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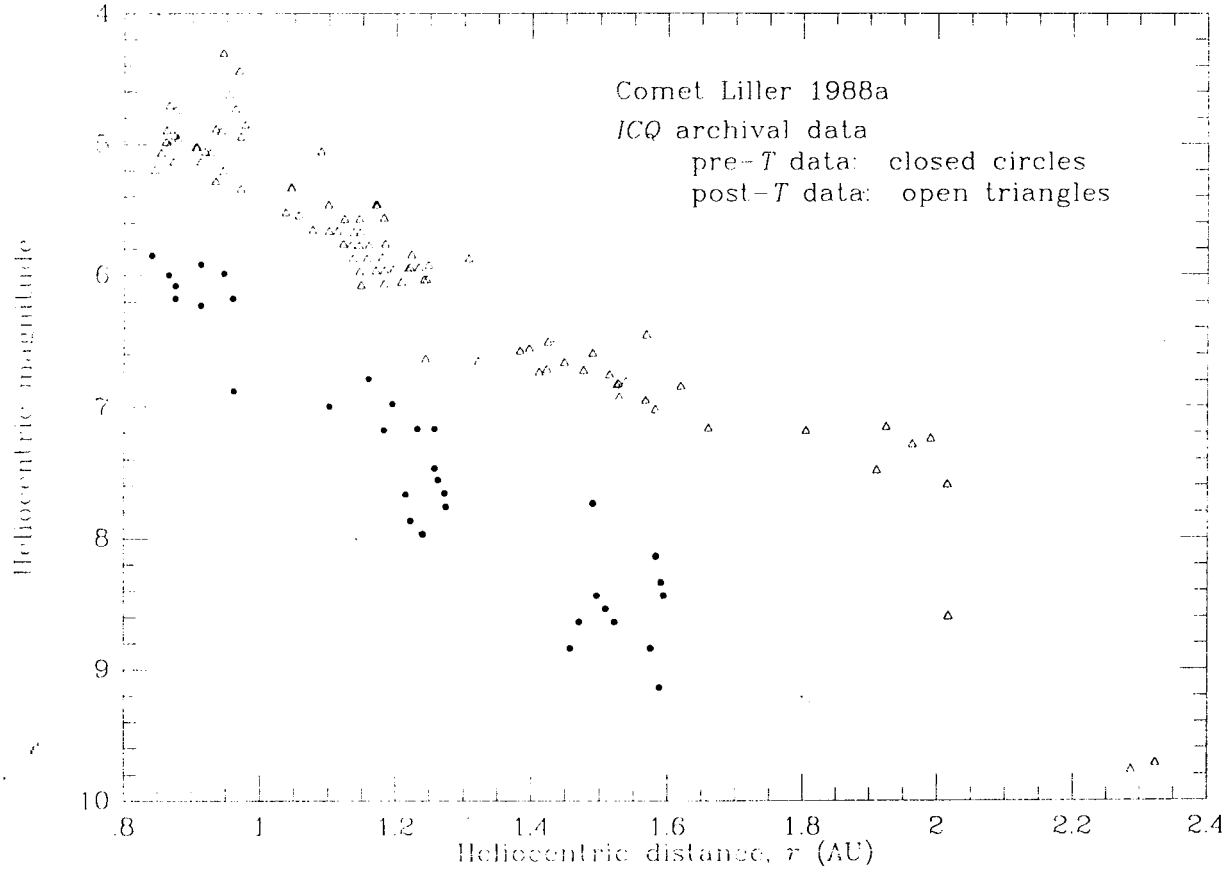

Total visual magnitude estimates of Comet Liller 1988*a* by the seven observers noted under "Comet Light Graphs" in *ICQ* **11**, 25. Total of 129 observations, 1988 Jan. 13-Aug. 12.

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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. 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 through mail via the computer networks *BITNET* (GREEN@CFA) or *SPAN* (CFAPS2::GREEN), or via floppy disks], and should contact the Editor for further information.

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This issue is No. 70 of the publication originally called *The Comet* (founded March 1973) and is Vol. 11, No. 2, of the *ICQ*. *[ISSN 0736-6922]*

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FROM THE EDITOR

Thomas L. Rokoske retires this year in his capacity as Associate Editor of the *ICQ*. This publication has been published for most of the past 16 years (including under its previous titles, *The Comet* and *The Comet Quarterly*) under the direction of Rokoske at the Department of Physics and Astronomy at Appalachian State University in Boone, North Carolina. Despite recurring printing delay problems stemming from the Print Shop at ASU, Rokoske has done an admirable job with this journal over the last decade and a half, and we thank him for his hard work. The *ICQ* likely would not exist now if it were not for Rokoske's dedicated effort.

The annual *ICQ Comet Handbook*, computed by Syuichi Nakano, is undergoing a change, as well. Following recommendation by the *ICQ* Editorial Advisory Board, we will begin publishing the *Handbook* earlier and will also concentrate on ephemerides of short-period comets. To accomodate this change, the July 1989 issue of the *ICQ* will be the *1990 Comet Handbook* and will be sent to all subscribers as a normal issue (although separate/extra copies will be available at the regular *Handbook* rate of $10.00). We plan to only include ephemerides in future *Handbooks* for those long-period comets that have well-established orbits and that will be brighter than $m_1 \simeq 18.0$ sometime during the year. As the *ICQ* will be published entirely in Cambridge, Massachusetts, from 1990 onwards — meaning more rapid publication and mailing schedules — we may include ephemerides for new comets (long- and short-period) in regular issues of the *ICQ*.

Those subscribers who have paid (or will pay) $8.00 for the next annual *ICQ Comet Handbook* will receive the *1991 Comet Handbook* under these terms, which we expect to publish sometime between January and April 1990. Thereafter we plan to publish the annual *Handbook* between January and March of each year.

Some readers will have noted the lack of an index for Volume 10 in the January 1989 issue. We will publish indices every two years in the future, so that the January 1990 issue will contain an index covering both Volumes 10 and 11.

— Daniel W. E. Green [1989 July 16]

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New additions to the Reference Key for tabulated data (cf. *ICQ* **10**, 34, 67, and 124):

CR = *V* magnitudes of 13 stars surrounding NGC 3627 (M66), as given by Ciatti and Rosino (1977, *Astron. Astrophys.* **56**, 62). The range in *V* is 13.8-16.9, and the stars are fairly red.

SE = *V* magnitudes of 134 stars of the II Persei Association (stars of spectral types A and B, magnitude range 5.1-11.4), as given in C. K. Seyfert *et al.*, *Ap.J.* **132**, 58.

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— CORRIGENDUM —

• In the Janaury 1989 issue, page 9, "Comet Yanaka (1988*r*)", line 4, *for* shart-edged *read* sharp-edged

TABULATION OF COMET OBSERVATIONS

Due to space and time constraints, we will publish the descriptive information (to complement the tabulated data) for the following observations in the October issue. Note the two new references given on page 30.

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 Komet. Tsirk.; 14 = Australian comet section, etc.].

CODE	S	OBSERVER, LOCATION
BOA		Andrea Boattini, Italy
BOR		John E. Bortle, NY, U.S.A.
CLA	14	Maurice L. Clark, Australia
GRE		Daniel W. E. Green, U.S.A.
HAL		Alan Hale, U.S.A.
HAS02		Werner Hasubick, West Germany
HAS03		Hisaya Hasegawa, Japan
JON		Albert F. Jones, New Zealand
KEE		Richard A. Keen, CO, U.S.A.
KOR		Stefan Korth, West Germany

CODE	S	OBSERVER, LOCATION
LOV	14	Terry Lovejoy, Australia
MCN		Robert Houston McNaught, Scotland/Austra
MIK		Herman Mikuz, Yugoslavia
MOE		Michael Moeller, West Germany
MOR		Charles S. Morris, U.S.A.
NOW		Gary T. Nowak, VT, U.S.A.
PER01		Alfredo Jose Serra Pereira, Portugal
SEA	14	David A. J. Seargent, Australia
ZAN		Mauro Vittorio Zanotta, Italy

Comet Wilson 1987 VII = 19861

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 08 25.51	S	11.5	AA	20	L	6	51	& 1.0	6			LOV
1986 08 26.51	S	11.6	AA	20	L	6	51		6			LOV
1986 08 26.51	S	11.8	AA	20	L	6	116	0.3				LOV
1987 02 27.76	S	7.5	AA	8.0	B		15		6			LOV
1987 02 28.76	S	7.5	AA	8.0	B		15		6			LOV
1987 03 08.76	S	7.2	AA	8.0	B		15		7			LOV
1987 03 24.78	S	6.6	AA	8.0	B		15					LOV
1987 03 25.78	S	6.6	AA	8.0	B		15		7			LOV
1987 03 27.78	S	6.5	AA	8.0	B		15	10		0.3		LOV
1987 03 28.78	S	6.4	AA	3	R	6	8					LOV
1987 04 27.4	S	4.8	AA	0.0	E		1		6			LOV
1987 11 25.79	S	11.5	A	31	L	4	60	2.5	5			CLA
1987 12 01.81	S	11.8	A	31	L	4	115	2	4			CLA
1987 12 16.79	M	11.8	A	31	L	4	115	1.5	5			CLA

Comet Rudenko 1987 XXIII = 1987u

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 11 25.81	S	8.3	AA	31	L	4	60	6	4			CLA
1987 12 01.78	S	8.8	A	31	L	4	60	7	4			CLA
1987 12 15.56	S	10.3	A	31	L	4	60	4	4			CLA
1987 12 16.76	S	10.1	A	31	L	4	60	6	3			CLA

Comet Bradfield 1987 XXIX = 1987s

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 12.44	S	8.8	AA	20	L	6	52	7	2			LOV
1987 08 14.42	S	9.0	AA	8.0	B		15	4	5			LOV
1987 08 15.43	S	8.8	AA	20	L	6	52					LOV
1987 08 20.38	S	8.5	AA	20	L	6	52	5	6			LOV
1987 08 21.38	S	8.5	AA	8.0	B		15		6			LOV
1987 08 22.38	S	8.3	AA	20	L	6	52		6	0.2		LOV
1987 08 24.42	S	8.3	AA	8.0	B		15	5.0	6			LOV
1987 08 26.40	S	8.1	AA	8.0	B		15	6	6	0.2		LOV
1987 08 27.45	S	8.2	AA	20	L	6	52	5.0	6	0.2		LOV
1987 08 31.40	S	7.8	AA	20	L	6	52		6			LOV
1987 09 19.40	S	7.1	AA	8.0	B		15					LOV
1987 09 23.37	S	6.9	AA	8.0	B		15	5.0	7	0.8		LOV

Comet Bradfield 1987 XXIX = 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 10.38	S	6.3	AA	8.0	B		15		7			LOV
1987 10 11.38	S	6.1	AA	8.0	B		15	& 3.0	7/	1.0		LOV
1987 10 17.38	S	5.8	AA	8.0	B		15	3.5	7/			LOV
1987 10 18.38	S	5.8	AA	8.0	B		15		7	1.3	95	LOV
1987 10 20.39	S	5.8	AA	8.0	B		15		7/			LOV
1988 01 14.55	S	8.2	AA	15	L	6	45	3	5			CLA
1988 02 13.55	S	9.4	AA	30	L	4	60	3	6			CLA

Comet Levy 1987 XXX = 1988e

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 21.07	I	[13.5	AC	30.5	L	5	150					ZAN

Comet McNaught 1987 XXXII = 1987b1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 27.42	S	8.3	AA	12.0	B		20	2	3	0.07	190	MCN
1988 04 10.90	S	9.9	AC	20.3	T	10	85	2.3	3			HAS02

Comet Ichimura 1987d1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 11 23.60	S	8.7	AA	31	L	4	60	10	2			CLA
1987 11 24.58	S	8.5	AA	31	L	4	60	15	3			CLA
1987 11 25.77	S	8.2	AA	31	L	4	60	16	3			CLA
1987 12 01.80	S	7.5	AA	31	L	4	60	16	4			CLA
1987 12 14.53	S	8.1	AA	6.3	B		9					MCN
1987 12 15.52	S	7.3	AA	31	L	4	60	7	2	0.69	97	CLA
1987 12 16.50	S	8.2	AA	12.0	B		20	5				MCN
1987 12 24.46	S	8.7	A	12.0	B		20	5				MCN

Comet Furuyama 1987f1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 12 15.57	S	10.2	AA	31	L	4	60	2	2			CLA
1987 12 16.77	S	10.2	AA	31	L	4	60	2	3			CLA
1988 01 14.57	S	10.3	AA	15	L	6	45	2	3			CLA
1988 02 13.57	S	9.9	AA	31	L	4	60	6	4			CLA

Comet Liller 1988a

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 01 12.46	S	10.2	AC	12.0	B		20	6	3			MCN
1988 01 14.58	S	9.2	AA	15	L	6	45	4	4			CLA
1988 01 19.58	S	9.0	AA	15	L	6	45	4	5			CLA
1988 05 21.04	S	6.3	AA	4.2	B		7	8	7	1.0	60	ZAN
1988 06 01.90	S	6.7	AA	8.0	B		20	6	6	0.5	85	ZAN
1988 06 13.93	B	8.3	S	10.0	B		14	9.0	4			HAS02
1988 06 16.91	S	7.4	AA	5.6	B		8	7	4			ZAN

Comet Machholz 1988j

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 08 08.79				20	L	6	52	6.5	6	0.3		LOV
1988 08 08.79	S	8.1	AA	8.0	B		15					LOV
1988 08 09.79				20	L	6	52	5.0	6	0.3		LOV
1988 08 09.79	S	8.1	AA	8.0	B		15					LOV
1988 08 11.79	S	8.0	AA	8.0	B		15	8	6			LOV
1988 08 11.79	S	8.3	AA	20	L	6	94					LOV

Comet Machholz 1988j [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 08 15.72	S	8.2	SC	7.8	R	8	30	4	1/			JON
1988 08 15.75	S	7.8	SC	4.5	R	6	13					JON
1988 08 16.69	S	8.1	SC	7.8	R	8	30	4	1/			JON
1988 08 16.74	S	8.0	SC	4.5	R	6	13					JON
1988 08 16.77	S	7.4	AA	8.0	B		15	5	7			LOV
1988 08 17.73	S	8.0	SC	4.5	R	6	13	3.5				JON
1988 08 18.74	S	7.8	AA	4.5	R	6	13					JON
1988 08 18.75	S	6.9	AA	8.0	B		15	5	7	0.3		LOV
1988 08 19.77	S	7.0	AA	8.0	B		15	5.0	7	0.4		LOV
1988 08 21.74	S	7.3	AA	4.5	R	6	13					JON
1988 08 23.77				20	L	6	52	5.0	7	0.6		LOV
1988 08 23.77	S	6.5	AA	8.0	B		15					LOV
1988 08 24.78	S	6.2	AA	20	L	6	52	2.0	7/	>0.5		LOV
1988 08 24.78	S	6.3	AA	8.0	B		15		7/			LOV
1988 08 25.79	S	6.4	AA	8.0	B		15		7/			LOV
1988 08 28.78				20	L	6	52	2.5	7/			LOV
1988 08 28.78	S	6.1	AA	8.0	B		15			0.3		LOV
1988 08 29.78				20	L	6	52	2.5	7/	0.5		LOV
1988 08 29.78	S	6.2	AA	8.0	B		15					LOV

Comet Yanaka 1988r

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 01.82	M	9.5	A	31	L	6	63	3	5			HAS03
1989 01 02.82	M	9.7	A	31	L	6	63	2.5	4			HAS03
1989 01 03.46	S	9.6	AC	31.7	L	6	68	1.5	5			BOR
1989 01 04.83	M	9.4	A	31	L	6	63	3.0	5/	0.1		HAS03
1989 01 05.45	S	9.7	AC	31.7	L	6	68	1.9	5			BOR
1989 01 05.84	M	9.7	A	31	L	6	63	3.4	4			HAS03
1989 01 08.22	S	8.7	AA	40	L	4	75	6	6/	0.22	300	ZAN
1989 01 09.21	S	10.5	AA	8.0	B		15	2.5	3			MIK
1989 01 13.54	M	10.5	AA	31.8	L	4	63	2	3			KEE
1989 01 15.54	M	10.1	AC	41	L	4	83					HAL
1989 02 03.32 !	S	12.5	AC	41	L	4	83					HAL

Comet Yanaka 1989a

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 04.80	S	11.4	A	31	L	6	63	3.5	3			HAS03
1989 01 05.44	S	10.7	AC	31.7	L	6	68	2.7	1			BOR
1989 01 11.44	S	10.8	AC	31.7	L	6	68	2.5	0			BOR
1989 01 13.52	S	10.3	AA	31.8	L	4	33	5	1			KEE
1989 01 14.44	S	10.7	AC	31.7	L	6	68	2.4	0			BOR
1989 01 14.54	S	11.2	AC	41	L	4	83					HAL
1989 02 03.39	S	11.5	AC	41	L	4	83		1			HAL
1989 02 05.99	S	11.3	AC	15.2	L	5	44	1.3	2			MOE
1989 02 26.14	S	11.5	AA	20	L	6	60	0.40	1			NOW

Comet Shoemaker 1989f

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 02 03.20	I	[14.0		41	L	4	244					HAL

Comet Shoemaker 1989e

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 25.89	S	13.5:	AC	36	T	11	325	0.5	4/			KOR
1989 01 27.23	S	13.6:	AC	41	L	4	183					HAL
1989 01 27.96	S	13.3:	AC	36	T	11	325	0.7	6			KOR

Comet Shoemaker 1989e [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 29.26	S	13.4	AC	41	L	4	83					HAL
1989 02 03.24	S	13.3	AC	41	L	4	83					HAL
1989 02 06.92	S	13.5:	AC	36	T	11	325	0.8	3			KOR
1989 02 12.47	S	13.3	AC	41	L	4	83					HAL
1989 02 13.29	S	13.7	AC	50.0	L	5	157	0.8	3			BOR
1989 02 28.23	I[	13.0		41	L	4	183					HAL
1989 03 02.23	I[	13.5		41	L	4	183					HAL
1989 03 06.31	S	13.4	NP	25.6	L	4	156	0.85	2			MOR
1989 03 06.35	S[	13.7	AC	41	L	4	183	1.0				HAL
1989 03 08.22	S[	13.9	CR	41	L	4	183	1.0				HAL
1989 03 11.29	I[	14.0		41	L	4	183					HAL

Periodic Comet Pons-Winnecke (1989g)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 05 06.26	I[	13.5		41	L	4	183					HAL
1989 05 24.16	I[	14.0		41	L	4	244					HAL
1989 06 01.18	I[	13.5		41	L	4	244					HAL
1989 06 08.26	I[	14.0		41	L	4	183					HAL
1989 06 25.18	I[	13.0		41	L	4	183					HAL
1989 07 04.19	I[	13.5		41	L	4	183					HAL

Periodic Comet Tempel 1 (1987e1)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 02 11.85	S	11.7:	VN	25	L	6	71	5.5	2			CLA
1989 04 09.48	I[	11 :		41	L	4	183					HAL
1989 05 05.46	I[	12 :		41	L	4	183					HAL

Periodic Comet Tempel 2 (1987g)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 21.02	I[	13.5		30.5	L	5	150					ZAN
1988 08 01.39	S	11.8	L	31.7	L	5	86	1	0			JON
1988 08 02.32	S	12.2	L	31.7	L	5	86	1				JON
1988 08 11.36	S	10.9	L	31.7	L	5	86	1.5	1			JON
1988 08 13.37	S	10.9	L	31.7	L	5	86	1.5	1			JON
1988 08 14.35	S	10.6	L	31.7	L	5	86	1.5	1			JON
1988 08 15.34	S	10.6	L	31.7	L	5	86	2	1			JON
1988 08 17.31	S	10.6	L	31.7	L	5	86	1.2	0/			JON
1988 09 08.36	S	10.2	VN	31.7	L	5	86	1	1			JON
1988 09 09.35	S	10.1	VN	31.7	L	5	86	1	1			JON
1988 09 14.36	S	10.0	VN	31.7	L	5	86	2	1			JON
1988 10 01.39	S	9.9	VN	31.7	L	5	86	1.5	1			JON
1988 10 02.43	S	9.9	VN	31.7	L	5	86	1.5	1			JON
1988 10 03.43	S	9.8	VN	31.7	L	5	86	2	1/			JON
1988 10 12.42	S	9.7	VN	31.7	L	5	86	2	1/			JON
1988 10 14.43	S	9.8	VN	31.7	L	5	86	2	1/			JON
1988 10 16.40	S	9.7	VN	31.7	L	5	86	1.5	1			JON
1988 11 01.43	S	10.4	MV	31.7	L	5	86	2	1/			JON
1988 11 02.42	S	9.6:	AA	8.0	B		15					SEA
1988 11 03.44	S	11.1	MV	31.7	L	5	86	2	1			JON
1988 11 08.44	S	11.4	MV	31.7	L	5	86	1.2	1			JON
1988 11 08.46	S	9.9	AA	8.0	B		15					SEA
1988 11 08.46	S	10.5	AA	15.2	L	5	29					SEA
1988 11 09.41	S	11.4	MV	31.7	L	5	86	2	1			JON
1988 11 11.43	S	10.8	MV	31.7	L	5	86	1.3	1			JON
1988 11 14.43	S	11.5	MV	31.7	L	5	86		1			JON
1989 01 26.11	I[	11.5		41	L	4	83					HAL

Periodic Comet Borrelly (1987 XXXIII = 1987p)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 11 24.59	M	7.4	AA	31	L	4	60	10	6			CLA
1987 11 25.78	M	7.5	AA	31	L	4	60	9	6			CLA
1987 12 01.81	M	7.5	AA	31	L	4	60	10	6			CLA
1987 12 15.54	M	7.5	AA	31	L	4	60	7	8	0.05	85	CLA
1988 01 19.55	S	8.6	AA	15	L	6	45	6	3			CLA

Periodic Comet Kopff (1988k)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 05 06.20	I	[13.5		41	L	4	183					HAL

Periodic Comet Schwassmann-Wachmann 2 (1987 XIX = 1986h)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1988 05 21.00	I	[13.5	AC	30.5	L	5	150					ZAN

Periodic Comet Gunn

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 19.55	I	[13.0		41	L	4	183					HAL
1989 02 12.50	I	[13.5		41	L	4	244					HAL
1989 03 06.46	I	[13.5		41	L	4	244					HAL
1989 03 11.40	I	[14.0		41	L	4	244					HAL
1989 03 16.46	I	[14.0		41	L	4	183					HAL
1989 03 29.32	I	[14.0		41	L	4	183					HAL
1989 04 06.45	S	12.5	AC	41	L	4	83		6/			HAL
1989 04 07.29	M	12.6	AC	41	L	4	183					HAL
1989 04 09.41	S	12.6	AC	41	L	4	83					HAL
1989 04 15.45	S	12.6	AC	41	L	4	83					HAL
1989 04 15.49	S	13.3	NP	25.6	L	4	156	0.6	6			MOR
1989 04 28.33	S	12.8	AC	41	L	4	83					HAL
1989 04 29.38	S	12.5	NP	25.6	L	4	111	1.6	2			MOR
1989 05 02.42	M	12.6	AC	41	L	4	83					HAL
1989 05 11.40	S	12.6:	NP	41	L	4	183					HAL
1989 05 22.94	S	12.8	AC	36	T	11	434	1.0	6/			KOR
1989 05 23.92	S	12.9	AC	36	T	11	434	0.8	3			KOR
1989 05 24.23	S	12.5:	AC	41	L	4	183					HAL
1989 05 25.21	S	13.0	NP	25.6	L	4	156	0.8	3			MOR
1989 05 27.22	S	12.8	NP	25.6	L	4	156	0.9	1/			MOR
1989 05 28.20	S	12.3	AC	31.8	L	4	63	1.6	2			KEE
1989 05 28.26	M	12.5	NP	25.6	L	4	156	1.2	3			MOR
1989 05 29.13	S	12.4	AC	50.0	L	5	96	0.8	3/			BOR
1989 06 01.22	S	12.6	AC	41	L	4	183					HAL
1989 06 03.25	S	12.6	AC	41	L	4	183		2/			HAL
1989 06 04.24	M	12.6	NP	50.8	L	4	195	0.8	5	0.03	90	MOR
1989 06 04.26	S	12.6	NP	25.6	L	4	156	1.0	3			MOR
1989 06 05.16	S	12.3	AC	50.0	L	5	157	1.0	4			BOR
1989 06 05.24	S	12.5	NP	25.6	L	4	156	1.2	3			MOR
1989 06 08.31	M	12.7	AC	41	L	4	83					HAL
1989 06 09.90	S	13.3	AC	40	L	5	333	0.5	6			BOA
1989 06 24.22	S	12.7	NP	25.6	L	4	156	1.2	2			MOR
1989 06 25.20	S	12.8	NP	50.8	L	4	120	1.2	2			MOR
1989 06 25.24	S	12.8	AC	41	L	4	183					HAL
1989 07 02.20	S	12.8	NP	25.6	L	4	156	1.5	1/			MOR
1989 07 03.20	S	13.1	NP	25.6	L	4	156	1.5	1			MOR
1989 07 03.24	S	13.0	AC	41	L	4	183					HAL

Periodic Comet Gunn [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 07 04.20	S[	13.1	NP	25.6	L	4	156					MOR
1989 07 05.20	S[	13.1	NP	25.6	L	4	156					MOR
1989 07 07.27	S	13.1	AC	41	L	4	183		1/			HAL

Periodic Comet Shoemaker-Holt 2 (1989j)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 03 10.23	S	13.5	AC	41	L	4	83		3/			HAL
1989 03 11.34	S	13.4	AC	41	L	4	183		3/			HAL
1989 03 26.17	S	13.7	AC	41	L	4	183		3/			HAL
1989 04 03.32	S	14.0	AC	41	L	4	183					HAL
1989 04 04.18	S	13.9	AC	41	L	4	183					HAL
1989 04 09.26	S	13.9	AC	41	L	4	183					HAL
1989 04 09.28	S	13.6	NP	50.8	L	4	120	1.2	2			MOR
1989 04 09.30	S	13.6	NP	25.6	L	4	156	1.0	1/			MOR

Periodic Comet Helin-Roman-Crockett (1989b)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 01 29.30	S[	14.0	CA	41	L	4	244	0.5				HAL

Periodic Comet Brorsen-Metcalf (1989o)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 07 07.41	S	11.5	AC	41	L	4	83	5	1			HAL
1989 07 07.44	S	10.4:	NP	50.8	L	4	78	5.0	1/			MOR
1989 07 08.45	S	9.6	NP	8.0	B		20	9	1/			MOR
1989 07 08.45	S	9.6	NP	25.6	L	4	45	6	2			MOR
1989 07 09.31	S	9.4	GA	20.3	L	6	49	& 6	2			GRE
1989 07 10.40	M	9.6	NP	25.6	L	4	45	5.4	2/			MOR
1989 07 10.40	S	9.4	NP	8.0	B		20	8	1/			MOR
1989 07 10.40	S	9.7	AA	31.8	L	4	33	2	2			KEE
1989 07 10.41	S	9.4	AA	15.2	L	3	16	3	3			KEE
1989 07 10.76	S	9.0	GA	15.2	L	5	29	& 5	4			SEA
1989 07 11.42	S	9.7:	AC	41	L	4	83		1/			HAL
1989 07 12.31	S	7.8	GA	5.0	B		7	&12	0			GRE
1989 07 12.31	S	7.8	GA	8.0	B		20	&11	4/			GRE
1989 07 12.32	S	7.8:	SE	8.0	B		20					GRE
1989 07 13.30	S	8.5	GA	8.0	B		20	& 9	4/			GRE
1989 07 13.43	M	8.8	AA	8.0	B		20	9	3			MOR
1989 07 13.45	S	8.7	AA	5.0	B		10	12	2			MOR
1989 07 14.44	M	8.1	AA	8.0	B		20	12	2			MOR
1989 07 14.44	S	8.1	AA	5.0	B		10	12	1/			MOR
1989 07 15.13	S	8.8	AA	15	L	4	26	5	0			PER01
1989 07 15.30	S	8.3	GA	8.0	B		20	& 8	2/			GRE
1989 07 15.42	S	8.2	AA	8.0	B		20	10	2/			MOR
1989 07 15.43				25.6	L	4	67	4.6	3/			MOR
1989 07 16.45	S	8.2	AA	8.0	B		20	9	2/			MOR

Periodic Comet Schwassmann-Wachmann 1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1989 05 05.46	I[	13.0		41	L	4	183					HAL
1989 06 04.44	I[	13.5		41	L	4	244					HAL
1989 06 10.40	I[	13.5		41	L	4	183					HAL
1989 07 03.42	I[	13.5		41	L	4	183					HAL
1989 07 09.44	S	12.6	AC	41	L	4	183					HAL
1989 07 10.43	S	13.1	NP	25.6	L	4	156	1.0	3/			MOR
1989 07 11.39	S	12.7	AC	41	L	4	183					HAL