THE INTERNATIONAL COMET QUARTERLY

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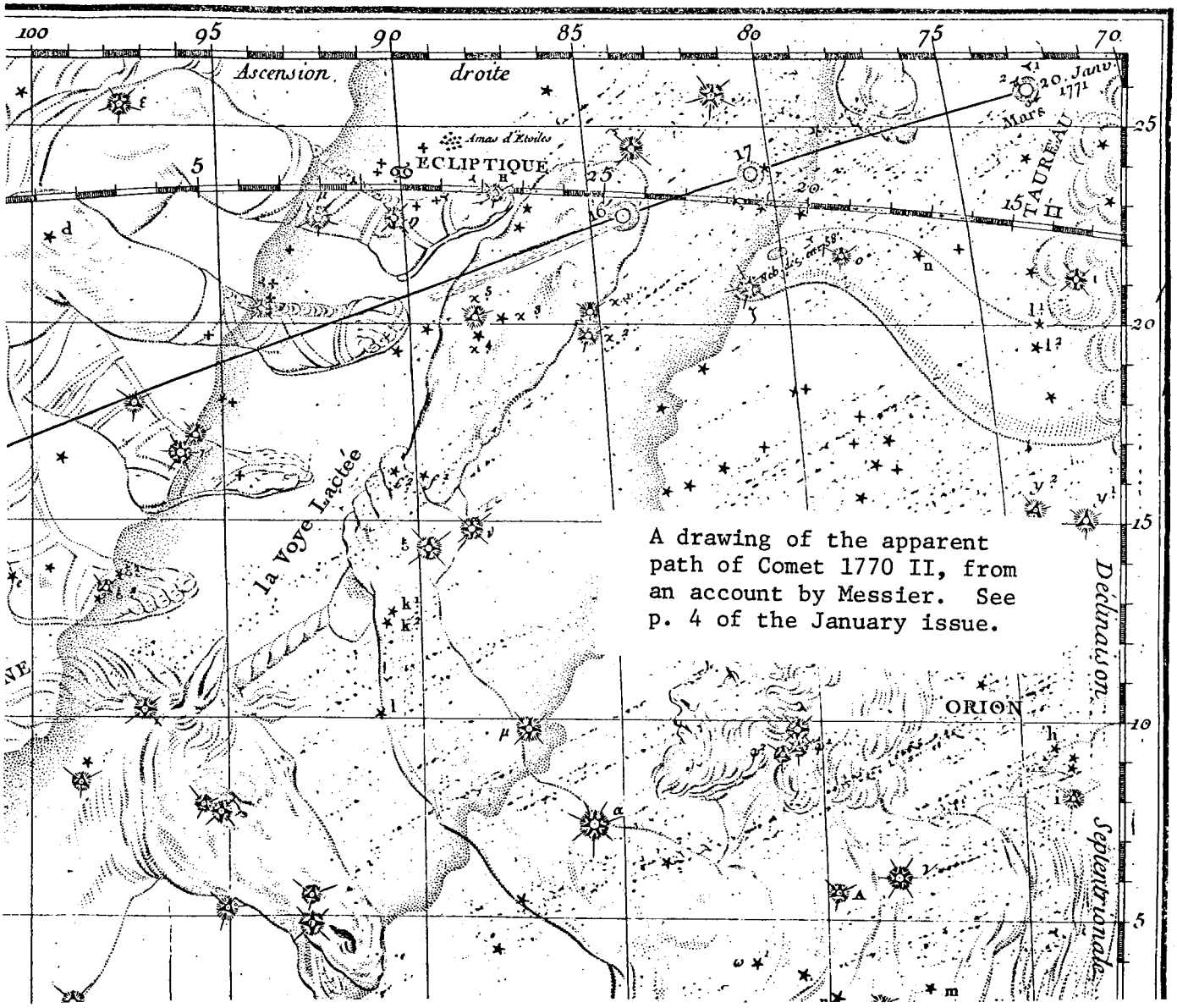

A drawing of the apparent path of Comet 1770 II, from an account by Messier. See p. 4 of the January issue.

INSIDE THIS ISSUE

From the Editor

Effective May 1, 1980, subscription rates to the ICQ will be $8.00 per year for both domestic and foriegn subscribers; this includes first class mailing in North America and air mailing to other locations. Included in this eight-dollar rate is an automatic annual invoicing charge. Subscribers who wish to keep track of their own subscription's expiration date may receive the ICQ at the rate of $5.00 per year.

Also effective June 1, 1980, the editorial address for the ICQ will change from Oak Park, IL, to the following:

Daniel Green, Editor
The International Comet Quarterly
Perkin 329
Smithsonian Astrophysical Obs.
60 Garden St.
Cambridge, MA 02138, U.S.A.

All subscription materials should be sent to the above address after June 1st (new subscriptions, subscription renewals, changes of address, etc.), as should editorial materials (articles, news items, etc.).

Daniel W. E. Green
Valparaiso, IN
April 3, 1980

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NEWS OF RECENT COMETS

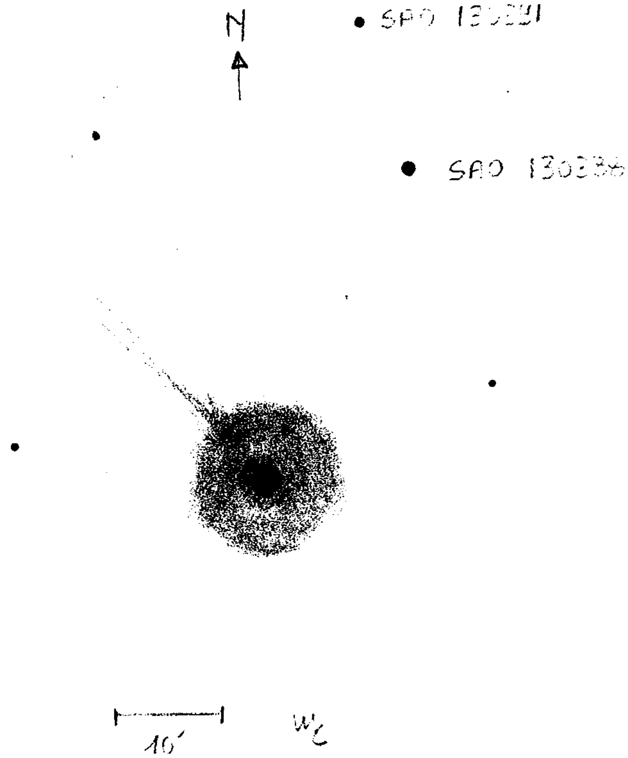
Hans-Emil Schuster found recovery images of Periodic Comet Forbes from plates taken at the European Southern Observatory on March 12 and 14. The object was diffuse and of total magnitude 19-20, and was given the designation Comet 1980a. (Cf. IAUC 3460)

Edward L. G. Bowell of Lowell Observatory discovered a comet on plates taken February 11 and March 13 with a 33-cm photographic telescope. Moving northwestward in Leo as a diffuse object of total magnitude 16.5, this comet was designated Comet 1980b. The orbit of Comet Bowell is an extremely interesting one in that close approaches to Saturn in April 1979 (2.7 AU) and Jupiter in December 1980 (0.23 AU) will have the effect of changing the object's orbit to the most hyperbolic orbit known for any comet, from e = 1.005 to e = 1.06 (IAUC 3468).

THE APPARITION OF COMET BRADFIELD (1979l)

by Charles S. Morris, Prospect Hill Observatory

Comet Bradfield 1979l was discovered by William Bradfield on December 24, 1979, UT as a 5th-magnitude object in Scorpius (cf. ICQ, Jan. 1980, p. 4). At discovery, Bradfield described the comet as being diffuse with condensation and having more than one degree of tail. After discovery, its orbit took the comet southward until January 23, reaching a declination of -80°. The object then raced north as it neared the earth, moving up to 10 degrees a day to become a northern hemisphere object by late January. The following summary of Comet Bradfield's apparition is based on observations which have thus far been reported to the ICQ.



The above drawing of Comet 1979l was made by Marco Cavagna (Milan, Italy) on Feb. 1.75 UT, as seen with 20x80 binoculars in a "perfect sky." He remarks about a very faint nebulosity from p.a. 346 to 79 degrees, with a principal tail in p.a. 53 degrees.

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Brightness. Comet Bradfield was approximately 5th magnitude when discovered. Although the comet had passed perihelion by discovery, a close approach to the earth in late January led some to believe that the object's magnitude might increase to 4th magnitude or brighter. However, the maximum brightness only reached 4.6-4.7 between January 21-28.

After January 28, Comet Bradfield began a rapid decrease in brightness as it receded from the earth. Within five days, the comet's magnitude had dropped to 6.0. However, on or about February 3 UT, there appears to have been a small flare in heliocentric brightness, causing the apparent brightness to remain approximately constant for several days. Unfortunately, this flare occurred just as the moon was leaving the evening sky. Thus, it is possible that the "flare" resulted from observing the comet in a dark sky. This author disagrees with that type of conclusion for two reasons. First, observations made by the author before and after moonrise indicated no difference in the brightness estimate. Second, there appears to have been a permanent reduction in the comet's value of n after the flare.

By the beginning of March, Comet Bradfield had faded to about 10th magnitude and was rapidly becoming inaccessible to most amateur instruments. Further discussion of Comet Bradfield's light curve can be found under "Photometric Parameters of Comets," in this same issue.

Coma Diameter and Degree of Condensation. At discovery, Comet Bradfield was small and condensed. The coma diameter increased as the comet approached the earth, from 1.5' (D.A.J. Seargent, The Entrance, Australia) on Dec. 28 to 10' (T. B. Tregaskis, Australia) on Jan. 21. Coma diameter estimates in ex-

cess of 10' were reported well into February. By March the comet had "shrunk" to a diffuse glow of diameter 3' (Morris).

The coma diameter observed was a function of instrument aperture. For example, this author made the following coma diameter estimates with a variety of instruments on Feb. 4:

6x15 binoculars	18'
12x50 binoculars	15
20x80 binoculars	12
25-cm reflector (70x)	7

The degree of condensation (DC) decreased after discovery from 7 to 2-4 (scale: 9 = stellar, 0 = diffuse) by the end of January. However, the DC increased again to about 6 by Feb. 3. This increase in DC corresponds approximately to the occurrence of the flare in brightness. After Feb. 5 the DC began to decrease slowly. By the beginning of March, the DC had dropped to 0, as reported by amateurs.

Tails. In late December and January, Comet Bradfield's tail length was typically one to two degrees. Thus far the maximum visual tail length reported has been 3 degrees, on Jan. 8 (Seargent). During late January the moon interfered with tail length observations. However, a couple of observations of tails were reported by observers using medium to large refractors. The observation by Steve O'Meara (Cambridge, Mass., U.S.A.) on Jan. 28 suggests a complex tail structure.

After the moon left the sky, it was possible to see faint tail structure with smaller instruments. The drawing by Marco Cavagna (p. 23) made on Feb. 1 illustrates the typical tail structure. Although the number and positions of tails and/or streamers varied from night to night, there was a persistent fan "tail" surrounding them. On many nights, the coma of the comet was also elongated in the direction of this fan.

Normally, at least two distinct tails (within the fan) were observed by the author. An apparent gas tail typically pointed eastward or northeastward. The other tail, probably a dust tail, trailed off toward the west-southwest. On at least one occasion this latter tail was distinctly curved. From night to night these tails and others (sometimes as many as four were observed or suspected) varied in brightness and length. Although much of this variation was no doubt due to variable observing conditions, some of the observed changes were intrinsic to the comet.

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PHOTOMETRIC PARAMETERS OF COMETS

by Charles S. Morris,
Prospect Hill Observatory

This issue's column will examine the light curve of Comet Bradfield 19791. The author will highlight some interesting features of the comet's light curve rather than present a definitive light curve. To that end, a total of 54 magnitude estimates by 7 observers have been selected from those submitted to the ICQ to date. (Most of the observations used have been published in this issue or in Vol. 2, No. 1, of the ICQ. However, a few of the observations will appear in the next issue of the ICQ.) The observers include:

Jack C. Bennett, South Africa (BEN) --4 observations
John E. Bortle, NY, U.S.A. (BOR)--17
R.N. Campbell, New Zealand (CAM)--1
V.F. de Assis Neto, Brazil (DEA)--2
Charles S. Morris, MA, U.S.A. (MOR) --22
David A.J. Seargent, Australia (SEA) --3
T.B. Tregaskis, Australia (TRE)--5

The magnitude estimates, which cover the period from 1979 December

29 to 1980 March 16 (r = 0.57-1.74 AU), were corrected to a standard aperture of 6.78 cm using the method outlined by Bobrovnikoff (1941a, b) and Morris (1973). The resulting light curve is depicted in Figure 1, below.

There are two features of significant interest in Comet Bradfield's light curve. First, the value of n (the parameter which determines how rapidly the comet's brightness changes with heliocentric distance) apparently decreased as the comet receded from the sun. (A constant value of n would be denoted by a linear change in magnitude in Fig. 1.) Secondly, a small flare in brightness occurred around Feb. 3. It is possible that the flare is related to the change in the comet's photometric characteristics. If this view is taken, the light curve can be broken up into parts and described by the following two power-low formulae:

For r = 0.57 - 1.00 AU,

$$H_\Delta = 8.4 + 13.2 \log r$$

And for r = 1.00 - 1.74 AU,

$$H_\Delta = 8.0 + 3.2 \log r,$$

where H_Δ is the comet's heliocentric brightness. These power-law formulae were obtained by graphical analysis.

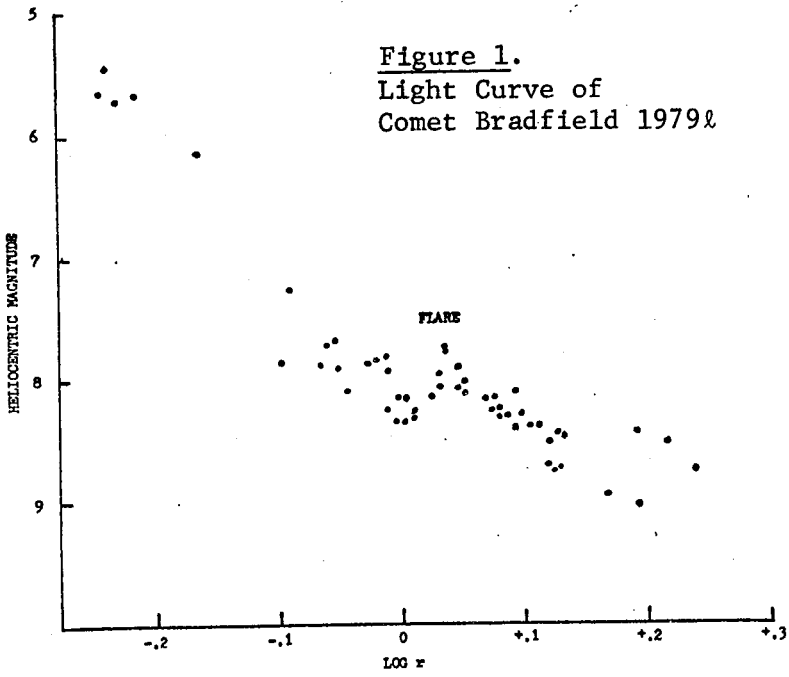

Figure 1.
Light Curve of
Comet Bradfield 1979ℓ

The light curve presented in Fig. 1 and the power-law formulae given above are based on the well-known comet magnitude formula:

$$m_1 = H_o + 5 \log \Delta + 2.5 n \log r, \quad (1)$$

where m_1 is the observed magnitude, Δ is the comet's geocentric distance, and r is the comet's heliocentric distance. When this equation is used, instrumental (aperture) effects are corrected prior to applying the formula. Öpik (1963) has proposed a modification of equation (1) which attempted to correct explicitly for instrumental effects: {Those interested in Öpik's formula should also read Meisel (1970) and Meisel and Morris (1976).}

$$m_1 = H_o - 2.5(s - 2) \log (D/6.78) + 2.5s \log \Delta + 2.5n \log r, \quad (2)$$

where D is the telescope aperture (in cm) and s is the index of variation of brightness within the comet's coma such that the comet surface brightness has a radial dependence $B(\rho) = B_o \rho^{-s}$, where ρ is the projected distance from the comet's central condensation. Note that when s = 2, equation (2) reduces to equation (1). Normally it is difficult to determine s from visual observations and therefore Öpik's formula is not used.

In Comet Bradfield's case, the Öpik formula is of interest because of the comet's close approach to earth. In equation (2) the 2.5(s-2) log (D/6.78) term will be small for binocular observations. However, the 2.5s log Δ term will become important if the comet makes a close approach to the earth. If s $<$ 2 for a comet receding from the sun, the comet's brightness will not increase as rapidly as expected from equation (1) when the comet approaches the earth resulting in an apparently larger value of n. As the comet recedes from the earth, the decrease in brightness will be less

rapid than predicted by equation (1), producing a smaller value of n. Thus, Comet Bradfield's light curve, as shown in Fig. 1, could be explained if Öpik's formula is correct and if s < 2 for this particular object. Physical descriptions of Comet Bradfield indicated that it was basically diffuse with no central condensation. This would support the idea that s < 2.

Which answer is correct? Did Comet Bradfield 1979ℓ undergo a drastic change in its photometric parameters as indicated by equation (1), or is the wrong formula being used to represent the comet's brightness? Should Öpik's formula be used to derive a single value of n for this comet by assuming s < 2? These questions require further investigation using all available observations, and even then, the questions may not be fully answered.

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OBSERVATIONS OF COMETS

On pages 27-39 of this issue we have listed observations of comets made by individuals who have contributed to the ICQ, and observations received from organizations including the Association of Lunar and Planetary Observers (ALPO) and the British Astronomical Association (BAA). We have included most of the ALPO observations of Comet Kobayashi-Berger-Milon, continued from the last issue, and the remainder will be published in the July issue. Also included are Comet Bradfield 1979ℓ observations received by early March.

The key to instrument type (column "T" in the tabulations) is as follows: L = reflecting telescope; R = refracting telescope; C = Cassegrainian-type telescope; B = binoculars; S = Schmidt camera.

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IMPORTANT NOTICE

CHANGE OF ADDRESS: Effective June 1, 1980, the address for this publication will change from 721 S. Elmwood Ave.; Oak Park, IL 60304, U.S.A.,

to:

Daniel Green, Editor
Perkin 329
Smithsonian Astrophysical Observatory
60 Garden Street
Cambridge, MA 02138, U.S.A.

Further information about this is on page 22 of this issue.

SUBSCRIPTION RATE INCREASE: Effective immediately, subscription rates worldwide (including North America) will be $8.00 per year; this includes invoicing. Those who wish to keep track of their expiration date may subscribe at the rate of $5.00 per year.

Comet Bennett (1970 II = 1969i)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 04 02.14			5.0	B		7			7		FEI
1970 04 02.14	1.0	K		E							FFI
1970 04 08.11	2.0	K		E							FEI
1970 04 09.13			5.0	B		7			7		FEI
1970 04 09.13	2.0	K		E							FFI
1970 04 12.09	2.5	K		E							FEI
1970 04 18.94	3.9	K	5.0	B		7					FFI
1970 04 20.86	4.0	K	5.0	B		7					FFI
1970 04 26.03			5.0	B		7			7		FFI
1970 04 26.03	3.9	K		E							FEI
1970 04 27.95	4.1	K		E							FFI
1970 05 01.11	4.3	K		E					5		FFI
1970 05 06.04	5.1	K	7.6	R		20					FFI
1970 05 08.00	4.9	K	5.0	B		7					FFI
1970 05 10.01	5.6	K	5.0	B		7					FFI
1970 05 18.04	5.7	K	5.0	B		7					FFI
1970 05 26.03	6.9	V	7.0	B		15					FFI
1970 06 08.00	7.8	V	7.6	R		20					FFI

Comet Kohoutek (1973 XII = 1973f)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 01 11.71	4.5	K	6.0	B		12					FEI
1974 01 13.71	4.6	K	6.0	B		12			5.00		FEI
1974 01 15.71	4.8	K	6.0	B		12					FEI
1974 01 16.74	4.7	K	6.0	B		12					FFI
1974 01 19.73	5.3	K	6.0	B		12					FEI
1974 01 24.75	6.1	A	6.0	B		12					FEI
1974 01 26.75	6.4	A	5.0	B		7					FEI
1974 01 27.75	6.4	A	5.0	B		7					FFI
1974 01 29.75	6.7	A	6.0	B		12					FEI
1974 01 31.75	7.1	A	6.0	B		12					FEI
1974 02 03.81	7.5	A	6.0	B		12					FFI

Comet Bradfield (1974 III = 1974b)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 03 30.81	5.2	K	5.0	B		7					FFI
1974 03 31.81	4.9	K	6.0	B		12			1.50		FEI
1974 04 04.83	4.7	K	6.0	B		12					FEI
1974 04 05.83	4.8	K	6.0	B		12					FFI
1974 04 06.83	4.9	K	6.0	B		12					FEI
1974 04 07.83	5.0	K	6.0	B		12					FEI
1974 04 09.81	6.1	K	6.0	B		12					FFI
1974 04 14.08	6.8	A	5.0	B		7					FEI
1974 04 14.88	6.3	A	5.0	B		7					FEI
1974 04 16.04	7.0	A	6.0	B		12					FEI
1974 04 18.98	7.5	A	6.0	B		12					FEI
1974 04 21.87	7.6	A	6.0	B		12					FFI
1974 04 22.87	7.9	A	6.0	B		12					FEI

Comet Bradfield (1974 III = 1974b) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 04 23.96	7.8	A	6.0	B		12					FEI
1974 04 25.95	7.9	A	6.0	B		12					FEI
1974 05 16.96	10.0	N	16	L							FEI
1974 05 18.02	10.2	N	16	L							FEI

Comet Kobayashi-Berger-Milon (1975 IX = 1975h)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 07.96			31.7	L						220	JCN
1975 07 07.96	8.2	S	7.8	R							JCN
1975 07 08.93	7.5		7.0	B		20	15				LUK
1975 07 09.56	7.2	V	5.0	B		7	16				SUM
1975 07 09.99	6.8	S	4.0	B		12					FEI
1975 07 10.09	7.0			E			15				LUK
1975 07 10.19	6.3	A	10.0	B		14					SIM
1975 07 10.20			10.8	L			12	3			SIM
1975 07 10.30	5.7	Y	3.5	B		7	25				MIL
1975 07 10.40	6.2	S	5.0	B		7					HAR
1975 07 10.40			15	R	15	72	4	4/			HAR
1975 07 10.52	7.1	V	5.0	B		7	18				SUM
1975 07 10.58	6.8		3.0	B		8	9				THO
1975 07 10.91	6.0	S	5.0	B		7	&15				MIN
1975 07 10.97	7.0	S	5.0	B		7					BUS01
1975 07 10.99	6.6	S	4.0	B		12					FEI
1975 07 11.64	6.9	V	5.0	B		7	18				SUM
1975 07 11.96	6.7	S	4.0	B		12					FEI
1975 07 12.30	7.0:	A	5.0	B		10		1			SWE
1975 07 12.51	6.7	V	8.0	B		11	&20				SUM
1975 07 12.56	5.8		8.0	B		11					THO
1975 07 13.06	6.3	K	8.0	B		11					MUR
1975 07 13.06			22.9	R	15	70	3.3	7/		270	MUR
1975 07 13.15	6.6	A	5.0	B		10		0			SWE
1975 07 13.55	6.6	V	5.0	B		7					SUM
1975 07 13.60	5.6			E							THO
1975 07 13.95	6.0	K	5.0	B		7	14				BEE
1975 07 14.01	5.9	K	4.0	B		12					FEI
1975 07 14.03	5.8	K	3.0	B		8	12				VAN
1975 07 14.3		P	15	R	10				&1	205	YCU
1975 07 14.43			15	R	15	72	3.0				HAR
1975 07 14.43	5.7	S	5.0	B		7					HAR
1975 07 14.47	6.0	S	5.0	B		7	10				MIN
1975 07 14.54	6.3	V	5.0	B		7	&20				SUM
1975 07 14.54	6	:		E			10				THO
1975 07 14.94	6.0	K	5.0	B		7					BUS01
1975 07 14.94	5.3	K	3.0	B		8	9				VAN
1975 07 14.95	5.4	K	5.0	B		7	18				BEE
1975 07 14.96	5.8		8.0	B		15	20				ALC
1975 07 14.96	5.5	P	30.0	R			15				LUK
1975 07 14.96	5.7	K	5.0	B		7	25				WUB
1975 07 14.97	5.8	K	4.0	B		12					FEI

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 14.97	5.7	K	4.0	B		8					MUH
1975 07 14.97			15	L	8	60	6				MUH
1975 07 15.0	5.7	K	5.0	B		7					CCM
1975 07 15.12	6.3	A	5.0	B		10		1			SWE
1975 07 15.15	6.2	K	3.5	B		7					KRO
1975 07 15.24	7.0	S	15	L	5	24	8	1/			SHE
1975 07 15.32	5.6	S	5.0	B		7	18				MIN
1975 07 15.33	6.0	A	5.0	B		10		0			SWE
1975 07 15.34	5.9	K	10.0	B		14					SIM
1975 07 15.39			15	R	15	72	3.0	5/			HAR
1975 07 15.39	5.7	S	5.0	B		7					HAR
1975 07 15.56	5.8			E			12				THO
1975 07 15.92	5.5	K	5.0	B		7					CCM
1975 07 15.94	5.2	A	7.0	B		20	15				LUK
1975 07 15.96	5.3	K	3.0	B		8					VAN
1975 07 15.96	5.5	K	5.0	B		7					WUB
1975 07 15.97	5.5	K	5.0	B		7	18.5				KRO01
1975 07 16.14	6.3	K	3.5	B		7					KRO
1975 07 16.14			25.4	L	7	70		2	&0.12	300	KRO
1975 07 16.14	6.3	K	3.5	B		7		3			STE01
1975 07 16.17	6.0	S	3.5	B		7					OME
1975 07 16.18	5.8	K	10.0	B		14					SIM
1975 07 16.28	6.1	S	15	L	5	24	&11	1/			SHE
1975 07 16.52	6.2	V	5.0	B		7					SUM
1975 07 16.92	5.5	K	5.0	B		7	25				WUB
1975 07 16.94	5.2	K	3.0	B		8					VAN
1975 07 16.95	5.3	K	5.0	B		7	16				BEE
1975 07 17.02	5.4	K	5.0	B		7	18				KRO01
1975 07 17.03	5.8	K	4.0	B		12					FEI
1975 07 17.04	5.9	K	5.0	B		12					BET
1975 07 17.07	6.0	K	6.0	B		12					BUS01
1975 07 17.17			25.4	L	7	70		2	&0.12	330	KRO
1975 07 17.17	6.3	K	3.5	B		7					KRO
1975 07 17.17	4.8	Y	3.5	B		7	&30				MIL
1975 07 17.17	5.0	S	3.5	B		7					OME
1975 07 17.22	5.2	S	5.0	B		7	&15				MIN
1975 07 17.25	6.4	S	15	L	5	24	&15	2			SHE
1975 07 17.92	5.3	K	5.0	B		7	30				WUB
1975 07 18.09			15	L	8	28	&25	2			SMI
1975 07 18.09	5.0	A	3.5	B		12					SMI
1975 07 18.10	5.0	X	5.0	B		20	&20	0			MAT02
1975 07 18.25	5.9	S	15	L	5	24	12	2			SHE
1975 07 18.26	4.9	K	4.0	B		8		2			WEI
1975 07 18.35	4.9	X	4.0	B		8		2			SHA01
1975 07 18.36	5.0	S	5.0	B		7	&15	1/			MIN
1975 07 18.38	4.6	K	3.5	B		7	11	0			WAL
1975 07 19.04	5.5	K	5.0	B		12					BET
1975 07 19.06	5.5		8.0	B		15	25				ALC
1975 07 19.08	5.0	X	5.0	B		15	&25	2/			MAT02
1975 07 19.12	5.2	A	3.5	B		7	&18	2			SMI

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 19.17	5.0	S	3.5	B		7					OME
1975 07 19.20	5.3	A	10.0	B		14					SIM
1975 07 19.20			10.8	L			10	3			SIM
1975 07 19.22	4.7		5.0	B		7	13				BCH
1975 07 19.22	4.9:K		3.5	B		7					CAP
1975 07 19.22	5.6	A	5.0	R		7					CCS
1975 07 19.22	4.7	M	4.0	B		8					SHA01
1975 07 19.22	4.7	M	5.0	B		7	&13				WEI
1975 07 19.25	5.8	K	3.5	B		7		1			STE02
1975 07 19.9			15	L	8		6		&0.18	230	MUH
1975 07 19.9	5.2	K	4.0	B		8					MUH
1975 07 19.92	5.3	K	4.0	B		12					BUS01
1975 07 19.92	5.4	K	4.0	B		12					FEI
1975 07 19.95	5.4	K	5.0	B		7	11				BEE
1975 07 19.95	5.1	K	5.0	B		7	18				KRO01
1975 07 19.96	5.0	K	3.0	B		8					VAN
1975 07 20.0	5.5	K	5.0	B		7					CCM
1975 07 20.07	4.6	X	5.0	B		20	20	3/			MAT02
1975 07 20.08	5.2	Y	5.0	B		12	&16.5	1			GRE
1975 07 20.14	5.7	A	5.0	B		7					SIM
1975 07 20.17			12.7	B	8		10				SWE
1975 07 20.17	5.5	A	5.0	B		10					SWE
1975 07 20.17			15.2	L	8		8				SWE
1975 07 20.19	4.8	M	5.0	B		7	12				BCH
1975 07 20.2	4.8:K		5.0	B		7	&15	8			CAP
1975 07 20.21	5.2	S	5.0	B		7	&20	1/			RCB
1975 07 20.23	4.5	M	4.0	B		8		4			SHA01
1975 07 20.40			31.8	L	6		17	7			RIM
1975 07 20.40	5.1	K	5.0	B		7					RIM
1975 07 20.92	4.8	K	5.0	B		7	&40				WUB
1975 07 21.07	4.7		8.0	B		15	&21.5				ALC
1975 07 21.11			15.2	L		42	4.5				HUL
1975 07 21.11			25.4	L	7	70		3	&0.12	30	KRO
1975 07 21.11	5.7	K	3.5	B		7					KRO
1975 07 21.12	4.9	A	5.0	B		10		1			SWE
1975 07 21.14	5.1	K	15.2	L	5	20	12	1			KAL
1975 07 21.17	5.4	A	5.0	B		7					SIM
1975 07 21.18	6.8	K	7.0	B		20	&20	2			SAN
1975 07 21.2	4.5:M		3.5	B		7	&26.5	2			JCN02
1975 07 21.2			25.4	L	7		15	7	0.17	310	WEI
1975 07 21.21			20.3	L	10		&13.5	8	&0.04	300	WEI
1975 07 21.21	4.6	M	5.0	B		7					WEI
1975 07 21.35	5.8	S	7.0	B		20	25	2			LUK
1975 07 21.87	5.3	K	4.0	B		12					FEI
1975 07 21.9	5.6	K	5.0	B		7					CCM
1975 07 21.90	5.5		8.0	B		15	15				ALC
1975 07 21.93	5.6	K	5.0	B		7					CCM
1975 07 21.93	5.5	K	5.0	B		7	16				KRO01
1975 07 21.94	5.5	K	15	L		30					BUS01
1975 07 22.04	5.3	K	5.0	B		12					BET

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 22.07			15.2	L	8	28	&20	3			SMI
1975 07 22.07	5.3	Y	3.5	B		12					SMI
1975 07 22.08	5.3	K	3.5	B		7		1/			STE02
1975 07 22.09			6.1	R		36	&12.5				PAT
1975 07 22.10			20	L	6		&27.5	0/			GRE
1975 07 22.10	5.4	Y	5.0	B		12					GRE
1975 07 22.10	4.5	X	5.0	B		15	20	4/			MAT02
1975 07 22.11			15.2	L	10	120	3.4	4			JCM02
1975 07 22.14	4.6	M	5.0	B		7					WEI
1975 07 22.14			25	L	7		&15.5	6			WEI
1975 07 22.15	4.9	Y	3.5	B		7	&20				MIL
1975 07 22.17	5.0	D	5.0	B		7					CCL
1975 07 22.18			10.8	L	10	45	10	2			DIL
1975 07 22.18	5.6	K	5.0	B		7					DIL
1975 07 22.21	5.3	Y	5.0	B		12	&18	1/			GRE
1975 07 22.93	5.0		8.0	B		15	20				ALC
1975 07 23.07	5.0	R	8.9	C		80			2		GCR
1975 07 23.07	5.2	Y	3.5	B		7					SMI
1975 07 23.07			15	L	8	28	&22	4	&0.17	335	SMI
1975 07 23.07	5.4	Y	3.5	B		7					SMI
1975 07 23.09	5.2	K	5.0	B		7					DIL
1975 07 23.09			10.8	L	10	45	13	3			DIL
1975 07 23.1	4.5	X	5.0	B		10	&27.5	6			MAT02
1975 07 23.17	5.3	A	5.0	B		7					SIM
1975 07 23.18	5.0:	S	5.0	B		7	23	2			RCB
1975 07 23.19	4.6	S	3.5	B		7					OME
1975 07 23.35	5.1	K	3.5	B		7					MCR01
1975 07 23.92	4.8	K	5.0	B		7	&40				WUB
1975 07 23.95	5.2		8.0	B		15	&17.5				ALC
1975 07 23.96	5.1	K	3.0	B		8					VAN
1975 07 24.06	5.1	K	4.0	B		12					FEI
1975 07 24.06	5.2	Y	3.5	B		7	&27				SMI
1975 07 24.06	5.1	Y	3.5	B		7					SMI
1975 07 24.07	4.4	X	5.0	B		20	&27.5	6/	0.50	90	MAT02
1975 07 24.08	5.1	D	5.0	B		7					CCL
1975 07 24.10	4.9	M	20	L			10	7			ARP
1975 07 24.10	5.9	S	3.5	B		7		1			PCR
1975 07 24.11	5	:K	15	L		42	9.0	7			HUL
1975 07 24.15	5.1	S	5.0	B		7	&15	1/			MIN
1975 07 24.15	5.1	A	5.0	B		7					SIM
1975 07 24.17			25.4	L		44	&20	7/	&0.25		CAP
1975 07 24.17	4.2:		5.0	B		7					CAP
1975 07 24.19	4.7	S	3.5	B		7					OME
1975 07 24.23	6.5		7.0	B		20					SAN
1975 07 24.33	4.6:	S	5.0	B		7	&25	1			RCB
1975 07 24.9	5.4	K	5.0	B		7					CCM
1975 07 24.90	5.4	K	5.0	B		7					CCM
1975 07 24.98	5.3	K	3.1	B		8					VAN01
1975 07 25.02	5.1	K	4.0	B		12					FEI
1975 07 25.12	4.8	K	15	L	5	20	11	1			KAL

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 25.16	5.2	A	5.0	B		7					SIM
1975 07 25.18	4.8	S	5.0	B		7	20	1	0.25	30	RCB
1975 07 25.19		P	15	S					0.43	140	SAN
1975 07 25.2	4.0:	M	5.0	B		7			&0.67	160	WEI
1975 07 25.2			20	C	10		&14.5	6			WEI
1975 07 25.21	5.8	K	7.0	B		20	&10	7			SAN
1975 07 25.88	4.8	K	5.0	B		7	&40				WUB
1975 07 25.91	5.1	K	5.0	B		7	14				KRO01
1975 07 25.92	5.0	K	5.0	B		12					BET
1975 07 25.94	4.6	K	3.0	B		8	9				VAN
1975 07 25.95	4.7		8.0	B		15	10		0.25		ALC
1975 07 25.96	5.0	K	5.0	B		7					BEE
1975 07 25.96	5.0	K	5.0	B		12					FEI
1975 07 25.98	5.2	K	3.1	B		8					VAN01
1975 07 26.08	4.4	Z	5.0	B		7	15		&0.50	100	SM101
1975 07 26.10	5.0:	K	5.0	B		7					DIL
1975 07 26.10			10.8	L	10	45	15	2			DIL
1975 07 26.10	4.9	K	3.0	B							MAL02
1975 07 26.12	4.2	X	5.0	B		10	&30	7	&0.5	110	MAI02
1975 07 26.14	4.5	B	5.6	B		8			&1.5		GCR
1975 07 26.15	4.8	Z	5.0	B		7					WBS
1975 07 26.15			15	L	8	47		5/	&1	80	WBS
1975 07 26.17	5.2	K	5.0	B		7	10	4			CCS
1975 07 26.2			25.4	L	7		13	5			WEI
1975 07 26.2	4.3	M	5.0	B		7			&0.92	160	WEI
1975 07 26.4	5.0	K	3.5	B		8					MUR
1975 07 26.4			22.9	B		35	13				MUR
1975 07 26.91	5.0	K	5.0	B		7					KRO01
1975 07 26.92	5.1	K	5.0	B		12					BET
1975 07 26.92	5.6	K	5.0	B		7					CCF
1975 07 26.92	5.2	K	3.1	B		8					VAL01
1975 07 27.0	5.6	K	5.0	B		7					CCF
1975 07 27.06	4.9	D	5.0	B		7					CCL
1975 07 27.06	5.2		3.5	B		7	&27	3	&0.33	100	SVI
1975 07 27.07	4.0:	X	5.0	B		10	&30	8	&0.83	120	MAI02
1975 07 27.09	5.0:	K	5.0	B		7					DIL
1975 07 27.1	4.3	B	5.6	B		8			&2		GCR
1975 07 27.10	5.4	K	5.0	B		7	16	0			CCS
1975 07 27.10	4.4	Y	3.5	B		7	25		&1		MIL
1975 07 27.11	4.6	Y	5.2	B		8	20	8			MCR
1975 07 27.12	5.0	K	5.0	B		7					MCC01
1975 07 27.12			15	L	7	56	&12	6	0.10	125	MCC01
1975 07 27.12			20	C		60	& 2				STE03
1975 07 27.13	5.2:	M	15	L	4		20	6			MCR
1975 07 27.13	5.2	S	15	L	5	24	&12.5	4	&0.67	130	SBE
1975 07 27.14	6.2	K	3.0	B							MAL02
1975 07 27.17	4.6	S	3.5	B		7					OME
1975 07 27.19	4.8	K	5.0	B		7	15		&1.5	115	MAY
1975 07 27.19	4.5	K	3.5	B		7	&12.5	0/			WAL
1975 07 27.2			20	C	10		11	5			WEI

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 27.2	4.3:	M	5.0	B		7			&1.08	170	WEI
1975 07 27.88	4.9	K	4.0	B		8	16				MUH
1975 07 27.91	4.9	K	3.0	B		8	8				VAN
1975 07 27.94	5.0	K	4.0	B		12					FEI
1975 07 27.95	5.0	K	5.0	B		7	14				BEE
1975 07 28.08	4.0:	X	5.0	B		10	&30	8	&0.83	120	MAT02
1975 07 28.08	4.6	S	3.5	B		7					OME
1975 07 28.11	5.1	Y	3.5	B		7					SMI
1975 07 28.11	5.2	Y	3.5	B		7	24	3			SMI
1975 07 28.11	5.2	K	3.5	B		7					STE02
1975 07 28.13			15	L	5	20	13	1			KAL
1975 07 28.13	4.6	Z	3.5	B		7					WES
1975 07 28.16	5.4	K	5.0	B		7					SIM
1975 07 28.19	5.0	S	3.5	B		7	11	1/			MIN
1975 07 28.2	4.0:	M	5.0	B		7			&2.25	170	WEI
1975 07 28.9	5.0	K	5.0	B		7					CCM
1975 07 28.90	5.1	K	5.0	B		12					HER01
1975 07 28.91	4.8	Y	7.0	P		20	22	5	&0.25	125	LUK
1975 07 28.92	4.9	K	5.0	B		12					BET
1975 07 28.92	4.8	K	5.0	B		7					BUS01
1975 07 28.92	4.9	K	4.0	B		12					FEI
1975 07 28.92	5.1	K	5.0	B		7					PAP
1975 07 28.92	4.8	K	3.0	B		8					VAN
1975 07 28.92	5.3	K	3.1	B		8					VAN01
1975 07 28.93	4.8	K	5.0	B		7					CCM
1975 07 28.94	4.8		8.0	B		15	15		0.83	112	ALC
1975 07 29.07	4.9	Y	3.5	B		7					SMI
1975 07 29.07			15	L	8	28	&22		0.33	110	SMI
1975 07 29.07	4.8	Y	3.5	B		7	28	3			SMI
1975 07 29.08			15	L	7	56	&12	5	&0.10	100	MCC01
1975 07 29.08	5.0	K	5.0	B		7					MCCCO
1975 07 29.08	4.6	S	3.5	B		7					OME
1975 07 29.08	4.5	X	3.5	B		7					SMI01
1975 07 29.11	5.2	K	15	L	8	20	13	1			KAL
1975 07 29.13	5.0	S	15	L	5	24	&25	2	&0.75	160	SHE
1975 07 29.16	4.5	Z	3.5	B		7					WES
1975 07 29.90	5.0	K	5.0	B		12					HER01
1975 07 29.90	4.8	K	3.1	B		8					VAN01
1975 07 29.92	4.8		8.0	B		15	&13.5		1.25	90	ALC
1975 07 29.92	4.9	K	5.0	B		12					BET
1975 07 29.92	4.7	K	5.0	B		7					BUS01
1975 07 29.92	4.5	Y	7.0	B		20	25	5	0.25	233	LUK
1975 07 29.92	4.7	K	3.0	B		8					VAN
1975 07 29.94	4.7	K	4.0	B		12					FEI
1975 07 29.95	4.7	K	5.0	B		7					CCM
1975 07 30.0	4.7	K	5.0	B		7					CCM
1975 07 30.07	4.5	Y	3.5	B		7	&30	2			SMI
1975 07 30.07			15	L	8	28			0.5	100	SMI
1975 07 30.08	4.8	X		E							CCL
1975 07 30.08	4.6	X	5.0	B		7	15				SMI01

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 07 30.09			15	L	7	28	12	5	0.33	100	MCC01
1975 07 30.09	5.0	K	5.0	B		7					MCC01
1975 07 30.10	4.4	Z		E							MAL02
1975 07 30.11	4.5	Z		E							MIL
1975 07 30.12	4.8	S	3.5	B		7					OME
1975 07 30.14			5.0	R		11	8	0			CCS
1975 07 30.14			15	L	5	24			&0.67	165	SHE
1975 07 30.14	5.2	S	15	L	5	24	&22.5	5	&1	95	SHE
1975 07 30.15	4.2	Z	5.0	B		7					OLI
1975 07 30.16	4.4	Z	3.5	B		7				100	WES
1975 07 30.17		P					10	1/	0.75	102	MIN
1975 07 30.17	4.8	Y	3.5	B		7					MIN
1975 07 30.18	4.5	S	4.8	R		60	20	3			RCB
1975 07 30.2	4.2	X	5.0	B		7			3.5	115	WEI
1975 07 30.88	4.9	K	5.0	B		7					BUS01
1975 07 30.89	4.5	Y	7.0	B		20	20	5	0.50	240	LUK
1975 07 30.90	4.7		8.0	R		28					MAL01
1975 07 30.91	5.0	K	5.0	B		7					PAP
1975 07 30.91	4.7	K	3.0	B		8					VAN
1975 07 30.92	5.0	K	5.0	B		7	10				BEE
1975 07 30.92	4.8	K	5.0	B		12					BET
1975 07 30.92	5.0	K	5.0	B		7	25				WOB
1975 07 30.94	4.8	K	5.0	B		7					CCM
1975 07 30.97	4.7	K	4.0	B		12					BET
1975 07 31.0	4.8	K	5.0	B		7					CCM
1975 07 31.06	4.5	X	5.0	B		7					CCL
1975 07 31.07			15	L	8	28			0.33	110	SMI
1975 07 31.07	4.5	Y	3.5	B		7	&25	2			SMI
1975 07 31.08	4.5	Z	4.0	B		10	8	1			DEL
1975 07 31.08	3.9	X	5.0	B		10	25	9	0.33	90	MAT02
1975 07 31.09	4.6	X	5.0	B		7					DIL
1975 07 31.09	4.7	K	5.0	B		7					MCC01
1975 07 31.09			15	L	7	28	&12	6	&0.33	92	MCC01
1975 07 31.11	4.6	K	3.5	B		7	&25	1			STE02
1975 07 31.13	4.6	S		E			&30				SBE
1975 07 31.13			15	L	5	24			&0.5	183	SBE
1975 07 31.13			15	L	5	24	30	5/	&1	98	SBE
1975 07 31.16			12.7	R					&0.83	85	PAT
1975 07 31.16	4.7	L	6	R	15	36	10.3	2/	&0.5	85	PAT
1975 07 31.17	4.6	S	3.5	B		7					OME
1975 07 31.17	4.5	S	5.0	B		7	15	3/			RCB
1975 07 31.18	4.3	X	5.0	B		7					WEI
1975 07 31.30	4.7	S	4.8	R		60	17	2/			RCB
1975 07 31.89	4.8		8.0	R		28					MAL01
1975 07 31.9	4.7	K	5.0	B		7					CCM
1975 07 31.91	4.7	K	5.0	B		7					CCM
1975 08 01.88	4.9	K	5.0	B		7					PAP
1975 08 01.88	5.3	K	5.0	B		7					WOB
1975 08 01.90	4.9	K	5.0	B		12					HER
1975 08 01.92	4.8	K	5.0	B		12					BET

Comet Kobayashi-Berger-Milon (1975 IX = 1975h) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 08 01.92	4.7	K	3.0	B		8					VAN
1975 08 01.93	4.8	K	5.0	B		7	10				BEE
1975 08 01.93	4.7	K	5.0	B		7					BUS01
1975 08 01.94	4.5	K	5.0	B		7					CCM
1975 08 01.94	4.7	K	3.1	B		8					VAN01
1975 08 02.0	4.5	K	5.0	B		7					COM
1975 08 02.08	4.9	Y	5.0	B		12		2/			GRE
1975 08 02.16	4.5	S	5.0	B		7					SHE
1975 08 02.16			15	L	5	24	27	7	1.6	92	SHE
1975 08 02.16	4.5	S		E			&30				SHE
1975 08 02.88	4.7	K	5.0	B		7					BUS01
1975 08 02.88	5.0	K	5.0	B		7	25				WUB
1975 08 02.90	4.9	K	5.0	B		12					HER
1975 08 02.90	4.8		8.0	R		28					MAL01
1975 08 02.90	4.7	K	5.0	B		10					VAN01
1975 08 02.92	4.9	K	5.0	B		7	&10				BEE
1975 08 02.92	5.0	K	5.0	B		12					BET
1975 08 02.95	4.8	K	3.0	B		8	6				VAN
1975 08 02.99	4.7	K	5.0	B		7					BUS01
1975 08 03.00	5.0	K	4.0	B		12					FEI
1975 08 03.06	4.8	X	5.0	B		7					COL
1975 08 03.08	4.8	Y	5.0	B		12	35	3/			GRE
1975 08 03.13	4.5	S		E			25				SHE

Comet Kohler (1977 XIV = 1977m)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1977 11 18.73	7.6	S	8.0	B		10	& 4	4			SHA02
1977 11 18.73			32	R		95	4	4	0.10	50	SHA02
1977 11 18.73	7.8:		5.0	B		7					NIG
1977 11 18.78	7.1		8.0	B		15	6	3			PAN
1977 11 19.00	7.1	O	5.0	B		10	4.9	5			BCR
1977 11 19.52	7.1		32	L		70	5	3/			CLA
1977 11 21.73	8.0:		5.0	B		7					NIG
1977 11 27.74	7.2		8.0	B		15	6	4			PAN
1977 11 27.75	6.5		8.0	B		15	6	2			KEI
1977 11 27.76	7.0	S	5.0	B		10	12	6			HUR
1977 11 28.42	7.2	S	32	L		86		2			JCN
1977 11 28.42	7.8	S	8.0	R				2			JCN
1977 11 28.74	6.6		8.0	B		15	6.5	2	1.00	85	KEI
1977 11 28.74			8.0	B		15			0.30	50	KEI
1977 12 02.74	7.7:		20	R		40	5	2/			SHA02
1977 12 06.40	7.0	S	4.0	R				5			JCN
1977 12 07.97	7.4	O	5.0	B		10	5.7	5			BCR
1977 12 09.97	7.5	O	5.0	B		10					BCR
1977 12 09.97	7.7	O	8.0	B		20	4	5			BCR
1977 12 13.40	7.6	S	4.0	R							JCN
1977 12 17.42	8.6	S	8.0	R				4			JCN
1977 12 18.41	8.2	S	8.0	R				4			JCN
1977 12 27.96	8.7	S	32	L	6	55	3.3	2			BCR

Comet Kohler (1977 XIV = 1977m) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1977 12 27.96	8.2	S	8.0	B		20	3	2			BCR
1978 01 02.40	9.9:		8.0	B				2			JCN
1978 01 02.97	8.7	S	8.0	B		20	2.6	2			BCR
1978 01 03.41	8.8	V	8.0	R							JCN
1978 01 06.40	9.3	V	8.0	R				1			JCN
1978 01 07.43	9.4	V	8.0	R				3			JCN
1978 01 09.42	9.1	S	8.0	R				3			JCN
1978 01 10.42	9.6:	S	8.0	R				3			JCN
1978 01 11.41	10.1	S	8.0	R							JCN
1978 01 12.41	9.7	S	8.0	R							JCN
1978 01 15.41	10.4	V	32	L		86		1			JCN
1978 01 16.42	11.0	V	32	L		86		0			JCN
1978 01 31.40	11.9	V	32	L		86		0			JCN
1978 02 01.40	11.9	V	32	L		86		1			JCN
1978 02 02.39	12.2	V	32	L		86		0			JCN
1978 02 05.39	12.2	V	32	L		86		0			JCN
1978 02 06.39	12.4	V	32	L		86		0			JCN
1978 02 07.38	12.2	V	32	L		86		1			JCN
1978 02 08.37	12.4	V	32	L		86		0			JCN

Comet Meier (1979i)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 09 24.03	12.0	A	32	L	6	88	1.4	3			BCR
1979 09 27.09	12.0	A	32	L	6	88	1.3	2			BCR
1979 10 09.03	12.1	A	32	L	6	88	1.3				BCR
1979 10 14.02	11.8	A	32	L	6	88	& 1.0				BCR
1979 11 27.41	11.9	A	32	L	6	88	1.8	4			BCR

Comet Bradfield (19791)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 12 26.73	5	:	8.0	B		15		7	0.50		SEA
1979 12 27.70	5	:	8.0	B		15		7	2.00	240	SEA
1979 12 28.70	5	:	8.0	B		15	1.5	7	2.50	240	SEA
1979 12 29.70	5.1			E							SEA
1979 12 29.70			8.0	B		15			1.75	240	SEA
1980 01 02.31	5.5		7.0	B		10					DEA
1980 01 02.31			10	L			2				DEA
1980 01 08.72	5.5		8.0	B		15			3.00	260	SEA
1980 01 16.68	5.8	G	5.0	B		10					TRE
1980 01 16.68			10	L		24	3.5		0.17		TRE
1980 01 17.66	4.7			E							SEA
1980 01 17.66			8.0	B		15			2.		SEA
1980 01 20.75	5.0		5.0	B		10					TRE
1980 01 20.75			10	L		24	9				TRE
1980 01 21.48	4.7		5.0	B		10					TRE
1980 01 21.48			32	L		150	10		0.08		TRE
1980 01 22.30	4.6		7.0	B		10					DEA
1980 01 22.30			10	L			10				DEA
1980 01 22.48	4.7:		5.0	B		10	&10				TRE

Comet Bradfield (19791) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 01 23.48	4.7:		5.0	B		10	&10				TRE
1980 01 25.83	4.7		12	R			15				BEN
1980 01 26.76	4.7		12	R			17				BEN
1980 01 27.04	4.0		5.0	B		7	25				MAL
1980 01 27.82	4.8		12	R			13				CAM
1980 01 27.98	4.8	Y	5.0	B		10	12	2			BCR
1980 01 28.02	4.7	Y	8.0	B		20	12	3			MCR
1980 01 28.96			23	R					0.05	240	OME
1980 01 28.96			23	R					0.33	315	OME
1980 01 28.96			23	R					0.33	60	OME
1980 01 28.96	6.0		8.0	B		11					OME
1980 01 28.96			23	R					0.08	0	OME
1980 01 28.96	6.0		8.0	B		11					CCL
1980 01 28.99	5.1	Y	5.0	B		10	13	4			BCR
1980 01 29.03	5.1	Y	8.0	B		20	10	3			MCR
1980 01 29.06	4.8		12	R		21	1		2.00		CAM
1980 01 29.75	5.5	O	8.0	B		20	15	6		70	CAV
1980 01 29.77	5.0		5.0	B		10					BEL
1980 01 29.98	6.3		5.0	B		7	10				DEY
1980 01 29.99	5.3	Y	5.0	B		10	13				BCR
1980 01 30.03	5.3	Y	8.0	B		20	10	3			MCR
1980 01 30.18	4.8		8.0	B		20	13				MAC
1980 01 30.50	5.8	G	5.0	B		10					TRE
1980 01 31.00	5.5	Y	5.0	B		10	13	5			BCR
1980 01 31.02	5.6	Y	8.0	B		20	12	4			MCR
1980 01 31.02	6.5		5.0	B		10	5	2			SAB
1980 01 31.04	6.5	S	25	L	7	70	5	3			MCR
1980 02 01.01	5.7	S	5.0	B		7	11				MCR02
1980 02 01.04	6.1		5.0	B		7					SHE
1980 02 01.53	6.2	G	5.0	B		10					TRE
1980 02 01.75	6.4	O	8.0	B		20	15	5	0.30	53	CAV
1980 02 01.76	6.3	O	5.0	B		7					CAV
1980 02 01.98	6.2	W	5.0	B		10					GLE01
1980 02 01.98	6.0	W	5.0	B		10					GLE
1980 02 02.00	5.9	Y	8.0	B		20	12	5			MCR
1980 02 02.00	6.5		15	R			10			80	SHE
1980 02 02.06	6.0	Y	15	L	4	24	10	4			MCR
1980 02 02.07	5.9	Y	4.0	R		12	12	4			MCR
1980 02 02.11	6.0	S	5.0	B		7	12		0.08	83	MCR02
1980 02 02.15	7.0	S	7.0	B		20	20				SAN
1980 02 02.99	6.1	W	5.0	B		10					GLE01
1980 02 02.99	6.3		5.0	B		7	17				MEI01
1980 02 02.99	6.0	W	5.0	B		10					GLE
1980 02 02.99	5.9:	Y	1.5	B		6		3/			MCR
1980 02 03.00			5.0	B		10			0.50	140	BCR
1980 02 03.00	6.0	Y	5.0	B		12	12	5			MCR
1980 02 03.00	5.7	Y	5.0	B		10	13	6	0.50	85	BCR
1980 02 03.01	6.0	Y	8.0	B		20	10	5			MCR
1980 02 03.01	6.0	S	5.0	B		7	10				MCR02
1980 02 03.02	6.5		5.0	B		10	8	0			SAB

Comet Bradfield (19791) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 03.02	6.6		5.0	B		7	8.1				DEY
1980 02 03.05	6.3		3.5	B		7					MAL
1980 02 03.98	5.9	Y	5.0	B		12	15	6			MCR
1980 02 03.99	5.9	Y	8.0	B		20	12	6	0.67	120	MCR
1980 02 03.99	5.8	Y	1.5	B		6	18	4			MCR
1980 02 03.99			8.0	B		20			0.17	90	MCR
1980 02 04.00	5.9	Y	4.0	B		12	15	6			MCR
1980 02 04.00			5.0	B		10			0.62	125	BCR
1980 02 04.00	5.8	Y	5.0	B		10	14	6	0.42	90	BCR
1980 02 04.02	6.3	S	5.0	B		7	9				MCR02
1980 02 04.05	6.6		3.5	B		7					MAL
1980 02 04.13	6.2		12	R		20	10				MAY
1980 02 04.47	6.9	G	5.0	B		10					TRE
1980 02 04.76	6.5	S	3.5	B		7	& 7				BEN
1980 02 04.76	7.4	S	8.0	B		20	8	3			CAV
1980 02 04.97	7.0		7.0	B		10					DEA
1980 02 04.98	6.1	Y	5.0	B		12	12	5			MCR
1980 02 05.01	6.9		5.0	B		7	7.6				DEY
1980 02 05.01	6.2	Y	8.0	B		20	10	6	0.50	60	MCR
1980 02 05.01			8.0	B		20			0.25	130	MCR
1980 02 05.02	6.2	Y	5.0	B		10	15	5	0.33	85	BCR
1980 02 05.02	6.0	Y	1.5	B		6	15	5			MCR
1980 02 05.09	6.7	S	5.0	B		7	8.5		0.08	85	MCR02
1980 02 05.1	6.6		3.5	B		7					MAL
1980 02 05.45	6.9	G	5.0	B		10					TRE
1980 02 06.02	6.4	Y	5.0	B		12	10	5			MCR
1980 02 06.03	6.4	Y	5.0	B		10	13	5	0.38	110	BCR
1980 02 06.04	6.5	Y	8.0	B		20	6	5	1.00	80	MCR
1980 02 06.04			8.0	B		20			0.83	50	MCR
1980 02 06.45	8.0	S	5.0	B		10					TRE
1980 02 07.08	7.0	S	5.0	B		7	8				MCR02
1980 02 08.06	7.3		5.0	B		7	6.6				DEY
1980 02 09.01	7.1	S	8.0	B		20	8	4/	1.00	85	MCR
1980 02 09.01			8.0	B		20			1.00	115	MCR
1980 02 09.02	7.0	S	5.0	B		12	10	4			MCR
1980 02 10.02	7.3	S	5.0	B		7	7				MCR02
1980 02 10.02	7.3	S	8.0	B		20	7	4			MCR
1980 02 10.98	7.5	S	8.0	B		20	8	4	0.33	100	MCR
1980 02 10.99	7.3	S	5.0	B		12	11	3			MCR
1980 02 11.01	7.6		5.0	B		7	6.2				DEY
1980 02 11.03	7.8	W	5.0	B		10					GLE
1980 02 11.03	7.6	W	5.0	B		10					GLE01
1980 02 11.99	7.6	S	8.0	B		20	8	4	0.33	115	MCR
1980 02 11.99			8.0	B		20			0.17	90	MCR
1980 02 12.01	7.5	S	5.0	B		12	10	3			MCR
1980 02 12.03	7.8		5.0	B		7	6.1				DEY
1980 02 13.02	7.8	S	8.0	B		20	7	3/	0.33	115	MCR
1980 02 13.03	7.9		5.0	B		7	5.8				DEY
1980 02 13.84	8.0		5.0	B		10					MAL
1980 02 13.99	7.8	S	8.0	B		20	7	3/			MCR

Comet Bradfield (19791) Cont.

DATE (UT)	MAG. R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 14.00		25	L	7	70			0.50	100	MCR
1980 02 14.00	8.0	5.0	B		7	4.5				DEY
1980 02 14.00		25	L	7	70	5	4	0.50	43	MCR
1980 02 15.11	8.0:S	8.0	B		20	6	3			MCR
1980 02 16.03	8.1 S	8.0	B		20	7	3			MCR
1980 02 17.07	8.2 S	7.5	R		35	6.2				MCR02
1980 02 17.82	8.8	5.0	B		10					MAL
1980 02 18.00	8.4 S	8.0	B		20	7	3			MCR
1980 02 18.07	8.9:S	25	L	7	70	4	3	0.08	70	MCR
1980 02 18.07		25	L	7	70			0.08	120	MCR
1980 02 19.02	8.4 S	8.0	B		20	7	2/			MCR
1980 02 19.03	8.7 S	25	L	7	44	4	3			MCR
1980 02 20.00		31	L			6				DEA
1980 02 20.00	9.1	7.0	B		10					DEA
1980 02 20.04	8.8 S	25	L	7	44	4	3			MCR
1980 02 24.02	9.4 S	7.5	R		35	4				MCR02
1980 02 27.03	9.8:A	25	L	7	70	& 3	2			MCR
1980 03 02.05	9.9 S	7.5	R		35	2				MCR02
1980 03 04.03	10.2:A	25	L	7	44	& 3	0			MCR
1980 03 04.04	11.0	15	L	8	67	3.5				DEY

Periodic Comet Schwassmann-Wachmann 1 (1974 II)

DATE (UT)	MAG. R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 10 31.04	12.7 A	32	L	6	88	0.7	3			BCR
1980 01 21.12	11.8 A	32	L	6	65	2.3	1			BCR
1980 01 22.11	11.6 A	32	L	6	65	2.3	1			BCR
1980 02 04.03		32	L	6	55	& 4	0			BCR
1980 02 05.06		32	L	6	55	& 4	0			BCR
1980 02 06.07		32	L	6	55	& 4	0			BCR
1980 02 11.09	12.5 A	25	L	7	140	1	2/			MCR
1980 02 14.11	12.5 A	25	L	7	140	1	2/			MCR
1980 02 14.11	11.5:A	25	L	7	44	3	0			MCR
1980 02 18.08	12.7:A	25	L	7	140	& 0.5				MCR

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FOLLOWING ARE NEW ADDITIONS TO THE OBSERVER KEY:

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GLE01 FLORENCE GLENN, NY, U.S.A.
DEY JIM DEYOUNG, VA, U.S.A.
BEL VANNI BELLI, ITALY
EME FERNAND EMERING, LUXEMBURG

FOLLOWING ARE NEW ADDITIONS TO THE REFERENCE KEY:

R = Norton's Atlas
D = Henry Draper Catalogue, Harvard College Observatory Annals
X = Specific stars quoted, but no catalogue given.

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