O	1.3	Y	4.0	B		10			5		DEL
1976 03 07.43		1.3	SP	0.0	E		1			7.5	99	SLO
1976 03 07.44	O	1.5	UX	0.0	E		1		9			SMI01
1976 03 07.44		1.2	AT	0.0	E		1			21.8	327	COS
1976 03 07.45	* I	0.8	Y	0.0	E		1			38	200	GRE
1976 03 07.45		2.0	UX	0.0	E		1			85	300	SAB
1976 03 07.52		1.5:	Y	5.0	B		10		8	10	295	MAY
1976 03 07.56	O	1.5:	SP	3.5	B		7		8	5	95	OHA
1976 03 08.40		1.7	SP	0.0	E		1			24		SLO
1976 03 08.41		1.8	UX	0.0	E		1			10		OME
1976 03 08.41	O	1.5	Y	4.0	B		10			5		DEL
1976 03 08.43	! B	1.7	Y	5.2	R		8		9			MOR
1976 03 09.19	! B	2.2	AT	4.0	B		8			4		MUH
1976 03 09.47	S	1.6	AT	3.5	B		7			15	290	WES
1976 03 10.19	! B	2.0	AT	4.0	B		8			4		MUH
1976 03 10.41	B	1.7:	Y	5.0	B		7					MEI01
1976 03 11.19	! B	1.9	AT	4.0	B		8			6		MUH
1976 03 11.43	* I	1.9	Y	0.0	E		1			22		GRE
1976 03 11.44		2.3	UX	0.0	E		1					SAN01
1976 03 11.44	! B	1.7	Y	5.2	R		8		9			MOR
1976 03 11.45		2.0	SP	5.0	B		7			15		WEI
1976 03 11.45	O	2.0	SP	5.0	B		7			15		BOH
1976 03 12.18		2.9	NO	6.0	B		20					SAS01
1976 03 12.18		2.5	NO	6.0	B		20					SAS
1976 03 12.40		1.9	SP	0.0	E		1			30		SLO
1976 03 12.40		3.2	UX	0.0	E		1			7	290	MAT02
1976 03 12.50		2.4	Y	5.0	B		10		8			MAY
1976 03 12.53	O	2.9	SP	3.5	B		7		8	2.5	70	OHA
1976 03 13.50		2.5	Y	5.0	B		10		8	20	300	MAY
1976 03 13.53	O	3.1	SP	3.5	B		7			3	70	OHA
1976 03 14.44	*	2.5	SP	0.0	E		1			8	280	SIM
1976 03 14.54	O	3.1	SP	3.5	B		7		8	5	70	OHA
1976 03 15.44		3.5	Y	0.0	E		1			4	295	GLI01
1976 03 15.52	O	3.3	SP	3.5	B		7			3	70	OHA
1976 03 17.41		3.7	AE	0.0	E		1			0.5		MCE
1976 03 17.42	B	3.3	UX	0.0	E		1			2	235	MAT02
1976 03 18.47	B	3.2	AT	3.5	B		7					WES
1976 03 18.47	S	3.2	AT	3.5	B		7					WES
1976 03 20.52	O	4.2	SP	3.5	B		7	& 3	8	3	72	OHA
1976 03 21.18	B	3.9	AT	4.0	B		8			3		MUH
1976 03 21.38		4.5	UX	5.0	B		10	& 7.5	6	4	230	MAT02
1976 03 21.41		3.2:	Y	5.0	B		7					COL
1976 03 21.51	O	4.4	SP	3.5	B		7			3	74	OHA
1976 03 21.53		3.8	UX	5.0	B		10		7	15	295	MAY
1976 03 22.17	B	3.6	AT	4.0	B		8			4	285	MUH
1976 03 22.54	O	4.5	SP	3.5	B		7	& 4	8	3	75	OHA
1976 03 23.38	B	4.1	Y	5.0	B		7					MEI01
1976 03 23.43		3.9	S	0.0	E		1			3	270	GLI01
1976 03 23.51	O	4.6	SP	3.5	B		7			3	75	OHA
1976 03 24.38		4.8	UX	5.0	B		20	& 7	6	3	220	MAT02

Comet West 1976 VI [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 03 26.14		5.6	Y	6.0	B		20					SAS01
1976 03 26.14		5.7	Y	6.0	B		20					SAS
1976 03 26.37		5.0	UX	5.0	B		10			4	220	MAT02
1976 03 26.41	S	4.4	AT	5.0	B		7					MCE
1976 03 26.51	O	5.0	SP	3.5	B		7			2	72	OHA
1976 03 27.38		4.1:	Y	5.0	B		7					COL
1976 03 27.38		4.6	AT	3.5	B		7					MIL
1976 03 27.39		5.2	UX	5.0	B		10			4	212	MAT02
1976 03 27.41		4.9	SP	3.5	B		7			3	297	POR
1976 03 28.13		5.6	Y	6.0	B		20					SAS01
1976 03 28.13		5.7	Y	6.0	B		20					SAS
1976 03 28.47	O	5.1	SP	3.5	B		7			1	92	OHA
1976 03 29.38		5.4	UX	5.0	B		10			4.5	215	MAT02
1976 03 31.14		5.8	Y	6.0	B		20					SAS
1976 03 31.14		5.6	SP	6.0	B		20					SAS
1976 03 31.14		5.7	Y	6.0	B		20					SAS01
1976 03 31.14		5.6	SP	6.0	B		20					SAS01
1976 03 31.51	O	4.6	SP	5.0	B		7			3		MIN
1976 04 01.16	B	5.1	SP	4.0	B		8			&2.5	275	MUH
1976 04 02.15	B	5.0	SP	4.0	B		8	4		2.0	276	MUH
1976 04 03.12		5.1	AC	5.0	B		7	5	5	3	280	SIM
1976 04 03.15	B	5.1	SP	4.0	B		8			1.7	275	MUH
1976 04 04.15	B	5.3	SP	4.0	B		8			1	275	MUH
1976 04 04.35		5.2	Y	5.6	R	10	20					COL
1976 04 04.43	O	6.1	SP	3.5	B		7	& 4	7	2		OHA
1976 04 05.12		5.9	SP	6.0	B		20					SAS01
1976 04 05.12		6.0	Y	6.0	B		20					SAS
1976 04 05.12		5.8	SP	6.0	B		20					SAS
1976 04 05.36		5.5:	Y	5.0	B		10	5	4	2	215	MAT02
1976 04 05.39	B	5.2	Y	5.0	B		12		6			MOR
1976 04 05.39	E	5.1	Y	5.0	B		12					MOR
1976 04 05.39	B	5.2	Y	5.2	R		8		8	3.5	278	MOR
1976 04 07.40		5.3	NO	0.0	E		1					OME
1976 04 08.31		5.7	S	0.0	E		1					OME
1976 04 08.35		5.6	UX	5.0	B		7			1	270	COL
1976 04 08.39	B	5.6	Y	5.2	R		8		8	3.5	275	MOR
1976 04 09.28		5.7	UX	5.0	B		7					COL
1976 04 09.38	B	5.7	Y	5.2	R		8		7/	3.5	273	MOR
1976 04 10.32		6.3	S	3.5	B		7		7	1.5	290	STE01
1976 04 10.33	*	5.9	AC	5.0	B		7					SIM
1976 04 10.38	B	5.7	Y	5.2	R		8		7	2.5		MOR
1976 04 11.34		6.1	S	4.0	B		8			0.5	270	COL
1976 04 12.13	B	6.0	S	4.0	B		8			1	268	MUH
1976 04 18.35		7.3	S	12.0	R		20			0.25	280	COL
1976 04 18.38	B	7.1	S	20.3	L	8	43		1	&0.50		GRE
1976 04 20.34		7.2	S	12.0	R		20			0.40	300	COL
1976 04 23.38	S	8.8	S	15.2	L	4	49		0			MCE
1976 05 01.06	B	7.6	S	17.8	R	15	43	& 4		&0.4	255	MUH
1976 05 01.25		7.1	S	5.6	R	10	20					OME
1976 05 02.01	B	7.4	S	15.2	L	8	30			1	255	MUH
1976 05 08.03	B	7.8	S	15.2	L	8	30	2				MUH
1976 05 08.29		8.6	S	15.2	L	8	35		2	0.5	290	STE01
1976 05 09.25		7.0	S	5.6	R	10	20					OME
1976 05 09.27	* O	7.9:	S	4.2	R		10					COL
1976 05 14.23		7.5	S	5.6	R	10	20					OME
1976 05 14.92	B	9.5	S	22.9	R		160					MUH
1976 06 23.25		8.7:	S	12.0	R		20					COL
1976 07 02.22	* B	9.0	S	20.3	L	8	43	& 6	8	0.12		GRE
1976 07 25.22	S	9.1	AC	15	L	4	24	15	2			MOR

Comet West 1976 VI [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 07 27.15	S	9.0	AC	15	L	4	24	8	2	0.20	320	MOR
1976 08 02.19	S	9.2	NP	15	L	4	24	8	3	0.20	315	MOR
1976 08 03.18	S	9.3	NP	15	L	4	24	10	1	0.08	315	MOR
1976 08 04.22	S	9.8	NP	15	L	4	24	6	0	0.07	310	MOR

Comet Kohler 1977 XIV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1977 11 06.40	* S	6.9	VN	4.5	R	6	13					JON
1977 11 09.39	S	7.4	SC	4.5	R	6	13					JON
1977 11 14.41	S	7.1	SC	4.5	R	6	13					JON
1977 11 16.41	S	7.2	SC	4.5	R	6	13					JON
1977 11 28.42	S	7.2	SC	7.8	R	8	30					JON
1977 12 06.40	S	7.0	SC	4.5	R	6	13					JON
1977 12 13.40	S	7.5	SC	4.5	R	6	13					JON
1977 12 13.40				31.7	L	5	86	2	6			JON
1977 12 17.42	S	8.5	S	4.5	R	6	13					JON
1977 12 17.42	S	8.6	S	7.8	R	8	30		5			JON
1977 12 18.41	S	8.2	S	7.8	R	8	30					JON
1978 01 02.40	S	9.9	S	7.8	R	8	30					JON
1978 01 03.41	* S	8.8	VN	7.8	R	8	30					JON
1978 01 06.40	S	9.3	VN	7.8	R	8	30					JON
1978 01 07.43	S	9.4	VN	7.8	R	8	30					JON
1978 01 09.42	S	9.1	S	7.8	R	8	30					JON
1978 01 10.42	S	9.6	S	7.8	R	8	30					JON
1978 01 11.41	S	10.1	S	7.8	R	8	30					JON
1978 01 12.41	* S	9.7	S	7.8	R	8	30					JON
1978 01 15.41	* S	10.4	VN	31.7	L	5	86		3			JON
1978 01 16.42	* S	11.0	VN	31.7	L	5	86		3			JON
1978 01 31.40	* S	11.9	VN	31.7	L	5	86					JON
1978 02 01.40	* S	11.9	VN	31.7	L	5	86		3			JON
1978 02 02.39	* S	12.2	VN	31.7	L	5	86					JON
1978 02 05.39	* S	12.2	VN	31.7	L	5	86					JON
1978 02 06.39	* S	12.4	VN	31.7	L	5	86					JON
1978 02 07.38	* S	12.2	VN	31.7	L	5	86		2			JON
1978 02 08.37	* S	12.4	VN	31.7	L	5	86					JON

Comet Bradfield 1978 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 02 07.68	S	7.8	SC	4.5	R	6	13					JON
1978 02 08.68	S	7.8	SC	8.0	B		11		5			JON
1978 02 09.68	S	7.6	SC	8.0	B		11		5			JON
1978 02 10.68	S	8.3	SC	8.0	B		11		6			JON
1978 03 02.70	S	6.0	SC	4.9	B		3			0.5		JON

Comet Machholz 1978 XIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 09 15.73	* S	11.5	VN	31.7	L	5	86		3			JON

Comet Seargent 1978 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 10 05.70	S	6.7	SC	8.0	B		11					JON
1978 10 11.67	S	7.4	SC	4.5	R	6	13			0.08	205	JON
1978 10 21.50	*			7.8	R	8	30		6	?	180	JON
1978 10 21.50	S	7.9	SC	4.5	R	6	13					JON
1978 10 31.43	S	8.1	SC	7.8	R	8	30		5			JON

Comet Seargent 1978 XV [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 11 03.42	* S	8.7	S	4.5	R	6	13			?	180	JON
1978 11 06.66	* S	8.4	S	4.5	R	6	13					JON
1978 11 07.41	* S	8.3	S	4.5	R	6	13					JON
1978 11 09.38	* S	8.8	S	7.8	R	8	30					JON
1978 11 19.42	* S	10.8	VN	31.7	L	5	86					JON
1978 11 19.42	* S	10.4	VN	7.8	R	8	30					JON
1978 11 20.42	* S	10.2	VN	7.8	R	8	30					JON
1978 11 21.42				31.7	L	5	86	3	2			JON
1978 11 21.42	* S	10.2	VN	7.8	R	8	30					JON
1978 11 25.41	* S	10.8	VN	7.8	R	8	30					JON
1978 11 25.41	* S	11.2	VN	31.7	L	5	86					JON
1978 11 27.41	* S	11.6	VN	31.7	L	5	86		2			JON
1978 11 29.42	* S	11.8	VN	31.7	L	5	86					JON

Comet Meier 1978 XXI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1978 06 01.17	B	8.1	S	8.0	B		20	& 7	3		270	GRE

Comet Bradfield 1979 X

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 04.05	B	7.8	S	5.0	B		12					GRE

Comet Wilson 1986I

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 11 18.43	S	11.5	L	25	L	4	82	1.3	2			JAC01
1987 12 19.35	S	11.0	L	25	L	4	46					JAC01
1987 12 19.35	S	10.9:	L	13	L	8	40					JAC01
1987 12 26.31	S	10.9	L	25	L	4	82	2	3			JAC01
1988 01 10.15	S	11.4	L	25	L	4	82					JAC01
1988 01 17.33	S	11.4	L	25	L	4	82					JAC01
1988 02 08.23	S	11.8	NP	25.6	L	4	111	1.5	2/			MOR
1988 02 11.45	S	11.6	L	25	L	4	82					JAC01
1988 02 13.20	S	12.0	NP	25.6	L	4	111	1.2	1			MOR
1988 02 16.19	S	12.2	NP	25.6	L	4	111	1.7	1/			MOR
1988 03 06.11	S	12.4	A	25	L	4	82	1.6	2			JAC01
1988 03 12.22	S	13.5	NP	25.6	L	4	156	1.0	1			MOR
1988 03 22.23	S[13.5			25.6	L	4	156					MOR
1988 04 07.14	S	12.5	A	25	L	4	179					JAC01
1988 09 08.48	S[13.3		AC	41	L	4	83	! 0.5				HAL

Comet Bradfield 1987s

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 10.73	B	8.0	S	5.0	B	4	10	10	7			PLE01
1987 10 14.73	B	7.7	S	5.0	B	4	10	12	6			PLE01
1987 10 15.72	B	7.1	S	5.0	B	4	10	18	5			PLE01
1987 10 26.70	B	6.4	S	5.0	B	4	10	20	5			PLE01
1987 10 28.71	B	6.3	AA	8.0	B		20	6	6	0.1		SPE01
1987 10 28.71	B	6.3	S	8.0	B		10	4	4			PAR03
1987 10 28.73	S	6.3	S	8.0	B		10	4	4			RZE
1987 10 28.73	B	6.0	S	6.4	R		40		4			KOS02
1987 10 28.73	B	6.4	AA	5.0	B		7					SPE01
1987 10 28.75	B	6.3	S	5.0	B	4	10	20	6	1	72	PLE01
1987 10 29.71	B	6.4	AA	8.0	B		20	4	6	0.3		SPE01
1987 10 29.71	B	6.4	S	8.0	B		10	8	4			PAR03
1987 10 29.71	S	6.2	S	5.6	R		11		5			RZE

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 29.72	B	6.3	S	8.0	B		8		3			VEL02
1987 10 29.72	B	6.3	AA	5.0	B		7					SPE01
1987 10 29.74	B	6.0	S	6.4	R		40		4			KOS02
1987 10 29.76	B	6.3	S	5.0	B	4	10	20	5	1.8	75	PLE01
1987 10 30.71	B	6.3	S	5.0	B		7	8	4			PAR03
1987 10 30.71	B	6.4	S	6.4	R		40		5			KOS02
1987 10 30.71	S	6.2	S	5.6	R		11		5			RZE
1987 10 30.71	B	6.3	AA	8.0	B		20	3	7	0.2		SPE01
1987 10 30.72	B	6.3	AA	5.0	B		7					SPE01
1987 10 31.69	S	6.2	S	5.6	R		11	& 2.5	5			RZE
1987 10 31.70	B	6.4	AA	8.0	B		20	3	6			SPE01
1987 10 31.71	B	6.3	S	5.0	B		7	8	4			PAR03
1987 10 31.75	B	6.4	S	4.0	B	6	11	15	5			RAF
1987 11 04.73	M	6.3	S	6.7	R	12	60	10	4	0.5	65	KOS01
1987 11 04.77	B	5.6	S	8.0	R	15	55	7.5	5			SZU
1987 11 08.80	B	5.6	S	8.0	R	15	55	7.5	5			SZU
1987 11 10.69	M	6.2	S	6.7	R	12	60	&12.5	4	0.5	63	KOS01
1987 11 10.73	B	5.4	S	8.0	R	15	55	8.0	5	0.53		SZU
1987 11 11.73	M	5.6	S	7.0	R		20		0			LUG
1987 11 12.73	M	5.6	S	7.0	R		20		0			LUG
1987 11 13.68	S	5.6	S	6.4	R		20		3			URB
1987 11 13.69	M	6.1	S	31	L	15	80	&12.5	4	0.5	62	KOS01
1987 11 13.77	B	5.4	S	8.0	R	15	55	9	5	0.62		SZU
1987 11 14.81	B	6.0	S	8.0	B		8		2			VEL02
1987 11 15.0	B	5.0	SP	0.0	E		1					MEI01
1987 11 15.0	B	5.5	SP	2.0	B		7					MEI01
1987 11 15.0	B	6.0	SP	5.0	B		7	8	5	0.67	110	MEI01
1987 11 15.69	S	5.5	S	6.4	R		20	2.4	4			URB
1987 11 15.70	B	6.2	AA	8.0	B		20	4	7	0.5		SPE01
1987 11 15.72	B	6.1	AA	5.0	B		7					SPE01
1987 11 15.74	B	5.9	S	5.0	B	4	10	25	3			PLE01
1987 11 22.9	B	6.0	SP	5.0	B		7	10	5	0.5	80	MEI01
1987 11 22.9	S	5.9	SP	5.0	B		7					MEI01
1987 11 25.71	S	5.5	S	5.6	R		11	& 3	6			RZE
1987 11 25.71	B	5.8	AA	4.5	B		7	6	6	0.3		SPE01
1987 11 25.72	B	5.8	S	5.0	B	4	10	25	7	3.8	55	PLE01
1987 11 25.75	B	5.6	S	7.0	R		36		7			GOR01
1987 11 25.76	B	5.9	S	8.0	B		8		2			VEL02
1987 11 26.67	B	5.7	S	4.0	B	6	11	20	3			RAF
1987 11 26.67	S	6.5	S	6.5	R	12	21	& 2	3	&0.15		DZI
1987 11 26.67	S	5.7	S	5.6	R		11	& 3	6	0.5		RZE
1987 11 26.69	B	6.0	AA	4.5	B		7	4	6			SPE01
1987 11 26.70	B	5.9	AA	5.0	B		7	6	6	0.3		SPE01
1987 11 26.71	M	5.7	S	7.0	R		20		1			LUG
1987 11 26.82	B	6.0	S	5.0	B	4	10	20	6	0.75	62	PLE01
1987 11 29.71	B	6.0	AA	5.0	B		7	4	7			SPE01
1987 11 29.75	B	6.1	AA	8.0	B		20	5	6			SPE01
1987 11 30.66	S	5.5	S	6.4	R		20	2.2	4			URB
1987 11 30.70	M	6.1	S	6.7	R	12	60	6	4	0.33	50	KOS01
1987 11 30.85	M	5.6	S	7.0	R		20		1			LUG
1987 12 01.73	M	6.0	S	6.7	R	12	60	6	4	0.33	50	KOS01
1987 12 02.72	B	5.9	S	8.0	R	15	55	9	5	0.77		SZU
1987 12 03.71	B	5.9	AA	5.0	B		7	4	6			SPE01
1987 12 04.05	B	5.4	AA	8.0	B		20			?	50	JAC01
1987 12 04.05	B	5.5	AA	5.0	B		10			?	50	JAC01
1987 12 04.67	S	6.5	S	6.5	R	12	21	2.5		0.15		DZI
1987 12 04.77	B	6.7	S	5.0	B	4	10	20	6			PLE01
1987 12 05.67	S	6.2	S	6.5	R	12	21	2	5	0.08		DZI
1987 12 05.72	B	6.6	S	5.0	B	4	10	20	5			PLE01

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 12 05.74	M	5.4	S	7.0	R		20		3			LUG
1987 12 06.75	M	5.4	S	7.0	R		20		3			LUG
1987 12 07.76	B	6.0	S	8.0	R	15	55	9	5	0.78		SZU
1987 12 07.76	M	5.4	S	7.0	R		20		3			LUG
1987 12 08.67	B	5.9	S	5.0	B	4	10	25	5	0.5	55	PLE01
1987 12 08.67	S	6.2	S	6.4	R		32		3			DAL01
1987 12 08.68	S	5.8	S	6.4	R		20	2.3	4			URB
1987 12 08.68	S	6.0	S	6.5	R	12	21	3	6	0.67		DZI
1987 12 08.69	M	6.0	S	6.7	R	12	60	5	3	0.25	48	KOS01
1987 12 08.71	B	5.8	S	8.0	B		10					PAR03
1987 12 08.72	B	6.0	S	8.0	R	15	55	8.6	5	1.62		SZU
1987 12 08.72	B	6.0	AA	5.0	B		7	6	6	0.5	56	SPE01
1987 12 08.73	B	6.1	AA	8.0	B		20	5	6	0.3	56	SPE01
1987 12 08.75	M	5.4	S	7.0	R		20		3			LUG
1987 12 09.67	S	6.3	S	6.4	R		32		3			DAL01
1987 12 09.68	B	6.7	S	5.0	B	4	10	30	5	0.17	55	PLE01
1987 12 09.69	M	6.0	S	6.7	R	12	60	5	3	0.25	48	KOS01
1987 12 09.71	B	5.9	AA	5.0	B		7	7	6	0.7	57	SPE01
1987 12 09.71	B	5.8	S	7.0	R		36		8			GOR01
1987 12 09.73	B	6.0	AA	8.0	B		20	7	7	0.6	57	SPE01
1987 12 09.74	B	5.8	S	8.0	B		10					PAR03
1987 12 09.76	B	5.7	S	7.0	R		20		1			LUG
1987 12 09.78	S	6.0	S	5.0	B		7			&0.17		DZI
1987 12 10.17	M	5.5	AA	5.0	B		10					JAC01
1987 12 11.68	S	5.7	S	5.0	B		7	2	6	0.5		DZI
1987 12 11.71	B	6.0	S	8.0	R	15	55	8.4	5	1.5		SZU
1987 12 11.74	S	5.8	S	6.4	R		20	2.6	4			URB
1987 12 11.77	B	6.3	S	5.0	B	4	10	36	5	1	65	PLE01
1987 12 11.80	B	5.9	S	8.0	B		8		2	0.7		VEL02
1987 12 11.84	B	5.7	S	7.0	R		20		1			LUG
1987 12 12.67	B	5.8	S	6.8	R		17			1	50	PAR03
1987 12 12.67	S	6.3	S	6.4	R		32		3			DAL01
1987 12 12.69	S	5.9	S	6.4	R		20	2.8	3			URB
1987 12 12.69	M	5.9	S	6.7	R	12	60	3	4	&0.21	46	KOS01
1987 12 12.69	S	5.6	S	5.6	R		11	4	6	1	55	RZE
1987 12 12.78	B	6.0	S	8.0	R	15	55	8.7	5	1.5		SZU
1987 12 12.85	B	5.8	S	7.0	R		20		1			LUG
1987 12 13.67	B	5.8	S	6.8	R		17			1	50	PAR03
1987 12 13.70	M	5.9	S	6.7	R	12	60	4	4	0.25	46	KOS01
1987 12 13.72	B	6.0	S	7.0	R		36		6			GOR01
1987 12 13.73	B	6.2	AA	5.0	B		7	5	6	0.8	64	SPE01
1987 12 13.74	B	6.3	AA	8.0	B		20	5	6	0.5	64	SPE01
1987 12 13.79	S	5.9	S	5.0	B		7	1.5	5	&0.08		DZI
1987 12 13.80	B	6.1	S	8.0	B		8		2			VEL02
1987 12 14.67	B	6.1	S	5.0	B	4	10	15	5	0.08		PLE01
1987 12 14.77	S	6.0	S	5.0	B		7	1.3	5	0.67		DZI
1987 12 15.71	B	6.2	AA	5.0	B		7	6	5			SPE01
1987 12 15.72	B	6.2	AA	8.0	B		20	6	6	0.5	62	SPE01
1987 12 17.04	M	5.5	AA	5.0	B		10			3	45	JAC01
1987 12 19.07	M	5.6	AA	5.0	B		10			3.4		JAC01
1987 12 20.09	M	5.7:	AA	8.0	B		20			1		JAC01
1987 12 21.67	B	6.7	S	5.0	B	4	10	20	5	1.2	65	PLE01
1987 12 21.79	B	6.0	AA	5.0	B		7	5	5	0.7	60	SPE01
1987 12 23.71	B	6.2	S	5.0	B	4	10	20	4	0.9	60	PLE01
1987 12 23.81	B	6.1	AA	5.0	B		7	5	5			SPE01
1987 12 24.86	B	6.7	S	8.0	B		8		2	1.0		VEL02
1987 12 25.02	B	5.9	AA	5.0	B		10			&1		JAC01
1987 12 25.74	B	6.4	S	8.0	R	15	55	5.3	3			SZU
1987 12 25.78	S	6.4	S	6.8	R		30		2			JAN01

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 12 26.06	M	5.7	AA	5.0	B		10			<1		JAC01
1987 12 26.77	B	6.8	S	8.0	B		8		2			VEL02
1987 12 27.03		5.9:		2.1	B		7					JAC01
1987 12 30.00	M	6.2:	AA	13	L	8	40					JAC01
1987 12 30.72	B	7.0	AA	5.0	B		7	4	3			SPE01
1987 12 30.73	B	7.2	AA	8.0	B		20	5	4			SPE01
1987 12 31.70	B	8.0	S	8.0	B		10		2			KOS02
1988 01 03.74	B	6.6	S	6.8	R		17					PAR03
1988 01 04.68	S	6.8	S	5.6	R		11	4	4			RZE
1988 01 04.77	B	7.2	S	5.0	B	4	10	25	4			PLE01
1988 01 05.02	M	6.3	AA	13	L	8	40					JAC01
1988 01 05.80	B	7.5	S	8.0	B		8		2			VEL02
1988 01 06.03	M	6.5	AA	5.0	B		10	7	3	0.7	50	JAC01
1988 01 06.76	B	7.1	S	5.0	B	4	10	20	4			PLE01
1988 01 07.08	M	6.6	AA	5.0	B		10			&1	50	JAC01
1988 01 07.75	B	7.0	AA	5.0	B		7	6	4			SPE01
1988 01 07.78	B	7.2	AA	8.0	B		20	6	4	0.2		SPE01
1988 01 09.77	B	7.2	S	8.0	R	15	55	5.1	3			SZU
1988 01 09.79	B	7.2	AA	5.0	B		7	5	3			SPE01
1988 01 09.81	B	7.4	AA	8.0	B		20	7	4			SPE01
1988 01 10.02	M	6.8	AA	5.0	B		10	8	2/	1.8	60	JAC01
1988 01 10.73	B	7.1	AA	5.0	B		7	6	3			SPE01
1988 01 10.76	B	7.1	AA	8.0	B		20	7	4	0.4	61	SPE01
1988 01 10.78	B	7.4	S	5.0	B	4	10	20	4			PLE01
1988 01 10.78				6.6	R	12	40	30	4	0.25	75	PLE01
1988 01 10.79	S	6.7	S	6.4	R		20		2			URB
1988 01 12.73	B	7.6	AA	5.0	B		7	7	3			SPE01
1988 01 12.75	B	7.7	AA	8.0	B		20	7	4			SPE01
1988 01 12.83	B	6.5	HD	8.0	R			7	6			NES
1988 01 13.18	M	6.8	AA	5.0	B		10	9.5	4	4.5	65	MOR
1988 01 13.19	M	6.8	AA	8.0	B		20	8.0	5	0.67	270	MOR
1988 01 13.73	S	7.7	AA	5.0	B		7	5	3			SPE01
1988 01 13.73	B	7.8	S	5.0	B	4	10	15	4			PLE01
1988 01 13.73	S	6.9	S	6.4	R		20	1.7	2			URB
1988 01 13.75	S	7.6	AA	8.0	B		20	6	4			SPE01
1988 01 14.73	B	8.5	S	25.0	L		60		2			KOS02
1988 01 15.73	B	7.8	S	5.0	B	4	10	25	4			PLE01
1988 01 15.78	B	8.6	S	6.4	R		40		2			KOS02
1988 01 15.88	B	6.8	S	6.8	R		17	8				PAR03
1988 01 16.69	B	7.4	S	5.0	B	4	10	20	4			PLE01
1988 01 16.75	B	6.8	S	6.8	R		17	8				PAR03
1988 01 16.80	B	6.8	HD	8.0	R			7	6			NES
1988 01 16.96	B	8.0	S	8.0	B		8		3			VEL02
1988 01 19.10	M	7.0	AA	5.0	B		10		3	2.25	54	MOR
1988 01 20.71	B	7.8	S	5.0	B	4	10	20	3			PLE01
1988 01 20.78	B	8.1	S	6.4	R		40		2			KOS02
1988 01 21.83	B	8.0	S	6.4	R		40	0.33	2			KOS02
1988 01 22.11	M	7.0	AA	5.0	B		10					MOR
1988 01 22.14	M	7.1	AA	8.0	B		20	10	4	1.67	60	MOR
1988 02 08.17	S	8.0	AA	8.0	B		20	9	3	2.17	69	MOR
1988 02 10.15	S	8.2	AA	8.0	B		20	9	2	0.33		MOR
1988 02 13.16	S	8.1	AA	8.0	B		20	10	2	0.33	60	MOR
1988 02 14.76	S	9.5	AA	8.0	B		20	2	1			SPE01
1988 02 16.16	S	8.1	AA	8.0	B		20	11	1/	0.33	70	MOR
1988 02 25.07	S	8.6	AA	25	L	4	46					JAC01
1988 03 05.09	S	8.7	AA	25	L	4	82	3.2	2	0.4	65	JAC01
1988 03 06.09	S	8.8	AA	8.0	B		20	5	1/	?	65	JAC01
1988 03 06.09	S	8.9	AA	25	L	4	82			0.43	63	JAC01
1988 03 11.16	S	9.8	NP	25.6	L	4	45	4.1	1/			MOR

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 03 11.17	S	9.8	NP	8.0	B		20	8	0			MOR
1988 03 14.07	S	9.0	AA	8.0	B		20	5	2	0.1	62	JAC01
1988 03 20.19	M	10.9	NP	25.6	L	4	67	2.1	2			MOR
1988 04 06.13	S	11.1	L	25	L	4	179					JAC01
1988 04 11.15	S	11.2	A	25	L	4	179	2.4	1/			JAC01

Comet McNaught 1987b₁

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 01 23.53				25.6	L	4	45	4.1	7			MOR
1988 01 23.53	M	6.4	AA	8.0	B		20	11	7	0.67	345	MOR
1988 01 23.54	M	6.4	AA	5.0	B		10					MOR
1988 02 13.76	S	8.2	AC	8.0	B		20	6	4			BOA
1988 02 22.53	S	8.6	AA	7.0	B		16	& 3.3	4	0.50	322	MOR
1988 02 23.51	S	8.1	AA	7.0	B		16	5.9	2/			MOR
1988 03 05.08	S	8.9	AA	25	L	4	82	5	3/	0.12	357	JAC01
1988 03 06.09	S	8.7	AA	8.0	B		20					JAC01
1988 03 13.34	B	9.0	AA	13	L	8	40	3.2	3	0.17	0	JAC01
1988 03 14.44	M	8.9	AA	8.0	B		20					JAC01
1988 03 20.17	S	10.2	NP	25.6	L	4	67		1/			MOR
1988 04 06.14	S	9.9	AA	25	L	4	82	4.1	0			JAC01
1988 04 11.16	S	10.4	A	25	L	4	82					JAC01
1988 05 04.15	S	12.2	L	25	L	4	179	3.2	0/			JAC01

Comet Levy 1988e

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 03 25.52	S	11.6	AC	25.6	L	4	111	2.0	1/			MOR
1988 04 24.48	S	12.7:	AC	25.6	L	4	111	2.0	1			MOR

Comet Furuyama 1987f₁

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 01 13.15	S	9.6	AC	25.6	L	4	45	3.0	2			MOR
1988 01 22.12	M	9.8	NP	25.6	L	4	45	4.0	3			MOR
1988 02 08.16	M	9.8	AA	25.6	L	4	45	3.5	2/			MOR
1988 02 10.14	S	9.8	AC	25.6	L	4	45	3.2	2			MOR
1988 02 13.15	S	9.9	AC	25.6	L	4	45	3.5	2			MOR
1988 02 16.14	S	9.8	AC	25.6	L	4	45	3.3	2			MOR
1988 05 23.80	S	10.2	V	15.2	L	5	29	3	4			SEA
1988 05 24.87	S	10.4	VN	20	L	4	45					PEA
1988 05 25.87	S	10.5	VN	20	L	4	45					PEA
1988 05 27.86	S	10.5:	VN	20	L	4	45					PEA
1988 06 19.88	S	10.7	VN	20	L	4	45	2.5	1/			PEA
1988 06 20.67	S	11.1	V	25.4	L	4	44					SEA
1988 06 21.89	S	10.8	VN	20	L	4	45	2.0	1			PEA
1988 06 22.88	S	10.8	VN	20	L	4	45	2.5	1			PEA
1988 06 25.89	S	10.9	VN	20	L	4	45	2.2	0/			PEA
1988 07 07.54	S	12.1	V	25.4	L	4	114	& 1				SEA
1988 07 10.80	S	11.1	VN	20	L	4	45	2.5	0/			PEA
1988 07 11.79	S	11.1	VN	20	L	4	45	3	1			PEA
1988 07 18.88	S	11.6	VN	20	L	4	45	2	0			PEA

Comet Liller 1988a

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 01 13.12	S	9.8	AA	25.6	L	4	67	3.3	1/			MOR
1988 02 08.13	M	8.4	AA	25.6	L	4	45	3.8	4			MOR
1988 02 08.14	S	8.5	AA	8.0	B		20		1			MOR

Comet Liller 1988a [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 02 10.13	M	8.5	AA	25.6	L	4	45	2.7	4/			MOR
1988 02 13.13	M	8.3	AA	25.6	L	4	45	3.1	5	0.07	45	MOR
1988 02 13.14	S	8.3	AA	8.0	B		20	6.2	3			MOR
1988 02 16.13	M	8.1	AA	8.0	B		20	7	3/			MOR
1988 02 16.14				25.6	L	4	45			0.07		MOR
1988 02 25.05	B	7.9	AA	25	L	4	46					JAC01
1988 03 01.06	S	7.9	AA	25	L	4	46					JAC01
1988 03 03.07	S	7.9	AA	25	L	4	46					JAC01
1988 03 04.07	S	7.8	AA	25	L	4	46					JAC01
1988 03 05.08	! M	7.8	AA	25	L	4	46	4.5	5			JAC01
1988 03 06.07	! M	7.6	AA	25	L	4	46					JAC01
1988 03 14.07	! M	7.3	AA	8.0	B		20	& 5	7/			JAC01
1988 03 15.07	B	7.5	AA	8.0	B		20					JAC01
1988 03 18.08	! M	7.4	AA	8.0	B		20					JAC01
1988 03 27.10	S	6.9	AA	5.0	B		10					JAC01
1988 03 30.10	S	6.8	AA	5.0	B		10					JAC01
1988 04 06.11	M	6.4	AA	5.0	B		10	& 7	6	&0.17	5	JAC01
1988 04 06.11	M	6.3	AA	6.0	R	13	32	& 4.5	7	&0.25	5	JAC01
1988 04 07.11	! M	6.4:	AA	5.0	B		10					JAC01
1988 04 08.13	M	6.4	AA	5.0	B		10					JAC01
1988 04 10.83	B	5.9	AA	6.3	B		9	& 2.5	7	?		KAM01
1988 04 11.13	M	6.3	AA	5.0	B		10	5	6	&0.42	355	JAC01
1988 04 11.84	S	6.0	AA	6.3	B		9		8	0.4	340	KAM01
1988 04 12.13	M	6.3	AA	5.0	B		10	4.2	8/	0.5	350	JAC01
1988 04 12.13	K	6.5	AA	5.0	B		10			0.5	350	JAC01
1988 04 14.13	B	5.2	S	5.0	B	4	7	5	5	1		CHE03
1988 04 14.14	M	6.0	AA	5.0	B		10			0.4		JAC01
1988 04 15.13	M	5.8	AA	5.0	B		10			0.4	345	JAC01
1988 04 16.00	B	5.5	S	5.0	B	4	7	5	5	1		CHE03
1988 04 18.13	M	5.8	AA	5.0	B		10		7	0.6	330	JAC01
1988 04 18.13	I	5.5	AA	0.7	E		1					JAC01
1988 04 18.87	B	5.7	S	6.3	B		9	& 4	7	0.3	0	KAM01
1988 04 19.13	M	5.9	AA	5.0	B		10			1.3	325	JAC01
1988 04 19.85	B	5.8	S	6.3	B		9	3.5	7/	0.67	348	KAM01
1988 04 21.13	M	5.8	AA	5.0	B		10			&0.5	325	JAC01
1988 04 21.32	S	6.5	SC	8.0	B	3	11	4	6	1.5	0	PRY
1988 04 23.76	B	6.2	S	8.0	B		8		4			VELO2
1988 04 23.80	B	6.3	S	8.0	B		8		4			RAD01
1988 04 23.85	B	6.3	S	8.0	B		8		3			STE09
1988 04 24.00	B	6.2	S	8.0	B		8		3			RAD01
1988 04 24.08	B	6.1	S	8.0	B		8		2			VELO2
1988 04 24.45	M	5.2	AA	5.0	B		10		8/	3	350	MOR
1988 04 24.46	M	5.2	AA	8.0	B		20		8/			MOR
1988 04 24.47	I	5.2	AA	0.7	E		1					MOR
1988 04 24.98	B	5.7	AA	6.3	B		9		7/	0.5	355	KAM01
1988 04 25.47	M	5.3	AA	8.0	B		20					MOR
1988 04 25.47	B	5.3	AA	5.0	B		10					MOR
1988 04 26.25	S	6.3	SC	8.0	B	3	11	3.5	5	0.25	0	PRY
1988 04 26.47	M	5.5	AA	8.0	B		20					MOR
1988 04 26.47	M	5.5	AA	5.0	B		10					MOR
1988 05 04.14	M	5.7	AA	5.0	B		10	9	7	1.5	330	JAC01
1988 05 04.14	S	5.7	AA	5.0	B		10			1.5	330	JAC01
1988 05 04.15	I	5.6	AA	0.7	E		1	&20	1/			JAC01
1988 05 04.15	B	5.9	AA	5.0	B		10					JAC01
1988 05 06.95	B	6.2	S	6.3	B		9		6/	0.5	13	KAM01
1988 05 07.29	S	7.0	SC	8.0	B	3	11	3	3	0.33	15	PRY
1988 05 08.31	S	6.9	SC	8.0	B	3	11	4.5	3	0.75	20	PRY
1988 05 09.01	B	5.9	S	8.0	B	4	10		5	0.6		CHE03
1988 05 09.18	M	6.1	AA	8.0	B		20	4	7			MOR

Comet Liller 1988a [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 10.19	M	6.1	AA	8.0	B		20	6	6/	2		MOR
1988 05 11.19	M	6.0	AA	8.0	B		20	6	7			MOR
1988 05 11.93	S	6.6	S	6.3	B		9		5/	0.6	23	KAM01
1988 05 11.98	B	6.5	S	8.0	B	4	10		5	0.6		CHE03
1988 05 12.20	M	6.1	AA	8.0	B		20	6	6/			MOR
1988 05 12.96	S	6.5	AA	6.3	B		9		6/			KAM01
1988 05 13.19	M	6.1	AA	8.0	B		20	6	6/			MOR
1988 05 13.92	B	6.3	S	8.0	B	4	10		5	0.5		CHE03
1988 05 14.21	M	6.2	AA	8.0	B		20		6			MOR
1988 05 15.22	I	5.9	AA	0.7	E		1					MOR
1988 05 15.23	M	6.2	AA	5.0	B		10	7	7	4	45	MOR
1988 05 15.24	M	6.1	AA	8.0	B		20	5	7	4	45	MOR
1988 05 16.22	M	6.2	AA	8.0	B		20	5	6			MOR
1988 05 17.20	M	6.4	AA	8.0	B		20	5	5			MOR
1988 05 18.22	M	6.5	AA	8.0	B		20	5	6			MOR
1988 05 19.22	M	6.4	AA	8.0	B		20	6	5			MOR
1988 05 19.46	M	6.3	AA	8.0	B		20	7	5	1.5	59	MOR
1988 05 20.22	M	6.4	AA	8.0	B		20	7	5			MOR
1988 05 20.24	S	7.3	SC	8.0	B	3	11	3	3			PRY
1988 05 21.23	M	6.5	AA	8.0	B		20	7	4			MOR
1988 05 21.43	M	6.4	AA	8.0	B		20	7.5	5	1.5	63	MOR
1988 06 04.24	M	7.2	AA	8.0	B		20	6	6	0.75	35	MOR
1988 06 04.24				8.0	B		20			1.0	70	MOR
1988 06 09.23	M	7.4	AA	8.0	B		20	4.5	5/	0.33	50	MOR
1988 06 09.23				8.0	B		20			0.50	111	MOR
1988 06 11.94	B	9.2:	S	20.4	L	6	72	2.8	3	&0.15	83	JAH
1988 06 12.23	M	7.8	AA	8.0	B		20	5.5	5	0.33	82	MOR
1988 06 12.26	S	8.5	AA	20	T	10	77	2.5	2			PRY
1988 06 12.95	S	8.2	S	5.0	R	10	13	6.1	1			JAH
1988 06 12.96	B	9.3:	S	20.4	L	6	72	2.5	4	&0.10	78	JAH
1988 06 13.96	S	8.5:	S	7.5	L	9	30	& 2.5	2			KAM01
1988 06 18.97	S	8.2	AA	8.0	B		15	7	2			KAM01
1988 07 02.88	B	10.7	AC	35	T	6	96	0.03	4			AMO
1988 07 03.87	B	10.8	AC	35	T	6	96	0.02	4			AMO
1988 07 12.22	S	8.8	AA	8.0	B		20	9	2			MOR
1988 07 15.21	S	9.0	AA	8.0	B		20	9	1/			MOR
1988 07 17.20	S	9.0	AA	8.0	B		20	11	1			MOR
1988 07 17.22	M	9.3:	AA	25.6	L	4	45	5.4	3			MOR
1988 07 17.85	S	10.2	AC	40	L	5	66	3.5	0/			BOA
1988 07 19.19	S	9.4	AC	41	L	4	83		1			HAL
1988 07 19.21	S	10.4	NP	25.6	L	4	67	1.9	1/			MOR
1988 08 09.20		12.0:		25.6	L	4	111	1.3	1			MOR
1988 08 12.18		12.0:		25.6	L	4	111	1.4	1			MOR

Comet Shoemaker-Holt 1988g

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 19.45	S	13.3	NP	25.6	L	4	156	0.6	4			MOR
1988 05 21.47	S	12.8	NP	25.6	L	4	111	1.6				MOR
1988 08 16.92	S	13.7	AC	33	L	4	150	1	5			BOA
1988 08 16.93	S	13.7	A	33	L	4	150	1	5			BAR

Comet Machholz 1988j

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 08 07.45	S	9.3	AA	8.0	B		20	5.6	2			MOR
1988 08 07.48	M	9.6	AA	25.6	L	4	67	3.7	3			MOR
1988 08 09.45	M	8.8	AC	41	L	4	83					HAL
1988 08 09.50	B	7.6	AA	15	L	4	18			0.3		SMI01

Comet Machholz 1988j [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 08 12.16	S	7.8	AC	14	S	4	28	6	3			KOR
1988 08 12.44	M	8.6	AA	25.6	L	4	45	3.2	4	0.13		MOR
1988 08 12.45	S	8.4	AA	8.0	B		20	4	2			MOR
1988 08 13.45	S	8.6	AC	5	B		10					HAL
1988 08 14.11	S	8.4	AC	33	L	4	50	4.5	3			BOA
1988 08 14.20	S	8.9	AA	15	L	4	26	3.0	6			PER01
1988 08 14.49	M	8.0	AA	8.0	B		20	4	4			MOR
1988 08 15.20	S	9.0	AA	15	L	4	26	2.5	2			PER01
1988 08 17.13	S	8.2	AA	13	R	4	21	4.0	4			CAM
1988 08 18.09	S	7.9	A	8.0	B		20	7	3			BAR
1988 08 18.10	S	7.9	AC	8.0	B		20	6	3			BOA
1988 08 18.11	S	8.0	AC	33	L	4	50	5	3/			BOA
1988 08 19.11	S	8.0	AC	33	L	4	50	5	4			BOA
1988 08 19.31	B	7.6	S	7.0	B		10	6	4			DEA
1988 08 20.14	S	7.9	AA	13	R	4	21	4.3	4			CAM
1988 08 20.31	B	8.0	S	7.0	B		10		4			DEA
1988 08 20.49	M	7.5	AA	8.0	B		20	4	6			MOR
1988 08 20.49				25.6	L	4	45			0.13	225	MOR
1988 08 21.19	S	7.8	AA	15	L	4	26	4.5	1			PER01
1988 08 21.30	B	8.5	S	7.0	B		10	5	5			DEA
1988 08 21.45	M	7.5	SC	5	B		10					HAL
1988 08 22.30	B	8.1	S	7.0	B		10	5	5			DEA
1988 08 22.49	M	7.4	AA	8.0	B		20	4	6			MOR
1988 08 23.21	S	7.5:	AA	15	L	4	26	3	4			PER01
1988 08 24.46	M	7.7	SC	5	B		10					HAL
1988 08 25.13	S	6.9	AA	13	R	4	21	5.0	5	1.5	152	CAM
1988 09 03.51	S	6.6	S	8.0	B		20					MOR
1988 09 03.51	S	6.0:	AA	8.0	B		20					MOR
1988 09 03.79	S	7.4	AA	6.3	B		9	1	6	0.2		MCN
1988 09 06.50	S	7.0	SC	41	L	4	83					HAL
1988 09 07.50	I[6 :	SC	41	L	4		83					HAL
1988 09 11.21	B	5.0	AA	25	L	5	208	2.9	3	0.40	35	DES01
1988 09 17.54	I[-2 :	UL	5	B			10					HAL
1988 09 24.08	I[3.4	SC	5	B			10					HAL
1988 09 25.08	I[3.5:	SC	5	B			10					HAL
1988 09 26.08	S[6.9	SC	20	L	6		35	! 1.0				HAL
1988 10 01.10	S[11 :	UP	41	L	4		83	! 1.0				HAL

Comet Shoemaker-Holt-Rodriguez 1988h

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 07 12.27	I[13.5			41	L	4	244					HAL
1988 07 19.22	I[13.5			41	L	4	244					HAL
1988 08 10.27	I[13.5			41	L	4	244					HAL
1988 08 12.90	S	13.6	AC	33	L	4	150	1	3			BOA
1988 08 12.90	S	13.6	A	33	L	4	150	1.2	3			BAR
1988 08 13.25	! S	13.7	AC	41	L	4	183		8			HAL
1988 08 13.94	S	13.7	A	33	L	4	150	1.2	3			BAR
1988 08 13.94	S	13.7	AC	33	L	4	150	1.2	3			BOA
1988 08 17.88	S	13.6	AC	33	L	4	150	1	4			BOA
1988 08 17.88	S	13.6	A	33	L	4	150	1	4			BAR
1988 08 18.92	S	13.5	AC	33	L	4	150	1	3			BOA
1988 08 21.31	M	13.8	AC	41	L	4	183		8			HAL
1988 09 07.25	S	13.6	AC	41	L	4	244		8			HAL
1988 09 07.86	S	13.4	AC	36	T	11	434	0.3	4			KOR
1988 09 08.85	S	13.5:	AC	36	T	11	434	0.3	4			KOR
1988 09 15.27	S	13.7	AC	41	L	4	183		8			HAL
1988 10 02.20	S	13.8	AC	41	L	4	244					HAL

Periodic Comet Encke (1971 II = 1974 V)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 11 23.61		10.5	UP	20.3	L							BOE
1970 12 01.03		9.6:	UM	15.6	L	8	76	& 6.5	0			WES
1970 12 02.96	O	9.5	UM	31.8	L	8	50	& 8	0			DEL
1970 12 03.00		8.6	S	10.2	L			6				MIL
1970 12 06.49		9.3	S	20.3	L							BOE
1970 12 07.98	O	9.1:	S	31.8	L	8		5	1			DEL
1970 12 08.45		9.0	S	20.3	L							BOE
1970 12 16.00		8.1	S	10.2	L							MIL
1970 12 18.46		7.5	S	20.3	L							BOE
1970 12 19.43		6.7	S	20.3	L							BOE
1970 12 20.96		6.8	S	10.2	L							MIL
1970 12 21.98		5.9	AC	5.0	B		7					SIM
1974 04 22.11		8 :		10.8	L	10	40	& 1	7/			WAL
1974 06 28.25		[12.5		31.7	L	5						JON

Periodic Comet Grigg-Skjellerup (1986m)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 25.50	S	12.0	VN	32	L	4	60	2.0	0			PEA

Periodic Comet Tempel 2 (1987g)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 07 12.25	S	13.3	AC	41	L	4	83					HAL
1988 07 16.20	S	12.7	AC	41	L	4	83					HAL
1988 07 17.05	B	11.8	AA	25	L	5	170	1.33	6			DES01
1988 08 09.23	S	9.6	AA	25.6	L	4	45	3.7	2	0.03	350	MOR
1988 08 09.25	S	9.4	AA	8.0	B		20	4.5	2			MOR
1988 08 10.18	S	10.5	AC	41	L	4	83					HAL
1988 08 10.85	S	9.5	A	33	L	4	50	4	1			BAR
1988 08 10.85	S	9.5	AC	33	L	4	50	4.5	2			BOA
1988 08 12.05	S	8.5	S	7.0	B		10	5				DEA
1988 08 12.20				25.6	L	4	67			0.05	320	MOR
1988 08 12.20	S	8.4	AA	8.0	B		20	9	2			MOR
1988 08 12.84	S	9.3	A	33	L	4	50	6.5	0			BAR
1988 08 12.84	S	9.3	AC	33	L	4	50	5	0/			BOA
1988 08 13.19	M	10.2	AC	41	L	4	83		3			HAL
1988 08 13.19	S	8.3	AA	8.0	B		20	9	2/			MOR
1988 08 14.04	B	8.7	AA	25	L	5	170	2.17	5			DES01
1988 08 14.20	S	8.3	AA	8.0	B		20	9	2/			MOR
1988 08 14.84	S	9.3	AC	33	L	4	50	5	0/			BOA
1988 08 14.85	S	9.3	A	33	L	4	50	5	1			BAR
1988 08 16.89	S	9.7	AA	15	L	4	26	2.5	1			PER01
1988 08 17.89	S	9.5	AA	15	L	4	26	2.5	1			PER01
1988 08 18.18	S	8.3	AA	8.0	B		20	9.5	3			MOR
1988 08 18.87	S	9.7	AA	15	L	4	26	4	1/			PER01
1988 08 19.88	S	9.3	AA	15	L	4	26	3.5	5			PER01
1988 08 20.21	S	7.9	S	8.0	B		20	10	3			MOR
1988 08 29.00	B	8.3	AA	25	L	5	170	3.03	4			DES01
1988 09 01.19	! S	9.9	AC	41	L	4	83					HAL
1988 09 03.14	S	9.4	NP	5	B		10					HAL
1988 09 04.86	S	8.5	AA	15	L	4	26	6	1			PER01
1988 09 07.04	S	8.2	S	8.0	B		20	& 6	2			GRE
1988 09 07.18	S	8.2	S	8.0	B		20	8	2			MOR
1988 09 08.15	S	9.1	NP	5	B		10					HAL
1988 09 10.15	S	8.2	S	8.0	B		20	8	2/			MOR
1988 09 10.17				25.6	L	4	67			0.08	300	MOR
1988 09 11.17	S	8.3	S	8.0	B		20	8	1/			MOR
1988 09 11.18				25.6	L	4	67		3	0.07	300	MOR

Periodic Comet Tempel 2 (1987g) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 09 12.02	B	8.2	AA	25	L	5	170	3.28	4			DES01
1988 09 13.17	S	8.3	S	8.0	B		20	8				MOR
1988 09 15.13	S	8.5	NP	5	B		10					HAL
1988 09 17.17	S	8.4	S	8.0	B		20	7.5	1			MOR
1988 09 17.18	S	8.8	M	25.6	L	4	67	2.9	2			MOR
1988 09 19.05	B	8.6	AA	25	L	5	208	4.33	4			DES01
1988 09 30.13	M	8.9	AC	41	L	4	83					HAL
1988 10 01.13	S	8.8	AC	5	B		10					HAL
1988 10 03.14	S	8.8	AC	5	B		10					HAL

Periodic Comet Honda-Mrkos-Pajdušáková (1969 V)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 09 13.43		9.5	AC	15.2	L							WOO01

Periodic Comet Kohoutek (1986k)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 02 08.24	S	12.8	NP	25.6	L	4	111	1.0	0/			MOR
1988 02 13.22	S	13.0	NP	25.6	L	4	156	0.9	0/			MOR
1988 02 16.21	S	13.0	NP	25.6	L	4	156	1.3	1/			MOR

Periodic Comet Finlay (1988f)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 04 22.83	I	[13.0	VN	20	L	4	190					PEA
1988 04 23.83	I	[13.0	VN	20	L	4	190					PEA
1988 07 12.45	I	[13.0	UP	41	L	4	183					HAL

Periodic Comet Borrelly (1987p)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 12 09.74	B	8.2	AA	8.0	B		20	6	4			SPE01
1987 12 11.71	S	8.2	AA	8.0	B		20	5	3			SPE01
1987 12 13.76	S	8.2	AA	8.0	B		20	5	3			SPE01
1987 12 13.82	B	8.2	AA	8.0	B		20					SPE01
1987 12 15.75	B	8.1	AA	8.0	B		20	6	3			SPE01
1988 01 07.77	S	9.0	AA	8.0	B		20	5	3			SPE01
1988 01 09.78	B	9.0	AA	8.0	B		20	4	3			SPE01
1988 01 10.83	B	9.1	AA	8.0	B		20	5	2			SPE01
1988 01 12.76	S	9.4	AA	8.0	B		20	3	1			SPE01
1988 01 13.23	M	8.3	AA	8.0	B		20	7	2		70	MOR
1988 01 13.76	S	9.4	AA	8.0	B		20	3	1			SPE01
1988 01 22.15	S	8.5	AA	8.0	B		20	12	2			MOR
1988 02 08.19	S	9.1	NP	8.0	B		20	9	0/			MOR
1988 02 10.17	S	9.1	NP	8.0	B		20	13	1			MOR
1988 02 13.18	S	9.3	NP	8.0	B		20	9	1			MOR
1988 02 13.18	M	9.6	NP	25.6	L	4	45	9	3			MOR
1988 02 16.18	M	9.6	NP	25.6	L	4	45	5.9	3			MOR
1988 03 12.18	S	10.9	NP	25.6	L	4	67	1.5	1			MOR
1988 03 20.22	M	11.4	NP	25.6	L	4	111	1.7	2			MOR

Periodic Comet Giacobini-Zinner (1972 VI = 1985 XIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 07 05.31		9.5	AC	15.2	L	8	45	0.80	3			SES
1972 07 19.83		9.4	AC	11.4	L		36	& 2.8	3			KLE01
1972 08 19.37		9.3	AC	15.2	L	8	45	4.3	5	0.03		SES
1972 09 05.37	O	10.4	AC	31.8	L	6	55	1.5	5	0.04	300	MOR

Periodic Comet Giacobini-Zinner (1972 VI = 1985 XIII) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 09 06.37	S	10.6	AC	31.8	L	6	55	& 1.8	3	&0.03	300	MOR
1985 07 14.00	B	10.2	S	20.3	L	5	30	5	5	0.10	242	GAR02
1985 07 18.00	B	10.5	S	20.3	L	5	30	2.5	5			GAR02
1985 07 21.92	B	10.4	CS	20.3	L	10	62	0.8	6	0.01	250	GAR02
1985 07 22.98	B	10.5	CS	20.3	L	5	30	3	6			GAR02
1985 07 23.89	B	10.6	CS	20.3	L	10	62					GAR02
1985 07 24.98	B	10.5	CS	20.3	L	10	62	2	5			GAR02
1985 08 04.95	B	9.0	S	8.0	B		12		5			GAR02
1985 08 07.85	B	8.2	S	8.0	B		12					GAR02
1985 08 08.92	B	8.1	S	8.0	B		12					GAR02
1985 08 11.88	B	7.8	S	8.0	B		12					GAR02
1985 08 12.90	B	7.7	S	8.0	B		12					GAR02
1985 08 14.92	B	7.7	S	8.0	B		12		4			GAR02
1985 08 15.90	B	7.6	S	8.0	B		12		4			GAR02
1985 08 17.93	B	7.6	S	5.0	R		8					GAR02
1985 08 19.00	B	7.6	S	5.0	R		8					GAR02
1985 08 22.08	B	7.4	S	8.0	B		12					GAR02
1985 08 24.00	B	7.2	S	8.0	B		12					GAR02
1985 08 28.11	B	7.0	S	5.0	R		8					GAR02
1985 09 12.06	B	8.2	S	8.0	B		12					GAR02
1985 09 18.12	B	9.4	CS	8.0	B		12					GAR02
1985 09 22.14	B	9.5	CS	20.3	L	10	62	2.5	5	0.25	270	GAR02
1985 10 12.15	B	10.8	CS	20.3	L	10	62	1	6			GAR02
1985 10 23.17	B	11.5	CS	20.3	L	10	62	0.5	7			GAR02

Periodic Comet Faye (1969 VI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 10 19.29				40.6	L			1		0.05	260	MIL
1969 11 06.25		11.5:	AC	31.8	L	6	150	3	4	0.25	275	RIM
1969 11 07.42		11.8:	AC	31.8	L	6	150	0.83	9	0.20	273	RIM
1969 12 07.23		12.0	AC	16.5	R							MIL
1970 02 05.10		14.3	AC	31.8	L	6		& 1.5	0			RIM

Periodic Comet Ciffréo (1985 XVI)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 11 11.74	S	13.4	AC	26	L	5	146	0.3	6/			KAN
1985 11 13.71	S	13.2	AC	20	L	6	123	1				NAK01
1985 11 14.70	S	13.1	AC	26	L	5	105	0.7	6/			KAN
1985 11 15.62	S	12.9	AC	20	L	6	123	1.0				NAK01
1985 12 03.90	B	12.0	CS	20.3	L	10	80	0.5				GAR02

Periodic Comet Comas Solá (1986j)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 02 22.45		14.5:		154.9	C	14	550	& 0.5	2/			MOR

Periodic Comet Halley (1986 III)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 02 23.39	S	[16.5	EB	154.9	C	14	654	0.5	0/			MOR

Periodic Comet Schwassmann-Wachmann 1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 21.10	S	13	:	L	25	L	4	179	0			JAC01
1987 10 28.12	S	[13.0	L	25	L	4	179					JAC01
1987 11 14.05	I	[13.0	L	25	L	4	179					JAC01

Periodic Comet Schwassmann-Wachmann 1 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 06 11.35	S	[13.0	L	25	L	4	179					JAC01
1988 06 22.34	S	[12.5	AC	25	L	4	82					JAC01
1988 07 12.36	I	[13.2	AC	25	L	4	179					JAC01
1988 07 12.38	I	[13.5		41	L	4	244					HAL
1988 07 19.39	I	[13.5		41	L	4	244					HAL
1988 08 09.35	I	[13.0	AC	25	L	4	179					JAC01
1988 08 13.36	I	[13.5		41	L	4	244					HAL
1988 08 14.36	S	[13.0	AC	31.7	L	5	305					JAC01
1988 08 15.36	M	13.6	AC	41	L	4	183		8			HAL
1988 08 20.30	M	12.8	NP	25.6	L	4	156	1.1	3			MOR
1988 08 21.28	S	13.0	NP	25.6	L	4	111	1.6	2/			MOR
1988 08 21.35	S	13.4	AC	41	L	4	183		4/			HAL
1988 08 24.45	S	13.3	WA	41	L	4	183		2/			HAL
1988 09 07.27	S	12.9	AC	41	L	4	83		1			HAL
1988 09 10.20	S	12.8	NP	25.6	L	4	111	1.9	1			MOR
1988 09 11.18	S	12.8	NP	25.6	L	4	111	1.9	2			MOR
1988 09 15.29	I	[13.0		41	L	4	183					HAL
1988 09 17.21	S	[13.3	NP	25.6	L	4	156	2				MOR
1988 09 18.43	I	[12.5		41	L	4	183					HAL
1988 10 02.22	I	[13.5		41	L	4	244					HAL

Periodic Comet Shoemaker 3 (1985 XVIII)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 01 16.70	S	14.0	AC	26	L	5	188	0.4	3			KAN
1986 02 08.71	S	13.4	AC	26	L	5	146	0.4	5			KAN

Periodic Comet Shoemaker-Holt (1987z)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 09 16.44	I	[13.5		41	L	4	244					HAL

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Descriptive Information to Complement the Tabulated Data:

◊ *Wilson 1986k*: 1988 Feb. 23.24: "After CCD image showed that comet had split, both parts of comet were observed visually by LEV and MOR using 154.9-cm f/13.5 C (654×); Primary had $m_1 \approx 13$: and secondary had $m_1 \approx 15$:" [MOR]. Mar. 22.23: "Comet not seen" [MOR]. Sept. 8.48: "observation attempted in response to report of a possible outburst; transparency conditions only fair, hence the fairly bright limiting magnitude; for a stellar comet, limiting magnitude m_1 [14.0]" [HAL].

◊ *P/Comas Soldá 1986j*: 1988 Feb. 22.45: " m_1 and coma size were guesses; coma significantly elongated" [MOR].

◊ *Schwassmann-Wachmann 1*: 1988 Aug. 15.36: "comet apparently near onset of new outburst; coma small and very condensed; appearance stellar at low power; the appearance is also remarkably similar to that of comet 1988h" [HAL]. Aug. 20.30: "hint of spiral structure; coma was asymmetric" [MOR]. Aug. 21.35: "coma more diffuse and considerably larger than on Aug. 15 [HAL]. Aug. 24.45: "coma even more diffuse than on Aug. 21" [HAL]. Sept. 7.27: "coma very large ($\sim 2'$) and diffuse; only a slight central brightening noticed" [HAL]. Sept. 15.29: "limiting magnitude based upon the diffuse appearance the comet exhibited at the previous observation (Sept. 7); a candidate was suspected but could not be confirmed" [HAL]. Sept. 17.21: "comet suspected; coma diameter assumed" [MOR]. Sept. 18.43: "low altitude" [HAL].

◊ *P/Halley 1986 III*: 1988 Feb. 23.39: "comet suspected" [MOR].

◊ *Machholz 1988j*: 1988 Aug. 7.48: "coma extended toward the west; Lumicon Comet Filter significantly enhances the comet" [MOR]. Aug. 9.45: "poor sky conditions" [HAL]. Aug. 14.49: coma elongated toward p.a. $\approx 225^\circ$: [MOR]. Aug. 21.45: "in 41-cm L, possible broad, faint tail toward p.a. $\approx 270^\circ$; second possible tail, also faint, but narrower, toward p.a. $\approx 285^\circ$ " [HAL]. Aug. 24.46: in 41-cm L, a faint, broad tail, $> \sim 15'$ long toward p.a. $\approx 270^\circ$ [HAL]. Sept. 6.50: "low altitude, bright twilight; only the small inner coma was detected; the total brightness may have been up to 1 magnitude brighter" [HAL]. Sept. 7.50: "low altitude, fairly bright twilight; comet not seen, although sky conditions and viewing geometry were similar to those on the previous morning, when comet was seen" [HAL]. Sept. 17.54: "daylight search; several other searches were conducted through-out the daytime hours" [HAL]. Sept. 24.08: "low altitude, bright twilight; limiting magnitude based upon magnitude of δ Virginis, which was seen" [HAL]. Sept. 25.08: "conditions very similar to those on Sept. 24; δ Virginis not seen" [HAL]. Sept. 26.08: "low altitude, fairly bright twilight; limiting magnitude based upon magnitude of HD 115983 = SAO 119886, which was seen" [HAL]. Oct. 1.10: "low altitude, but sky reasonably dark; all but the faintest stars on Vehrenberg Falkauer chart were seen" [HAL].

◊ *P/Tempel 2 1987g*: 1988 Aug. 9.23: "distinct sunward fan" [MOR]. Sept. 10.15: "brightest region of sunward fan directed in a more easterly direction than the axis of the fan" [MOR].

NOTE: Due to lack of space, further comments by these and other observers (concerning tabulated data published in this issue) will be published in the January 1989 issue.

BOOK REVIEW

"The Guide Star Photometric Catalog. I."

Barry M. Lasker, Conrad R. Sturch, Carlos Lopez, and 13 other authors. In *The Astrophysical Journal Supplement Series*, Volume 68, Number 1 (1988 September). 90 pages + 132 plates, University of Chicago Press. Cost: US\$13.00 from The Astrophysical Journal, P.O. Box 37005, Chicago, IL 60637, U.S.A.

This catalogue has the potential of becoming one of the more useful sources (for stellar magnitude data) utilized by visual observers for making brightness estimates of comets, and it is therefore very appropriate to review such a publication in these pages. "The Guide Star Photometric Catalog" (GSPC-I, as the authors refer to it) was produced to support the pointing of the Hubble Space Telescope, and it is scheduled for updates from time to time.

There are many strengths of this catalogue from the view of a cometary photometrist. First, it is an all-sky catalogue, meaning that there are useful fields scattered rather uniformly from $\delta = +90^\circ$ to -90° ; this way, the observer is assured of fields fairly close to a particular comet under observation. Second, the V magnitudes (given to 0.01 mag) are provided for various stars in each field in the general range 9-15 (many fields also have stars 1-2 mag brighter or fainter than this); $B-V$ values are also given. Third, the stellar coordinates are listed at equinox 1950.0, which is most useful for most observers today (the more limited Landolt catalogue, reviewed in the April 1984 issue of the *ICQ*, p. 37, uses awkward 1975 coordinates). Fourth, there is a photograph (in the plates section at the end of the monograph) for each field, identifying the stars with the coordinates and magnitudes in the master table; furthermore, all *SAO Star Catalog* stars (the majority of which are not included in the GSPC-I list) are marked in a manner that will greatly aid visual observers in finding the fields. Most of the square field charts represent $30'$ or 1° on the sky. Fifth, most of the comparison stars appear to be well placed (i.e., not too close to other bright stars).

And sixth, the price (US\$13.00) is respectable. A problem here, however, is that there are less than 200 copies in back stock at the *Astrophysical Journal* offices, and they will be sold on a first-come, first-served basis (and may sell out rather soon, so hurry!).

A random check by the undersigned of 26 stars listed in both the GSPC-I and *SAO Star Catalog* (throughout the sky; mag range 8.0 and fainter in the *SAOC*) showed how bad the *SAOC* stars really are for magnitudes fainter than 9: of 12 stars listed at visual mag 9.3-9.5 in the *SAOC*, the actual V magnitudes for 10 of them were fainter than 9.95! [Which means that everything from true visual mag 9.5-11.0 gets clumped into the categories of "visual mag 9.3-9.5" in the *SAOC*. Thus, as we've noted earlier in these pages, observers should never use magnitudes from the *SAOC* for stars fainter than mag 9. When a comet is faint and there are no available "catalogue" stars within a couple of degrees of the comet, the author often has found it useful (and more accurate) to simply make a magnitude estimate of the comet using comparison stars (with unknown brightness) in the same field of view, and then later comparing those comparison stars with a good stellar sequence of visual magnitudes [such as Landolt, the Everhart series (1984, *Sky. Telesc.* 67, 28), the North Polar Sequence, or the U.S. Naval Observatory *Photoelectric Catalogue*]; and now there is also the GSPC-I.

[Incidentally, one of the base sources used by Lasker *et al.* in producing GSPC-I is a 1982 paper by J. A. Graham (*Publ. A.S.P.* 94, 244) which can be recommended to our southern-hemisphere observers as another good source of V stellar data. Graham's paper has nine fields (from Harvard 'E' regions) evenly distributed about the sky every 2^h40^m of right ascension at $\delta \approx -45^\circ$, listing magnitudes for generally 10-12 stars per field in the range mag 8-16. The finder charts are $\approx 50'$ across. This source can be identified by new *ICQ* abbreviation HE.]

There are some drawbacks to the GSPC-I. The largest of these problems is the difference between V magnitudes versus visual magnitudes, which will vary in general from 0.0 to 0.3 mag (occasionally more for very red stars); this problem slowed our enthusiasm several years ago for producing *ICQ* charts based on the Landolt sequences. However, this visual/ V problem is still minor compared to the problems inherent in many other charts used by visual observers for comets fainter than mag 9 (among the worst of which are a few AAVSO variable star charts; while there are some good AAVSO charts — including the North Polar Sequence — it is difficult to know offhand which charts are not so good, though again comparisons can be made between AAVSO charts and these other photoelectric catalogues to get an idea of the accuracy of the variable-star sequences). Another, more practical, drawback to GSPC-I is the poor binding: our library copy was practically destroyed in about 2 or 3 weeks due to heavy handling, during which the plates (which take up the second half of the volume) simply started falling out in large numbers as individual sheets. For this reason, it may not be wise to regularly use your original copy of GSPC-I at the telescope.

Each GSPC-I field usually has 6 or 7 stars with determined magnitudes between mags 9 and 15, and they are chosen such that there is a single star every magnitude or so. Randomly-chosen field S-607 has stars with the following V magnitudes: 9.36, 11.29, 11.48, 12.58, 13.68, 13.93, 15.06. If a comet were close to this particular field and was around total visual magnitude 10.5, one would perhaps want to use this field in conjunction with a nearby field (or two) which has stars closer to mag 10.5. [This using of two or more comparison fields is an inconvenience that many observers may not wish to deal with; but a nearby GSPC-I field can still be used to verify the accuracy of a variable-star field with better magnitude distribution.] Also, one needs to read the introduction and become familiar with the master table to best understand how the authors laid out their catalogue (and thus how to use it). For example, one might find two nearly adjacent (on the sky) GSPC-I fields several pages apart in the catalogue's ordering and listing. And *SAOC* stars on the finder charts are listed SA, SB, SC, etc., if they are included in the GSPC-I master list, but as S1, S2, S3, etc., if not.

This catalogue should be in the private collection of every serious observer of faint comets. (The *ICQ* abbreviation assigned to this new sources will be GA.) I encourage *ICQ* readers to quickly order a copy before they sell out. [I thank Charles S. Morris for useful comments concerning this review.]

— D. W. E. Green