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Comet Seki-Lines 1962 III on 1962 Apr. 11 UT. Ten-minute 103a-O exposure with the 40-inch reflector at the U.S. Naval Observatory, Flagstaff Station, by Elizabeth Roemer (official U.S. Navy photograph). Other observations, both visual (by A. Jones) and photographic (by A. McClure), of this comet appear on pages 143, 147–148, and 174–175.

INSIDE THIS ISSUE

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 December. The *ICQ* is published in part by the Department of Physics and Astronomy at Appalachian State University in Boone, North Carolina.

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 are available upon request. Back issues are available for $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 3 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 (see pages 175–176 of this issue). 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* or *SPAN* to GREEN at either node CFA1, CFA2, or CFAPS2, or to DAN at node CFAPS1), and should contact the Editor for further information.

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FROM THE EDITOR

We once again apologize for the printing delays which occur at Appalachian State University in Boone, North Carolina. The over-worked Print Shop at ASU has been taking 2–3 months (even more with the April and July 1987 issues!) to get an issue out, and their situation does not appear likely to change. As a result of these problems at ASU, we have been planning for some time now to move the entire publishing of the *ICQ* to the Boston area. The current schedule calls for ASU to print this issue and the January 1988, July 1988, and January 1989 issues as the final four to be published in Boone. All other issues will be published in Massachusetts, including the *1988 Comet Handbook*, and we plan to use a private printer in Cambridge who has guaranteed printing in one week or less.

The printing change will also help Dr. Rokoske, who has supervised the printing of this publication at ASU since 1976 and who is quite overburdened with other responsibilities (especially teaching) at ASU. Along these lines, we will transfer all back issues from Boone to Cambridge sometime during the next few months. We anticipate that the transfer will be complete sometime in early 1988, and all requests for back issues should be sent to the Editor in Cambridge after December 15, 1987 (see top of this page).

The *1988 Comet Handbook* should be available for mailing in early December 1987. As noted in the July issue (page 98), we are printing fewer copies of the *Handbook* than we did last year, so those who have not yet ordered the *1988 Comet Handbook* should do so now. The *1988 Comet Handbook* will be called Volume 9, No. 5, of the *ICQ*.

— Daniel W. E. Green (1987 Novemer 10)

RECENT NEWS AND RESEARCH CONCERNING COMETS

New Discoveries and Recoveries

Since I wrote this column for the July issue, history has been made in the assigning of provisional letter designations to comets: for the first time ever, 24 comets have been confirmed as being discovered/recovered in a single year, with comet 1987*x* being given to the recovery of P/West-Kohoutek-Ikemura (*IAUC* 4456). The previous record had been set in 1983, when the 23^{rd} comet discovered/recovered that year (P/Clark) was designated comet 1983*w*. P/West-Kohoutek-Ikemura was observed by James V. Scotti on September 27 with the 91-cm *SPACEWATCH* reflector at Kitt Peak in Arizona, and an independent recovery was later reported by T. Seki (Geisei, Japan) on a photograph exposed on October 1. The comet, which is making its third observed return to perihelion (having been previously seen in 1974–75, when discovered, and 1980–81, upon its first recovery), was –0.11 day off from the predicted time of perihelion.

Three other comets have been recovered since early July: P/Reinmuth 1 (1987*r*, by T. Gehrels and Scotti at Kitt Peak on July 22 and 23; *IAUC* 4424), P/Jackson-Neujmin (1987*t*, by J. Gibson with the 152-cm Cassegrain reflector at Palomar on July 25 and also by Gehrels and Scotti on Aug. 17 and 18; *IAUC* 4438), and P/Gehrels 1 (1987*v*, by Scotti on Aug. 29 and 31; *IAUC* 4444). Comets 1987*r* and 1987*t* were close to the predicted orbits, but P/Gehrels 1 (which is making its first return to perihelion following its discovery apparition in 1972–73) was off by $\Delta T = -4.4$ days from S. Nakano's prediction (*ICQ 1987 Comet Handbook*, pp. 4 and 38). P/Jackson-Neujmin is making its third predicted-and-observed return to perihelion; this comet (orbital period, P, of 8.4 years) was not seen from 1936 (its discovery apparition) until 1970, but has been seen at each return since then. P/Reinmuth 1 has been seen at seven returns prior to 1987, first in 1928.

There have been seven new comet discoveries from early August through late October, three of them by amateur astronomers who actively hunt visually for comets. While ~ 70% of all comets discovered during 1980–1987 carry names reflecting professional observing efforts (*i.e.*, discoveries made through professional observing programs, including artificial satellites), 9 or 10 of the last 19 comet discoveries (since May 1986) have been made by amateurs. Could this be a new long-term trend?

William A. Bradfield of Dernancourt, near Adelaide, South Australia, has discovered his 13^{th} comet (see his "Letter to the Editor" on page 140), comet 1987*s* being 81° in elongation from the sun (and just a day or so after full moon!) upon discovery on August 11.437 ($m_1 \sim 10$; *cf.* *IAUC* 4431), in northern Hydra and moving slowly northward. Comet Bradfield 1987*s* has gradually brightened as it nears perihelion on Nov. 7 ($q = 0.87$ AU) and was near $m_1 \sim 7$ in early October, and tail lengths of several arcmin were reported from August up to nearly half a degree by early October.

Michael Rudenko of Amherst, Massachusetts, spent 266 comet-hunting hours in 128 observing sessions (since his discovery of comet Levy-Rudenko in 1984, which had taken 247 hours in 140 sessions) before discovering comet Rudenko 1987*u* on August 21.11 at $m_1 \sim 9.5$. Rudenko used the same 6-inch refractor to discover both of his comets, and he uses a Lumicon Swan-band filter during all of his visual searching to increase contrast in his somewhat-light-polluted sky. Upon discovery, comet 1987*u* was some 60° from the sun and near the Bootes/Canes Venatici border, moving southwestward. By October the object reached $m_1 \sim 7$ ($T =$ 1987 Oct. 9.5 ET, $q = 0.6$ AU), and it is moving rapidly into southern-hemisphere skies during November and December.

Eleanor Helin discovered comet 1987*w* on Palomar Sky Survey II plates exposed Aug. 24 and 26 by Jean Mueller with the 48-inch (1.2-m) Schmidt telescope at Palomar Mountain; these plates showed the comet ($m_1 \sim 16.5$) as condensed with a faint diffuseness toward the west-southwest (*cf.* *IAUC* 4448). Mueller found her own comet (1987a_1) on plates exposed Oct. 18 and 19 with the same telescope (*cf.* *IAUC* 4472); this comet was then reported as diffuse ($m_1 \sim 17$) with condensation and also with a short tail toward the south-southwest. Both of these Sky Survey discoveries are short-period comets, with P/Helin having $P \simeq 14.5$ years and P/Mueller having a period of ~ 8.3 yr; both comets have a perihelion distance (q) near 2.6 AU.

David Levy of Tucson, Arizona, discovered a comet visually on Oct. 11 with an 8-inch *f*/7 reflector; at discovery, comet Levy 1987*y* was at a solar elongation of 33°, diffuse with condensation and near $m_1 = 9.3$, and moving southeastward in Bootes (not far from Arcturus). Comet 1987*y* is the third comet discovered by Levy that carries his name, and he found this one 107.6 hunting hours after finding comet 1987*a*.

Carolyn S. Shoemaker discovered her tenth comet on films exposed at Palomar on Oct. 18 and 19 with the 18-inch Schmidt telescope. Eugene Shoemaker (Carolyn's husband) and Henry E. Holt were involved with obtaining the films, and this "new" short-period comet is known as P/Shoemaker-Holt 1987*z*. The comet appeared strongly condensed, with a slight coma asymmetric toward the southwest, and at $m_1 \sim 15$, on the discovery films (*cf.* *IAUC* 4472). The object was near opposition in Pisces and moving slowly southwestward when discovered. Apparent, faint, pre-discovery images from Sept. 24 were later found by Carolyn which helped to show that the comet has $P \sim 9.5$ yr, $q \sim 3.0$ AU, and $T \sim$ 1988 May 12.

Rob H. McNaught discovered comet 1987b_1 on films obtained Oct. 18 with an 85-mm camera lens, as part of a regular patrol program which he undertakes in his spare time while not operating a satellite tracking camera at Siding Spring Observatory in Australia. Comet McNaught 1987b_1 was near $m_1 \sim 9$ upon discovery (*cf.* *IAUC* 4473), moving rapidly northeastward in southern Lupus, and it rapidly is becoming lost in the solar glare enroute to perihelion on Dec. 11. This comet will continue to move northward and should be visible to northern-hemisphere observers as a 9^{th}-magnitude object in late January and early February 1988.

— Daniel W. E. Green (1987 October 30)

THE LAST 20 COMETS TO RECEIVE PROVISIONAL LETTER DESIGNATIONS

Listed below, for handy reference, are the last 20 comets which have been given letter designations (1985a is the first comet to be discovered or recovered in 1985, 1985b is the second comet..., etc.). If a "Roman numeral designation" has been assigned, it is given in brackets at the end of the line. After the "equal sign" is given the name, preceded by an asterisk (*) if the comet is a new discovery (as opposed to a recovery from predictions of a previously-known short-period comet). Also given parenthetically are such values as the date of perihelion, T (month/date/year), and the perihelion distance, q (in AU). [This list updates the previous list in the April 1987 issue, p. 95.]

1987i = P/Klemola (T = 7/22/87, q = 1.77, P = 10.9)
1987j = * Torres (T = 4/9/87, q = 3.6)
1987k = P/d'Arrest (T = 2/3/89, q = 1.29)
1987l = P/Reinmuth 2 (T = 10/25/87, q = 1.9, P = 6.7)
1987m = P/Brooks 2 (T = 10/16/87, q = 1.84, P = 6.9)

1987n = P/Harrington (T = 10/31/87, q = 1.6, P = 6.8)
1987o = * Shoemaker (T = 11/20/86, q = 5.46)
1987p = P/Borrelly (T = 12/18/87, q = 1.36, P = 6.9)
1987q = P/Russell 2 (T = 7/4/87, q = 2.15, P = 7.1)
1987r = P/Reinmuth 1 (T = 5/9/88, q = 1.9, P = 7.3)

1987s = * Bradfield (T = 11/7/87, q = 0.87)
1987t = P/Jackson-Neujmin (T = 5/24/87, q = 1.4, P = 8.4)
1987u = * Rudenko (T = 10/9/87, q = 0.60)
1987v = P/Gehrels 1 (T = 8/10/87, q = 3.0, P = 15.1)
1987w = * P/Helin (T = 8/11/87, q = 2.6, P = 14.5)

1987x = P/West-Kohoutek-Ikemura (T = 7/27/87, q = 1.6, P = 6.4)
1987y = * Levy (T = 9/9/87, q = 0.52)
1987z = * P/Shoemaker-Holt (T = 5/12/88, q = 3.0, P = 9.6)
1987a1 = * P/Mueller (T = 12/4/87, q = 2.7, P = 8.3)
1987b1 = * McNaught (T = 12/11/87, q = 0.84)

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LETTER TO THE EDITOR: Comet Hunting Notes

[Editor's note: After discovering his eleventh comet in 1980, William Bradfield wrote an article entitled "Some Procedures for Comet Discovery" which appeared in the July 1981 issue (ICQ **3***, 71–75). Upon the discovery of his 13th comet this past August, I wrote to Mr. Bradfield to ask for more information about his last three comet discoveries, and edited excerpts from his reply are provided below. — D.W.E.G.]*

Dear Sir,

The search time spent between my discoveries of comets 1980*t* and 1984*a* was 384 hours, while that between comets 1984*a* and 1987*s* was 307 hours. Comet 1980*t* was detected with a 7×50 binocular, comet 1984*a* was discovered with a 25.0-cm *f*/5.6 Newtonian reflector (44×), and comet 1987*s* was found with the same 15.0-cm *f*/5.5 refractor (26×) that was used for my first ten discoveries.

My current comet-hunting procedures — on where and when to search — have not changed very much, except that, in recent years:

- I have introduced the optional use of a 25-cm reflector, and
- I now operate both the reflector and the refractor on mountings which incorporate motor drives to reduce difficulties due to the earth's rotation. Both telescopes are supported on altazimuth systems.

The 15-cm-refractor mounting and stand is the same as described in the April 1977 *Sky and Telescope* except that the altitude angle is continually changed by a small synchronous geared-down electric motor. The 25-cm reflector is supported on an altazimuth which is mounted on, and driven about, a polar axis at sidereal rate. Some discussion about the mountings is given in a paper I presented at the 11th National Australian Convention of Amateur Astronomers held at Perth, Western Australia, in April 1984 ("Telescope Mountings for Greater Efficiency in Comet Hunting", published in *Proceedings of the 11th NACAA*, pp. 35–43).

Up to the end of September 1981, I used the 15-cm refractor for all my comet hunting, but there was a brief period in 1972 (including the discovery of comet 1972 III) when this telescope was stopped down to 12.5 cm. At the beginning of October 1981, I introduced a 25-cm reflector as an alternative instrument to be used whenever I felt the need to detect a comet at a lower brightness. Although this larger telescope increased the detection limit by a little more than one magnitude, the time required to cover a given sky area was increased by 2.9 times. Actually, in the initial years of usage, the search time was increased by much more because many more unfamiliar diffuse objects were being observed for the first time and had to be identified.

I use a wide-angle Erfle eyepiece of 32-mm focal length with a 43-mm-aperture field lens and insert it into the 15-cm refractor or the 25-cm reflector, as required. The larger telescope is not used very much during the winter months because, with the limited clear sky opportunities, there is not enough time to cover the desired search areas with its smaller field-of-view.

From the beginning of October 1981 to the end of August 1987 (when the larger telescope was available as an alternative), the average usage of the 25-cm reflector was 45% of the total search hours. The search hours for this period are tabulated below (*cf.* Table I).

After the end of a morning search, at 15 or 20 minutes after astronomical twilight, I sometimes spend a minute looking at the horizon area near the sunrise azimuthal position with a 7×35 binocular. This brief operation is only undertaken if I do not have sufficient time to sweep close to the horizon with a telescope. This action was responsible for alerting me to the presence of comet 1980*t*.

My effort in 1984 was at an all-time low. I am gradually increasing my annual effort and expect to reach 120 hours for my total 1987 effort. I retired from my Department of Defence job in August 1986 and turned 60 years of age last June. It is assumed by many of my friends that I will be able to spend more time comet hunting.

Sincerely,
William A. Bradfield
Dernancourt, South Australia
1987 September 9

TABLE I. WILLIAM BRADFIELD'S SEARCH HOURS (given as hours:minutes)

	15-cm R	25-cm L	Total
1981 Oct.-Dec.*	6:05	10:50	16:55
1982	82:55	50:10	133:05
1983	67:10	52:20	119:30
1984	21:55	24:55	46:50
1985	47:05	30:20	77:25
1986	58:30	45:50	104:20
1987 Jan.-Aug.*	42:10	48:50	91:00
TOTALS	325:50	263:15	589:05

* = inclusive

TABLE II. BRADFIELD'S COMETS

Comet: Prov. Desig.	Comet: Roman Desig.	Discovery Date (UT)	Disc. Mag. (m_1)	Search Hours	Ref.: IAUC	Days from New Moon	Days before or after Perihelion	Elong.
1972f	1972 III	1972 Mar. 12.8	10	260	2392	3 before	15 before	31
1974b	1974 III	1974 Feb. 12.5	9	306	2633	10 before	34 before	33
1975d	1975 V	1975 Mar. 12.4	9	145	2759	0.5 before	23 before	30
1975p	1975 XI	1975 Nov. 11.7	10	106	2866	8 after	39.5 before	57
1976a	1976 IV	1976 Feb. 19.5	9	57	2914	10.5 before*	5 before	56
1976d	1976 V	1976 Mar. 3.8	9	9	2923	3 after	7.5 after	44
1978c	1978 VII	1978 Feb. 4.8	8	360	3170	3 before	41 before	48
1978o	1978 XVIII	1978 Oct. 10.8	9	75	3286	8.5 after**	11.5 after	32
1979c	1979 VII	1979 June 24.4	10	98	3372	0	29 before	44
1979l	1979 X	1979 Dec. 24.8	5	67	3437	5.5 after	3 after	27
1980t	1980 XV	1980 Dec. 17.8	6	113	3554	10 after***	12 before	22
1984a	1983 XIX	1984 Jan. 7.7	11	385	3907	4.5 after	11 after	46
1987s	1987	1987 Aug. 11.4	10	307	4431	13 before****	88 before	81

NOTES: * 4 days after full moon. ** 5.5 days before full moon. *** 4 days before full moon. **** 2 days after full moon.

COLUMNS: 1) Provisional designation of comet; 2) Roman numeral designation of comet; 3) Discovery date in Universal Time; 4) Approximate total visual magnitude at discovery; 5) Number of search hours to find comet (counted from previous comet discovery); 6) IAU Circular reference #, giving the Circular on which the discovery was announced; 7) Number of days before or after new moon at the time of discovery; 8) Number of days before or after perihelion at the time of discovery; 9) The comet's elongation from the sun in degrees at the time of discovery.

This table was compiled by D. W. E. Green and W. A. Bradfield.

* * *

PERIODIC COMETS FOR THE VISUAL OBSERVER IN 1988

Alan Hale
Department of Astronomy
New Mexico State University

After the flurry of cometary activity which marked the latter half of 1987, visual comet observers can expect a mild respite in 1988, barring any bright unexpected discoveries. Two short-period comets, P/Borrelly and P/Tempel 2, should be easily visible with small telescopes, while a handful of fainter ones will challenge observers with larger instruments.

P/Borrelly (1987p)

This comet may become as bright as 7^{th} magnitude about the time it passes perihelion on 1987 December 18 ($q = 1.36$ AU), and, as it will be near opposition, it will be well placed for observation. It should still be 7^{th} or 8^{th} magnitude as 1988 opens, but should begin fading at about that time. As it fades, it will be very conveniently placed for observers in the northern hemisphere, reaching a declination of $+53^{o}$ in March ($m_1 \sim 10$). It may still be accessible in large telescopes in June and July as a 13^{th}- or 14^{th}-magnitude object.

P/Tempel 2 (1987g)

With perihelion passage occurring on 1988 September 16 ($q = 1.38$ AU), this comet ($P = 5.3$ yr) is making its best return in 21 years. With opposition occurring in mid-May, the comet will be conveniently placed in the evening sky for the remainder of the year.

Careful observation at recent returns has shown that the light curve of P/Tempel 2 is very asymmetric with respect to perihelion, with a rapid brightening followed by a slow fading. Moreover, the light curve does not appear amenable to fitting with a normal inverse-power curve, but rather is better fit by a linear dependence on time. Applying such a brightness law determined by Bortle (1984) from observations at the comet's last return in 1983 suggests that it should become visible as an object near mag 13 around June, and it should reach a peak brightness of $\sim$ mag 8 near the end of September. It should still be visible as an 11^{th}-mag object at the end of the year.

Interest in this comet is especially high, as it is the primary target for the *Comet Rendezvous/Asteroid Flyby (CFAF)* mission currently slated for launch in 1993 (though not yet funded). Rendezvous with the comet is planned for 1996, when the comet will be near aphelion, and the probe will travel with the comet through its perihelion passage in 1999. Readers may find more specific details of the *CRAF* mission in the review by Neugebauer (1987). The perihelion date in 1999 is only 8 days earlier than the corresponding date in 1988, and since the comet will be badly placed for observation at the intervening return in 1994, observations at the current return would be especially valuable to researchers.

P/Schwassmann-Wachmann 2 (1986h)

The brightness behavior of this comet ($P = 6.4$ yr), currently making a rather unfavorable return, is evidently poorly known. It was seen by a handful of observers in early 1987 at $m_1 \sim 12.5$, about one magnitude brighter than had been predicted for that time. This same prediction had suggested a peak brightness of about this magnitude occurring around the beginning of March 1988, with the comet being only slightly fainter when it passes opposition a month later.

With the comet's unexpected brightness in early 1987, any brightness predictions for the period around opposition must now be considered quite uncertain. Complicating the issue further is the fact that P/Schwassmann-Wachmann 2 will be well past perihelion (T = 1987 Aug. 30, q = 2.07 AU) at the time of opposition, and the comet may well be faint and diffuse by then. Observers are encouraged to attempt observations of this comet when it becomes accessible in the morning sky after perihelion, roughly around the beginning of October 1987.

P/Comas Solá (1986j)

This comet begins 1988 as a faint object ($m_1 \sim 13.5$) in the morning sky. It is expected to fade by about a half-magnitude by the time it passes opposition in early April, after which is will probably fade rapidly beyond the range of visual observations.

P/Kohoutek (1986k)

As stated in the 1987 comet review (Hale 1987), visual observations of this comet have apparently never been attempted. If the "11.5 rule" proposed by the author (Hale 1986) is valid for this comet, a peak brightness of mag 14 (possibly brighter) may be expected at the beginning of 1988. Opposition occurs at the end of January, after which the comet will (presumably) quickly become inaccessible visually.

P/Reinmuth 1 (1987r)

Photographic magnitude estimates made at this comet's discovery apparition in 1928 suggest a peak brightness of mag $\sim$ 14 occurring at the beginning of 1988, opposition having been passed at the beginning of December 1987. Since the comet at that time will still be several months away from perihelion (T = 1988 May 9, q = 1.87 AU), this prediction must be regarded as extremely uncertain. When the comet does pass perihelion, it will still be accessible in the evening sky but will presumably be no brightner than $m_1 \sim 14.5$.

P/Finlay

Because of unfavorable conditions, this comet (P = 7.0 yr) has not been visually observed for several returns. In 1988 the conditions are not much better, but neither are they completely hopeless — observers with large telescopes may be able to glimpse the comet as a 13^{th}-mag object some 40^o from the sun in the morning sky near the time of perihelion passage (T = 1988 June 6, q = 1.09 AU). Southern-hemisphere observers will be favored before perihelion, while those in the northern hemisphere will have the advantage shortly thereafter.

P/Schwassmann-Wachmann 1

This annual comet spends most of 1988 in the constellation Aquarius, $\sim 5^o$–10^o southwest of the "Water Jar". It should be accessible from about April through the end of the year, with opposition occurring toward the end of August. After being disappointingly inactive for some time, there are some signs that this period of quiescence is nearing an end. The first reasonably well-observed outburst in several years occurred near the end of April 1987, when at least two observatories reported it to be no fainter than 15^{th} magnitude. There is some indication that it actually became a couple of magnitudes brighter than this, although very few visual sightings were reported. Observers are encouraged to keep a close watch on this comet throughout the coming observing season.

References

Bortle, J. E. (1984). *Sky Telesc.* **67**, 290.
Hale, A. (1986). Submitted to *Int. Comet Q.*
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— CORRIGENDA —

- In the July 1982 issue (Whole No. 43), p. 68, the two lines of observations by David Seargent (SEA) which are attributed to 1982 July 30.79 *should instead read* 1982 July 31.79.
- In the October 1986 issue, p. 130, line –8, the information concerning the 13-cm R was not made on Mar. 20.11 but rather on Mar. 22.12 (observer CAM).
- In the July 1987 issue, p. 99 ("Recent News"), Gibson's magnitude for comet Machholz 1985 VIII was made with a Thuan-Gunn r filter.
- In July 1987 issue, p. 99, column 2, line 5, *for* strongly condensed *read* condensed
- In July 1987 issue, p. 101, "Comet Černis 1983 XII", line 6, *for* $10'' - -15''$ *read* $10''$–$15''$
- In July 1987 issue, p. 102, "Comet Terasako 1987*d*", line 1, *for* $250^o - -270^o$ *read* 250^o–270^o
- In the July 1987 issue, p. 128, all of the naked-eye P/Halley observations by Eric Jacobson (JAC01) should be deleted.

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TABULATION OF COMET OBSERVATIONS

New additions to the Reference Key:

C = Photovisual magnitudes from "Cape Photographic Catalogue for 1950.0", in *Annals of the Cape Observatory*, Vols. **17–22**.

CM = Photovisual and photoelectric-*V* magnitudes from *Cape Mimeograms* (Royal Observatory, Cape of Good Hope).

MS = From "McCormick Photovisual Sequences", by C. A. Wirtanen and A. N. Vyssotsky (1945, *Ap. J.* **101**, 141–178).

MV = From *Publ. Leander McCormick Obs.*, Vol. **VI**, Part II, pp. 201–306 ("Magnitudes and Coordinates of Comparison Stars in Regions of Long-Period Variables", by S. A. Mitchell, 1935) or Vol. **IX**, Part V, pp. 59–88 ("Sequences for Fifty Variable Stars", by Mitchell and C. A. Wirtanen, 1939).

RB = "Photoelectric Magnitudes and Colours of Southern Stars", A. W. J. Cousins and R. H. Stoy (1963), in *Royal Observatory Bulletin* No. 64 (Royal Greenwich Obs.), Series E3, pp. E101–E248.

RC = "Standard Magnitudes in the E Regions", A. W. J. Cousins and R. H. Stoy (1962), in *Royal Observatory Bulletin* No. 49 (Royal Greenwich Obs.), Series E2, pp. E1–E59.

Descriptive information (to complement the tabulated data):

◇ *Comet Kresak-Peltier* 1954 *XII*, all observations by JON with 31.7-cm *f*/5 L (86×): 1954 July 23.34: non-stellar nucleus of mag 11.7 (ref. VN, MM = S). July 26.34: non-stellar nucleus of mag 11.7 (ref. VN, MM = S). July 29.35: stellar nucleus of mag 11.5 (ref. VN, MM = I). Aug. 9.32: faint nucleus of mag ~ 12 suspected. Aug. 21.32: "strong bright cond., though no nucleus resolved".

◇ *Comet Arend-Roland* 1957 *III* (all observations by JON): 1957 Jan. 4.43: in 20-cm *f*/8 L (54×), "small, stellar(?) nucleus of mag 11.2". Jan. 6.74: in 2.8-cm *f*/10 R (15×), "nonstellar(?) nucleus of mag 4.6 (MM = S, ref. = SC) near tip of parabolic coma/tail; comet orange, easily visible to unaided eye". Jan. 8.74: "bright nucleus of mag 4.5 (MM = S, ref. = SC) near tip of parabolic coma/tail" in 7.0-cm *f*/10 R (21×). Jan. 10.75: "bright cond."

◇ *Comet Mrkos* 1957 *V* (all observations by JON): 1957 Aug. 31.31: in 7.0-cm *f*/10 R (21×), DC = 5, "narrow tail?" Sept. 8.31: in 31.7-cm *f*/5 L (86×), DC = 7, tail in p.a. ~ 65°. Sept. 21.33: in 20-cm L, oval cond. of size ~ 1.5′ and mag 9.1 (ref. S, MM = S); "broad tail with slightly brighter diffuse central ray." Sept. 28.33: in 20-cm L, small nucleus glimpsed (mag 9.2, ref. SC, MM = S), faint broad tail.

◇ *Comet Humason* 1962 *VIII*, all remarks are by JON: 1962 July 2.77: tail was short and broad. July 3.77 and Aug. 5.73: in 31.7-cm *f*/5 L (86×), DC = 4. July 6.77: in 31.7-cm *f*/5 L (86×), tail possibly glimpsed; DC = 4. July 7.75: in 31.7-cm *f*/5 L (48×), coma dia. 2.5′, DC = 5. Aug. 6.73: in 31.7-cm *f*/5 L (86×), coma dia. 2′, DC = 5. Aug. 12.73: in 7.8-cm *f*/7.5 R (30×), tail in p.a. 280°. Aug. 25.52: in 7.8-cm *f*/7.5 R (30×), coma dia. 2.5′. Sept. 9.67: in 17-cm *f*/8 L (55×), coma dia. 2.5′, DC = 5. Oct. 6.49: in 20.0-cm *f*/8 L (96×), DC = 5, tail length 0.2°, "short tail in longer fainter tail." Nov. 3.44: in 20.0-cm L, "strongest and longest streamer" in p.a. 125°; also 0.13° tail in p.a. 73° and sunward "short beak" in p.a. 320°. Nov. 16.42: long, irregular tail. Dec. 1.42: faint tail. 1963 Jan. 24.66: in 31.7-cm *f*/5 L (86×), coma dia. 1.5′, DC = 5. Jan. 26.65: also 0.05° tail in p.a. 200°. Feb. 11.69: in 31.7-cm *f*/5 L (86×), coma dia. 1′, DC = 4. Feb. 21.69: tail faint and short. Feb. 25.69: short, faint tail suspected. Feb. 28.70: in 7.8-cm R, tail suspected to 1°; in 31.7-cm *f*/5 L (86×), DC = 5. Mar. 16.72: in 20.0-cm *f*/8 L (54×), coma dia. 2′, DC = 4, "trace?" of tail in p.a. 260°. Mar. 22.73: in 31.7-cm L, tail suspected in p.a. 245°–260°. Mar. 27.73: in 31.7-cm *f*/5 L (86×), DC = 6; short, broad, 0.05° tail suspected in p.a. 235°. Apr. 17.48: in 31.7-cm *f*/5 L (86×), coma dia. 1.5′; faint sunward "beak" toward p.a. 180°, faint tail curving from p.a. 336° to p.a. 327°. Apr. 22.49: faint, broad tail bounded by p.a. 335°–355°. Apr. 24.47: broad tail. Apr. 26.49: in 31.7-cm *f*/5 L (86×), DC = 5, 0.3° tail in p.a. 5°. May 14.45: in 31.7-cm *f*/5 L (86×), DC = 6, short tail in p.a. 35°–50°. May 18.51: in 31.7-cm *f*/5 L (86×), faint, striated 0.2° tail in p.a. 65°. May 19.33: tail narrow near head. May 30.47: faint, diffuse tail; slightly brighter spine.

◇ *Comet Seki-Lines* 1962 *III*, all notes by JON: 1962 Feb. 8.39: in 31.7-cm *f*/5 L (86×), coma dia. 3′. Feb. 9.40: in 20.0-cm *f*/8 L (54×), cond. of mag 10.5 (MM = S, ref. = VN). Feb. 10.40: in 20.0-cm *f*/8 L (54×), DC = 6, 0.2° tail in p.a. 20°. Feb. 13.50: in 31.7-cm *f*/5 L (48×), DC = 6, tail in p.a. 20°, cond. of mag 11.2 (MM = S, ref. = VN). Feb. 18.38: in 31.7-cm *f*/5 L (48×), DC = 5, coma dia. 2′, cond. of mag 11.9 (MM = S, ref. = VN). Feb. 22.42: in 31.7-cm *f*/5 L (86×), cond. of mag 10.9 (MM = S, ref. = VN). Feb. 23.41: in 20.0-cm *f*/8 L (54×), cond. of mag 10.8 (MM = S, ref. = VN). Feb. 28.42: in 31.7-cm *f*/5 L (48×), cond. of mag 9.8 (MM = S, ref. = VN), DC = 6, coma dia. 5′; in 7.8-cm *f*/7.5 R (30×), 0.4° tail in p.a. 80°. Mar. 2.49: in 20.0-cm *f*/8 L (54×), coma dia. 5′, DC = 8, "faint diffuse tail, narrower than head but wider than cond.", in p.a. 90°; comet visible to unaided eye. Mar. 6.39: in 7.8-cm *f*/7.5 R (30×), 0.6° tail in p.a. 100°; in 31.7-cm *f*/5 L (86×), coma dia. 4′, DC = 7. Mar. 9.39: in 20.0-cm *f*/8 L (54×), cond. of mag 9.4 (MM = S, ref. = VN); in 4.5-cm R, tail's width is half the diameter of the coma. Mar. 21.35: in 4.5-cm *f*/6 R (13×), straight tail in p.a. 120°. Mar. 22.34: in 17.0-cm *f*/8 L (55×), cond. of mag 7.0 (MM = S, ref. = SC), DC = 7, tail in p.a. 100°.

◇ *Comet Kilston* 1966 *V*, 1966 Oct. 8.39 and 17.41: in 31.7-cm *f*/5 L (86×), DC = 8 [JON].

◇ *Comet Rudnicki* 1967 *II:* 1966 Dec. 7.44: faint, diffuse tail [JON].

◇ *Comet Honda* 1968 *IX*, all notes by JON: 1968 Sept. 20.64: in 31.7-cm *f*/5 L (86×), nucleus of mag 13.1 (MM = I, ref. = VN), DC = 5. Sept. 24.69: in 31.7-cm *f*/5 L (86×), DC = 5, tail in p.a. 290°. Sept. 27.68: in 31.7-cm *f*/5 L (86×), cond. of mag 12.2 (MM = S, ref. = VN), "short, diffuse tail". Sept. 29.68: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.3 (MM = I, ref. = VN); DC = 5, tail in p.a. 270°. Sept. 30.68: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.1 (MM = I, ref. = VN). Oct. 6.50: during lunar eclipse. Oct. 9.41: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.8 (MM = I, ref. = VN). Oct. 16.47: in 31.7-cm *f*/5 L (86×), DC = 5, tail in p.a. 200°.

◇ *Comet Tago-Sato-Kosaka* 1969 *IX*, all remarks are by JON: 1969 Oct. 26.35: comet low, possibly elongated in p.a. 0°. Oct. 29.35: "comet elongated?" Dec. 26.42: in 11×80 B, condensation of mag 4.6 (MM = S, ref. = SC); in 31.7-cm *f*/5 L (86×), m_2 = 5.5 (MM = I, ref. = SC); brighter segment of tail bounded by p.a. 155°–160°, fainter tail segment bounded by p.a. 160°–165°. Dec. 27.42: "nucleus/cond. elongated at right angle to tail."

Dec. 28.42: bright nucleus (nonstellar, in 31.7-cm *f*/5 L, 86×, mag 6.8, MM = S, ref. = SC) set in small cond. near tip of parabolic coma/tail envelope; tail fan-shaped to ~ 0.4° from head, "p. half of tail fainter than f. side". Dec. 29.42: "bright stellar(?) nucleus; greenish(?) near tip of coma/tail envelope; trace of dark lane along tail, to f. side of center of tail"; comet altitude 20°. Dec. 30.42: in 7.8-cm *f*/7.5 R (30×), 3° tail in p.a. 150°–157°.

1970 Jan. 2.42: long tail with faint, diffuse "edges"; "p." half of tail a little brighter than f. half of tail; p.a. of tail at 2° from head is 143°–152°; p.a. of tail at 3° from head is 146°–156°; trace of faint spike 0.1° long at p.a. 325°; cond. of mag. 4.7 (MM = S, ref. = SC, 11×80 B), nucleus of mag 6.7 (MM = I, ref. = SC, 31.7-cm *f*/5 L, 86×); in 11× 80 B, tail length 5°. Jan. 3.42: "bright, stellar(?) greenish nucleus in cond. near tip of hyperbolic coma/tail envelope"; in 31.7-cm *f*/5 L (86×), m_2 = 6.5 (MM = I, ref. = SC), head dia. 6′. Jan. 9.46: tail narrower at head than coma; in 11×80 B, cond. mag = 4.9 (MM = S, ref. = SC); in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 7.9 (MM = I, ref. = SC). Jan. 10.46: long, bright spine to tail, in p.a. 128°; comet alt. 20°; in 31.7-cm *f*/5 L (86×), nucleus mag 8.6 (MM = I, ref. = S), tail spans p.a. 122°–140°. Jan. 11.43: tail traced to 6.5° with unaided eye; in 31.7-cm *f*/5 L (86×), dark lane along center of tail, "p." branch fainter than "f." branch, nucleus of mag 6.8 (MM = I, ref. = SC); in 11×80 B, 5° tail in p.a. 117°–133°. Jan. 14.44: bright streamer in tail, p.a. 110°. Jan. 20.43: in 31.7-cm *f*/5 L (86×), nucleus of mag 8.0 (MM = I, ref. = SC) and small, strong cond.; in 11×80 B, tail in p.a. 80°–95°. Jan. 25.41: in 11×80 B, cond. of mag 5.5 (MM = S, ref. = SC) and 0.5° tail in p.a. 65°–80°; in 31.7-cm *f*/5 L (86×), nucleus of mag 9.3 (MM = I, ref. = VN) and "small, strong cond. around stellar(?) nucleus". Jan. 27.41: in 31.7-cm *f*/5 L (86×), nucleus of mag 9.4 (MM = I, ref. = S), faint tail suspected in p.a. 90°, DC = 6.

◇ *Comet Bennett* 1970 *II*, all remarks are by JON: 1970 Jan. 2.47: in 31.7-cm *f*/5 L (86×), "small, stellar(?) nucleus" of mag 12.9 (MM = I, ref. = VN). Jan. 3.40: in 31.7-cm *f*/5 L (86×), "small, stellar(?) nucleus" of mag 12.8 (MM = I, ref. = VN). Jan. 8.48: in 31.7-cm *f*/5 L (86×), nonstellar nucleus of mag 12.8 (MM = S, ref. = VN). Jan. 10.49: in 31.7-cm *f*/5 L (86×), "nonstellar(?) nucleus" of mag 11.1 (MM = S, ref. = VN). Jan. 11.47: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 12.8 (MM = I, ref. = VN). Jan. 12.42: in 31.7-cm *f*/5 L (86×), small nucleus of mag 11.6 (MM = I, ref. = VN). Jan. 14.46: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 10.8 (MM = I, ref. = VN). Jan. 20.45: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 10.5 (MM = I, ref. = VN). Jan. 25.44: in 31.7-cm *f*/5 L (86×), DC = 5, tail in p.a. 90°, "stellar(?) nucleus" of mag 9.8 (MM = I, ref. = VN). Jan. 27.43: in 31.7-cm *f*/5 L (86×), DC = 5, tail in p.a. 100°, "stellar(?) nucleus" of mag 9.5 (MM = I, ref. = VN). Feb. 1.42: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 9.7 (MM = I, ref. = S). Feb. 3.43: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 9.2 (MM = I, ref. = S); faint tail narrower than coma. Feb. 8.42: in 31.7-cm *f*/5 L (86×), "stellar(?) nucleus" of mag 9.1 (MM = I, ref. = S); "long, straight, diffuse tail, trace of faint streamer to S of main streamers; comet visible to unaided eye". Feb. 9.40: in 31.7-cm *f*/5 L (86×), DC = 5, 1.0° tail in p.a. 130°; "stellar(?) nucleus" of mag 9.5 (MM = I, ref. = S); "near head, tail narrower than coma, but broadened away from head; comet visible to unaided eye". Feb. 10.35, in 11×80 B, DC = 5, 0.75° tail in p.a. 133°; "stellar(?) nucleus" of mag 8.9 (MM = I, ref. = S); tail diffuse with very diffuse "edges". Feb. 15.40: in 31.7-cm *f*/5 L (86×), DC = 6, tail in p.a. 145°–152°, nucleus of mag 8.0 (MM = I, ref. = SC and S), diffuse coma/tail; in 11×80 B, tail faint and short. Feb. 17.40: in 31.7-cm *f*/5 L (86×), DC = 7, 0.3° tail in p.a. 150°, nucleus of mag 4.9 (MM = I, ref. = SC). Feb. 21.41: in 31.7-cm *f*/5 L (86×), tail in p.a. ~ 180°; nucleus of mag 6.5 (MM = I, ref. = SC). Feb. 23.37: cond. of mag 4.4 (MM = S, ref. = SC, 11×80 B); in 31.7-cm *f*/5 L (86×), nucleus of mag 6.6 (MM = I, ref. = SC), broad tail with some short streamers near head, on each side of main tail. Feb. 28.71: in 31.7-cm *f*/5 L (86×), nucleus of mag 6.2 (MM = I, ref. = SC). Mar. 3.70: in 31.7-cm *f*/5 L (86×), tail in p.a. 180°, nucleus of mag 4.6 (MM = I, ref. = SC). Mar. 4.70: in 11×80 B, 2° tail. Mar. 15.71: in 7.8-cm *f*/7.5 R (30×), nucleus of mag 4.3 (MM = I, ref. = SC); in 11×80 B, cond. of mag 2.7 (MM = S, ref. = SC); in 31.7-cm *f*/5 L (86×), bright nucleus near tip of parabolic coma/tail, and "there appeared to be a brighter inner envelope originating at nucleus and sweeping back parallel to border of center envelope. Tail curved radius about 20°? p.a. near head 210°–220°. Tangent to tail at 5° from head 185°–190° n.p. border less diffuse than s.f. border". Mar. 16.72: in 11×80 B, 4° tail; in 4.5-cm *f*/5 R (7×), tail 5° long. Mar. 18.72: in 31.7-cm *f*/5 L (86×), bright nucleus of mag 5.1 (MM = I, ref. = SC) near tip of coma/tail; "tail curved; northern (p.) streamer less curved, brighter and traced further than southern streamer; center of tail fainter". Mar. 21.72: in 11×80 B, 4.5° tail in p.a. 225°–238°; in 31.7-cm *f*/5 L (86×), small, bright nucleus of mag 5.0 (MM = I, ref. = SC), coma/tail formed parabolic envelope, bright inner envelope centered on nucleus; "from the sharp cut-off radially at p.a. 140° (at right angle to tail), the inner envelope was well defined and uniform brightness back to p.a. 0°, and from there to p.a. 270° it became faint and diffuse; tail curved, p.a. near head 225°–238°, p.a. tangent to tail borders at 5° from head = 210°–225°, center of tail fainter".

◇ *Comet White-Ortiz-Bolelli* 1970 *VI*, all notes by JON: 1970 May 23.27: "tail noticed first, with unaided eye; traced to 10° in 2.5×30 B; head only faintly seen in 11×80 B, very low in sky". May 24.26: "small nucleus in cond.; narrow tail". May 26.27: "comet very low; small cond. in diffuse coma; tail broader = width of coma?". May 27.27: "comet low in smoky sky;" in 11×80 B, tail 5.5° in p.a. 120°. May 30.27: comet low, diffuse coma. May 31.27: in 31.7-cm L, nucleus of mag 12 suspected. June 7.28: "comet appeared as a diffuse streak, no distinct head apparent."

◇ *Comet Abe* 1970 *XV*, all notes by JON: 1971 Jan. 23.62: in 31.7-cm *f*/5 L (86×), nucleus mag 12.4 (MM = I, ref. = VN); cond. mag 11.0 (MM = S, ref. = VN). Jan. 26.65: in 31.7-cm *f*/5 L (86×), cond. of mag 11.2 (MM = S, ref. = VN) displaced in p.a. 100°. Jan. 29.64: in 31.7-cm *f*/5 L (86×), cond. mag 11.4 (MM = S, ref. = VN), DC = 5. Feb. 3.65: in 31.7-cm *f*/5 L (86×), cond. mag 11.2 (MM = S, ref. = VN), DC = 6. Feb. 7.65: in 31.7-cm *f*/5 L (86×), cond. mag 11.3 (MM = S, ref. = VN), DC = 5. Feb. 28.69: in 31.7-cm *f*/5 L (86×), cond. mag 11.2 (MM = S, ref. = VN). Mar. 8.68: in 31.7-cm *f*/5 L (86×), cond. mag 11.2 (MM = S, ref. = VN). Mar. 30.53: "faint, short?" tail. Apr. 5.67: in 31.7-cm *f*/5 L (86×), nucleus mag 12.5 (MM = I, ref. = VN). Apr. 22.44: in 31.7-cm *f*/5 L (86×), cond. mag 11.4 (MM = I, ref. = VN). Apr. 23.45: in 31.7-cm *f*/5 L (86×), cond. mag 11.7 (MM = S, ref. = VN). Apr. 25.42: in 31.7-cm *f*/5 L (86×), cond. mag 12.6 (MM = S, ref. = V).

◇ *Comet Toba* 1971 *V*, all notes by JON: 1971 Apr. 23.71: in 31.7-cm *f*/5 L (86×), cond. of mag 11.2 (ref. = V, MM = S). Apr. 26.73: in 31.7-cm *f*/5 L (86×), cond. of mag. 9.1 (ref. = V, MM = S). Apr. 27.73: in 31.7-cm *f*/5 L (86×), cond. of mag. 11.3 (ref. = V, MM = S). May 7.74: in 31.7-cm *f*/5 L (86×), cond. of mag 10.9 (ref. = V, MM = S); in 4.5-cm R, "trace?" of tail. May 18.73: short tail; moon 10° from comet. May 22.75: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.6 (ref. = VN, MM = I). May 23.76: short, broad tail. May 24.76: in 31.7-cm *f*/5 L (86×), cond. of mag 10.5 (ref. = AA, MM = S) and short tail in p.a. 280°–295°. May 26.75: in 31.7-cm *f*/5 L (86×), cond. of mag. 10.1 (ref. = AA, MM = S). May 28.75: in 31.7-cm *f*/5 L (86×), cond. of mag. 10.1 (ref. = VN, MM = S), DC = 6, short tail in p.a. 280°. June 4.73: tail in p.a. 280°–310°. June 15.48: in 31.7-cm *f*/5 L (86×), DC = 5, tail in p.a. 280°. June 19.46: in 31.7-cm *f*/5 L (86×), cond. of mag. 12.3 (ref. = VN, MM = S) and nucleus of mag 13.0 (MM = I, ref. = VN). June 20.50: in 31.7-cm *f*/5 L (86×), "broad, diffuse tail". June 29.48: in 31.7-cm *f*/5 L (86×), cond. of mag. 12.0 (ref. = VN, MM = S) and nucleus of mag 13.5 (MM = I, ref. = VN). July 3.77: trace of tail. July 5.75: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.1 (MM = I, ref. = VN). July 10.31: in 31.7-cm *f*/5 L, cond. of mag. 10.7 (ref. = VN, MM = S; 86×) and nucleus of mag 12.4 (MM = I, ref. = VN; 104×). July 17.37: in 31.7-cm *f*/5 L (86×), nucleus of mag 12.4 (MM = I, ref. = VN).

◇ *Comet Bradfield* 1972 *III*, all notes by JON: 1972 Apr. 15.33: in 31.7-cm *f*/5 L (86×), nucleus mag = 13.0 (MM = I, ref. = VN). Apr. 15.73: in 31.7-cm *f*/5 L (48×), coma dia. 3.5′, DC = 6. May 2.37: in 31.7-cm *f*/5 L (86×), nucleus mag = 12.5 (MM = I, ref. = VN). May 3.39: in 31.7-cm *f*/5 L (86×), nucleus mag = 12.5 (MM = I, ref. = VN).

◇ *Comet Kojima* 1973 *II*, all notes by JON: 1972 Dec. 11.43: nucleus mag 12.3 (MM = I, ref. = VN). Dec. 22.42: nucleus mag 12.5 (MM = I, ref. = VN). Dec. 26.48: in 31.7-cm *f*/5 L (86×), nucleus mag = 12.5 (MM = I, ref. = VN). Dec. 30.46: in 31.7-cm *f*/5 L (86×), nucleus mag = 12.5 (MM = S, ref. = VN). Dec. 31.48: in 31.7-cm *f*/5 L (86×), nucleus mag = 11.8 (MM = S, ref. = VN). 1973 Feb. 3.41: in 31.7-cm *f*/5 L (86×), nucleus mag = 13.2 (MM = I, ref. = VN). Feb. 9.42: comparison stars 3° below comet.

◇ *Comet Kohoutek* 1973 *XII:* 1973 Nov. 19.65: in 31.7-cm *f*/5 L (86×), cond. mag = 10.6 (MM = S, ref. = VN) [JON].

◇ *Comet Austin* 1984 *XIII:* 1984 July 22.44: possibly glimpsed via naked eye; in 41-cm L, narrow tail, central cond. slightly sunward of coma's center [CLA]. 1984 July 23.45: seen via naked eye with averted vision; in 41-cm L, cond. even further sunward from coma's center, tail slightly brighter [CLA]. Sept. 2.14: 2′ sunward spike in p.a. 197° [KEI]. Sept. 6.15: in 20×80 B, "gas" tail in p.a. 301°; also 0.17° diffuse tail in p.a. 240°, 0.03° sunward spike in p.a. 180°, and possible 1′ tail in p.a. 90° [KEI]. Sept. 24.15: in 20×80 B, sunward fan spanning p.a. 50°–138° [KEI]. Oct. 20.92: tail appears fanned [KEI]. Oct. 22.96: tail appears fanned [KEI]. Oct. 25.81: in 5×10 B, "extremely low surface brightness" [KEI]. Oct. 26.96: in 20×80 B, "possibly fanned toward E" [KEI].

◇ *Comet Wilson (1986l):* 1987 Mar. 10.69: in 31.7-cm *f*/5 L (86×), coma dia. 3′, DC = 5–6 [JON]. Mar. 11.69: in 31.7-cm *f*/5 L (86×), coma dia. 2.5′, DC = 6 [JON]. Mar. 13.69 and 25.72: in 31.7-cm *f*/5 L (86×), coma dia. 3′, DC = 6 [JON]. Mar. 18.73: in 31.7-cm *f*/5 L (86×), DC = 5 [JON]. Mar. 19.71 and 21.73: in 31.7-cm *f*/5 L (86×), coma dia. 3′, DC = 5 [JON]. Mar. 26.67: in 31.7-cm L, "short, broad, wispy tail" spanning p.a. 260°–280° [JON]. Mar. 27.70: in 31.7-cm L, tail spans p.a. 255°–290° [JON]. Mar. 28.70: in 31.7-cm L, tail spans p.a. 240°–280° [JON].

Apr. 1.72: in 31.7-cm L, tail spans p.a. 270°–300° [JON]. Apr. 2.74: in 31.7-cm *f*/5 L (86×), coma dia. 4′ [JON]. Apr. 3.72: in 31.7-cm *f*/5 L (86×), coma dia. 4′, DC = 7 [JON]. Apr. 5.70: in 7×50 B, "small bright cond."; in 31.7-cm *f*/5 L (86×), coma dia. 4.5′, DC = 7, "short broad diffuse tail" in p.a. 260°–295° [JON]. Apr. 7.73: in 7.8-cm *f*/7.5 R (30×), coma dia. 5′; in 31.7-cm *f*/5 L (86×), coma dia. 4′, DC = 7 [JON]. Apr. 10.73: in 7.8-cm *f*/7.5 R (30×), coma dia. 4.5′, DC = 7, "diffuse coma, small bright cond." [JON]. Apr. 11.73: in 7.8-cm *f*/7.5 R (30×), coma dia. 4.5′; in 31.7-cm *f*/5 L (86×), DC = 8, "small bright cond.; short faint diffuse tail" in p.a. 260°–280° [JON]. Apr. 12.74: in 7.8-cm *f*/7.5 R (30×), coma dia. 4.5′; in 31.7-cm L (86×), small bright cond. [JON]. Apr. 16.75: in 31.7-cm *f*/5 L (86×), coma dia. 4′, DC = 7 [JON]. Apr. 17.74: in 7.8-cm *f*/7.5 R (30×), coma dia. 4.5′, DC = 7 [JON]. Apr. 22.73 and May 20.36: in 31.7-cm *f*/5 L (86×), DC = 7 [JON]. Apr. 23.73: in 31.7-cm L, tail spans p.a. 245°–280° [JON]. Apr. 27.31: in 4.5-cm *f*/6 R (13×), coma dia. 7′, DC = 6 [JON]. Apr. 28.72: in 31.7-cm L, tail spans p.a. 210°–245° [JON]. Apr. 29.40: in 31.7-cm *f*/5 L (86×), DC = 7, 0.5° tail in p.a. 160°–190° [JON].

May 1.33: in 31.7-cm L, "short broad tail" 0.1° long in p.a. 180° [JON]. May 1.70: comet possibly glimpsed via naked eye (m_1 = 5.1, ref: SC) [JON]. May 2.44: in 7×50 B, coma dia. 15′, DC = 4; in 31.7-cm *f*/5 L (86×), DC = 7, 0.4° tail in p.a. 150°–210° [JON]. May 5.34: in 31.7-cm L, "broad fanshaped tail" in p.a. 140°–178° [JON]. May 8.37: in 7×50 B, coma dia. 7′, DC = 3; in 31.7-cm L (86×), DC = 6 [JON]. May 9.34: in 7.8-cm *f*/7.5 R (30×), DC = 5; in 31.7-cm L, broad tail spanning p.a. 125°–135° [JON]. May 11.38: in 31.7-cm *f*/5 L (86×), DC = 6, "fairly strong cond." [JON]. May 12.38: in 31.7-cm *f*/5 L (86×), DC = 6, "trace of tail?" [JON]. May 13.31 and 15.38: in 31.7-cm *f*/5 L (86×), DC = 6 [JON]. May 14.33: in 31.7-cm *f*/5 L (86×), DC = 5 [JON]. May 24.33: in 7×50 B, m_1 = 6.7 (ref. SC, MM = S), coma dia. 5′, DC = 2; in 31.7-cm L, "broad faint tail with parallel sides" [JON]. May 29.32: in 31.7-cm *f*/5 L (86×), DC = 6, "moderate cond., small 10.5-mag nucleus" [JON]. June 1.32: in 31.7-cm L, "faint broad tail, diffuse coma with small cond." [JON]. June 8.32: in 31.7-cm *f*/5 L (86×), coma dia. 3′, DC = 3 [JON]. July 6.46 and 17.45: faint outer coma [PEA].

◇ *Comet Sorrells (1986n):* 1986 Dec. 29.14: "coma elongated NNW-SSE" [SIM]. 1987 July 17.59: "mag 13.8 stellar nucleus" [PEA]. July 19.30: fan tail from p.a. 45° to 150° [MOR]. July 19.93: tail in p.a. 130°–135° and a jet in p.a. 50° with average length of ~ 70″-80″ [BOA]. July 20.92: also jet in p.a. 50° [BOA]. July 25.37: fan tail from p.a. 100° to 200°; longest in p.a. 100° [MOR]. July 26.28: "coma elongated toward east" [MOR]. Aug. 17.22: "large, non-stellar cond." [JAC01].

◇ *Comet Levy (1987a):* 1987 Jan. 12.27: "quite diffuse, faint outer coma" [PEA]. Jan. 30.47: "slight cond. offset towards the N; cond. non-stellar and quite faint" [JAC01]. Feb. 9.44: "cond. unimpressive, $m_2 \geq 14$" (*cf.* Feb. 11 notes below) [JAC01]. Feb. 11.47: "stellar cond. of mag ~ 11; outburst?" (*cf.* Feb. 9 notes, above) [JAC01]. Feb. 24.44: "no cond.; coma still somewhat centrally condensed, but not near the intensity of Feb. 11" [JAC01].

◇ *Comet Nishikawa-Takamizawa-Tago (1987c):* 1987 Apr. 11.72: in 31.7-cm *f*/5 L (86×), coma dia. 3′, DC = 5, diffuse coma with large bright cond. [JON]. Apr. 12.73: in 7.8-cm *f*/7.5 R (30×), coma dia. 4′, DC = 5 [JON]. Apr. 16.74: in 31.7-cm *f*/5 L (86×), coma dia. ~ 3′, DC = 4–5 [JON]. Apr. 18.71: in 7.8-cm *f*/7.5 R (30×), coma dia. 4′; in 31.7-cm *f*/5 L (86×), DC = 3 [JON]. Apr. 23.74: in 7.8-cm *f*/7.5 R (30×), coma dia. 3′, DC = 2 [JON]. Apr. 27.73: in 7.8-cm *f*/7.5 R (30×), coma dia. 4′, DC = 3 [JON]. May 7.71: in 31.7-cm *f*/5 L (86×), DC = 2, "trace of short, faint tail?" in p.a. 270° [JON]. May 8.71: in 31.7-cm L, "trace of short, faint tail?" [JON]. May 10.72: in 31.7-cm L, "trace of short, faint tail?" [JON]. May 12.75: in 31.7-cm *f*/5 L (86×), DC = 1 [JON]. May 23.535–June 2.354: in 7×50 B and 15-cm L, very diffuse, no central cond. [GAR01]. May 25.72: in 7.8-cm *f*/7.5 R (30×), coma dia. 5′, DC = 1; in 4.5-cm *f*/6 R (13×), coma dia. 6′; in 31.7-cm *f*/5 L (86×), coma dia. 4′, DC = 0–1, "large, faint, diffuse patch" [JON]. May 29.47: comet not visible in 7×50 B or 4.5-cm R (13×); in 31.7-cm *f*/5 L (86×), coma dia. 3′ [JON]. June 1.85: "large very diffuse coma" [JON]. June 27.22: in 29-cm L, tail spanning p.a. 90°–180°; pointlike cond. [JAC01]. June 28.24: tail very faint but possibly fanned over p.a. 90°–160° [JAC01].

◇ *Comet Terasako 1987d:* The following observations were made by JON with a 31.7-cm *f*/5 L (86×). 1987 Jan. 29.40: DC = 2. Jan. 31.40: coma dia. 4′, DC = 3.

◇ *P/Klemola (1987i):* 1987 July 25.78: "very doubtful observation; comet only suspected with averted vision": in 31-cm *f*/3.75 L (51×), m_1 = 13.9: (Sidgwick, AC), coma dia. 0.5′, DC = 0 [CLA].

◇ *Comet Bradfield (1987s):* 1987 August (all dates): "tail was broad and faint" [MOR]. Aug. 12.397: 10-min exposure (IIIaF hypered plate) with the Uppsala Schmidt telescope at Siding Spring Observatory shows diffuse tail 5′ long in p.a. 120°, m_1 ~ 8.5, strong central condensation [MCN]. Aug. 13.50: "starlike nucleus of mag 10.5; quite condensed" [PEA]. Aug. 13.51: "parabolic coma; well condensed" [CLA]. Aug. 14.31: small cond. [JON]. Aug. 15.45: "pronounced central condensation" (20×120 B) [MCN]. Aug. 15.49: 10-min exposure (hypered 2415 film) at Siding Spring Observatory shows diffuse tail 5′ long in p.a. 125° [MCN]. Aug. 16.52: in 32-cm L, "parabolic head; tail quite broad" [PEA]. Aug. 26.51: "coma circular" [CLA]. Sept. 11.42: "broad tail suspected" [SEA]. Sept. 12.49: "tail broad" [CLA]. Sept. 15.34: in 31.7-cm L, faint diffuse tail [JON]. Sept. 18.33: in 31.7-cm L, short, broad tail 0.05° long and faint, narrow streamer 0.1° long [JON]. Sept. 19.35: in 31.7-cm *f*/5 L (86×), coma dia. 2′, DC = 6 [JON]. Sept. 24.03: "tail very diffuse, fan-shaped" [CHE]. Sept. 27.35: in 31.7-cm L, "faint tail suspected" [JON]. Sept. 29.33: in 31.7-cm *f*/5 L (86×), coma dia. 1.5′, DC = 5 [JON]. Oct. 1.35: in 31.7-cm *f*/5 L (86×), coma dia. 2′, DC = 5; "faint wispy tail?" [JON]. Oct. 14.05: very condensed; tail diffuse and fanned over 20° arc [CHE]. Oct. 16.02: photo (25-min exposure on hypered 2415 film) taken with 14-cm S shows 1.75° ion tail in p.a. 90° and 1° dust tail in p.a. 100° [CHE].

◇ *Comet Rudenko 1987u:* 1987 Aug. 23.219: with 18-inch Palomar Schmidt telescope, 12-min exposure shows trail of strong cond. in coma ~ 40″ wide [GIB].

◇ *P/Encke:* 1987 July 24: both GAR01 and MCN "thought P/Encke was a uniform disk in bright twilight, but there was clearly a central cond. in darker sky." July 24.45: "small and condensed with quite high surface brightness" [PEA]. Aug. 2.46: "prominent central cond.; no nucleus" [PEA]. Aug. 11.49: "a lot more diffuse than in early Aug." [PEA]. Aug. 26.48: "very difficult" [CLA]. Aug. 28.48: "very difficult and diffuse" [PEA]. Sept. 10.51 and 12.50: comet not visible in 31-cm *f*/3.75 L (51×) [CLA].

◇ *P/Howell (1987h):* 1987 July 25.77: "faint and almost totally diffuse; best seen at low power" [PEA]. July 26.43: "faint (m_2 = 15) stellar cond." [MOR].

* * *

Key to observers with observations published in this issue [those with asterisks (*) preceding the 5-character code are new additions to the Observer Key (cf. ICQ 9, 102)]:

*AMO		Mauro Amoretti, Italy
AND01		Karl-Gustav Andersson, Sweden
*BOA		Andrea Boattini, Italy
BUS01	11	E. P. Bus, The Netherlands
CAM		J. da S. Campos, South Africa
*CHE		G. R. Chester, VA, U.S.A.
CLA	14	Maurice L. Clark, Australia
COM	11	Georg Comello, The Netherlands
DEA		V. F. de Assis Neto, Brazil
GAR01	14	Gordon Garradd, N.S.W., Australia
GRE		Daniel W. E. Green, U.S.A.
HAL		Alan Hale, U.S.A.
HAS02		Werner Hasubick, West Germany
HAS03		Hisaya Hasegawa, Japan
ICH	06	Kazuhiko Ichikawa, Japan
ISH02	16	Akiyoshi Ishikawa, Japan
JAC01		Eric A. Jacobson, MN, U.S.A.
JON		Albert F. Jones, New Zealand
KAN	06	Kiyotaka Kanai, Japan
KEE		Richard A. Keen, CO, U.S.A.
KEI	07	Graham Keitch, England
LEV		David Levy, AZ, U.S.A.
LIN02		Juergen Linder, West Germany
LOV	14	Terry Lovejoy, Australia
MAC		Donald E. Machholz, CA, U.S.A.
MCN		Rob H. McNaught, Australia
MIK		Herman Mikuz, Yugoslavia
MOE		Michael Moeller, West Germany
MOR		Charles S. Morris, U.S.A.
MOR03		Warren C. Morrison, Canada
NAK01	06	Akimasa Nakamura, Japan
OHT	16	Tadao Ohtsuka, Japan
PEA	14	Andrew R. Pearce, Australia
SCH04	11	A. H. Scholten, The Netherlands
SCO01		James V. Scotti, AZ, U.S.A.
SCO02		T. Gehrels and J. Scotti, Kitt Peak, AZ, U.S.A.
SEA	14	David A. J. Seargent, Australia
SIM		Karl Simmons, FL, U.S.A.
SIM01		Wanda Simmons, FL, U.S.A.
WEG	11	R. L. W. van der Weg, The Netherlands
ZAN		Mauro Zanotta, Italy

Comet Kresak-Peltier 1954 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1954 07 22.32	*			31.7	L	5	48	3	4			JON
1954 07 22.32	* S	7.9	SC	4.5	R	5	7					JON
1954 07 23.34	*			31.7	L	5	48	3	4			JON

Comet Kresak-Peltier 1954 XII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1954 07 23.34	* S	7.9	SC	4.5	R	5	7					JON
1954 07 26.34	* S	7.7	SC	4.5	R	5	7					JON
1954 07 29.35	*			31.7	L	5	48	3	4			JON
1954 07 29.35	* S	7.6	SC	4.5	R	5	7					JON
1954 08 09.32				31.7	L	5	48	2	4			JON
1954 08 09.32	S	8.0:	S	7.8	R	8	30					JON
1954 08 21.31				31.7	L	5	48	2	7			JON
1954 08 21.31	S	8.4	S	7.8	R	8	30					JON
1954 08 28.74	*			31.7	L	5	48	2	7	?	180	JON
1954 08 28.74	S	8.0	S	7.8	R	8	30					JON
1954 09 07.73	* S	8.7	HD	4.5	R	5	7					JON
1954 09 24.70	* S	8.4	AC	7.5	R	12	23					JON
1954 09 25.70				20	L	8	52	3	5			JON
1954 09 25.70	S	8.0	AC	2.8	R	10	15					JON
1954 09 25.70	* S	8.1	AC	7.5	R	12	23					JON
1954 10 07.69	* S	9.0	AC	7.8	R	8	30					JON

Comet Arend-Roland 1957 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1956 11 27.45	S	9.6:	HD	31.7	L	5	86		4			JON
1956 12 29.45	S	10.2	MP	20	L	8	54	2	3/			JON
1957 01 01.44	S	10.0	MP	20	L	8	54		5		60	JON
1957 01 04.43	S	10.1	MP	20	L	8	54	2	4		80	JON
1957 04 06.74		3.0	SC	0.0	E		1			4	190	JON
1957 04 10.75				7.0	R	10	21	1.5	5			JON
1957 04 10.75	S	3.0	SC	3.0	B		2					JON

Comet Mrkos 1957 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1957 08 31.31	S	4.7	SC	2.8	R	10	15					JON
1957 09 08.31	S	5.3	SC	4.5	R	5	7					JON
1957 09 16.33				31.7	L	5	48	3	6		80	JON
1957 09 16.33	S	5.9	SC	4.5	R	5	7					JON
1957 09 21.33				20.0	L	8	54	4		0.7	80	JON
1957 09 21.33	S	6.6	SC	2.8	R	10	15			0.7		JON
1957 09 28.33				20.0	L	8	54	4	5		85	JON
1957 09 28.33	S	6.6	SC	2.8	R	10	15					JON

Comet Burnham 1958 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1958 03 19.37	S	10.4	AC	31.7	L	5	48	3	3			JON
1958 04 20.34	S	9.8	AC	31.7	L	5	86					JON
1958 04 20.34	S	9.9	AC	14.0	R	16	42	3.5	4			JON

Comet Seki-Lines 1962 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1962 02 07.40				31.7	L	5	48	3	3		350	JON
1962 02 07.40	S	8.7	VN	7.8	R	8	30					JON
1962 02 08.39	S	8.5	VN	4.5	R	5	7					JON
1962 02 08.39	S	8.7	VN	7.8	R	8	30					JON
1962 02 09.40				20.0	L	8	54	5	6	0.2	25	JON
1962 02 09.40	S	7.9	SC	4.5	R	6	13					JON
1962 02 10.40	S	6.6	SC	4.5	R	6	13					JON
1962 02 13.50	S	7.5	SC	4.5	R	5	7					JON
1962 02 18.38	S	6.2	SC	4.5	R	5	7					JON

Comet Seki-Lines 1962 III [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1962 02 22.42				31.7	L	5	86	4.5	6			JON
1962 02 22.42	S	5.8	SC	4.5	R	5	7					JON
1962 02 23.41				20.0	L	8	54	4	6	0.6	70	JON
1962 02 23.41	S	6.6	SC	4.5	R	6	13					JON
1962 02 28.42	S	6.3	SC	4.5	R	5	7					JON
1962 03 02.49	S	5.6	SC	3.0	B		2					JON
1962 03 06.39	S	5.0	SC	4.5	R	5	7					JON
1962 03 09.39				4.5	R	6	13			1.3	90	JON
1962 03 09.39				20.0	L	8	54	13	8			JON
1962 03 09.39	S	4.2	SC	3.0	B		2					JON
1962 03 14.37	S	4.5	SC	2.3	B		2					JON
1962 03 21.35	S	3.9	SC	2.3	B		2					JON
1962 03 22.34	S	3.0	SC	2.3	B		2					JON
1962 03 24.33				4.5	R	6	13			1	110	JON
1962 03 24.33				7.7	R	12	23	3.5	8			JON
1962 03 24.33	S	2.9	SC	3.0	B		2					JON

Comet Humason 1962 VIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1962 05 13.76	S	10.2	MP	31.7	L	5	86		3			JON
1962 06 06.76	S	10.2	MP	31.7	L	5	48		4			JON
1962 06 08.77	S	9.7	MP	7.8	R	8	30					JON
1962 06 13.76	S	9.6	MP	7.8	R	8	30		5/			JON
1962 06 14.76	S	9.6	MP	7.8	R	8	30		4			JON
1962 06 15.77				31.7	L	5	48	2	5			JON
1962 06 15.77	S	9.7	MP	7.8	R	8	30					JON
1962 07 02.77				31.7	L	5	48	2	4		270	JON
1962 07 02.77	S	8.2	MP	4.5	R	5	7					JON
1962 07 02.77	S	8.5	MP	7.8	R	8	30					JON
1962 07 03.77	S	8.0	MP	4.5	R	5	7					JON
1962 07 04.77				31.7	L	5	48	2		0.1	260	JON
1962 07 04.77	S	7.8	MP	4.5	R	5	7					JON
1962 07 06.77	S	8.3	MP	4.5	R	5	7					JON
1962 07 07.75	S	8.4	MP	4.5	R	5	7					JON
1962 07 08.75				31.7	L	5	48		4	?	270	JON
1962 07 08.75	S	8.2	MP	4.5	R	5	7					JON
1962 07 29.75				31.7	L	5	86		4	0.2	248	JON
1962 07 29.75	S	8.1	MP	4.5	R	5	7					JON
1962 08 01.74				31.7	L	5	48	3	4	0.05	270	JON
1962 08 01.74	S	7.5	MP	4.5	R	5	7					JON
1962 08 05.73	S	7.8	MP	4.5	R	5	7					JON
1962 08 06.73	S	7.8	SC	4.5	R	5	7					JON
1962 08 12.73	S	7.0	SC	4.5	R	6	13					JON
1962 08 25.52	S	6.0	SC	4.5	R	6	13			0.8	30	JON
1962 08 29.42				7.8	R	8	30	5	5			JON
1962 08 29.42	S	6.7	SC	4.3	R	3	4					JON
1962 08 29.42	S	7.1	SC	4.5	R	5	7			1.3	25	JON
1962 08 30.49	S	7.1	SC	4.5	R	5	7				15	JON
1962 08 31.52	S	7.0	SC	4.5	R	5	7				25	JON
1962 09 01.51				20.0	L	8	96	3.5	6		58	JON
1962 09 01.51	S	7.5	SC	4.5	R	6	13					JON
1962 09 06.49				31.7	L	5	86	2	6		45	JON
1962 09 06.49	S	8.2	SC	4.5	R	5	7					JON
1962 09 09.67	S	7.6	SC	4.5	R	6	13					JON
1962 09 25.47	S	7.0	SC	4.5	R	5	7					JON
1962 09 25.47	S	8.0	SC	7.8	R	8	30	5	5	0.8	70	JON
1962 09 30.45	S	6.7	SC	4.5	R	5	7			0.3	80	JON

Comet Humason 1962 VIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1962 10 06.49	S	7.1	SC	4.5	R	6	13	4.5		0.5	70	JON
1962 10 16.42				7.8	R	8	30	3	4	0.5	80	JON
1962 10 16.42	S	7.2	SC	4.5	R	5	7					JON
1962 10 21.43	S	7.4	SC	4.5	R	6	13			1	90	JON
1962 10 28.42				7.8	R	8	30	2		0.3	95	JON
1962 10 28.42	S	7.7	SC	4.5	R	5	7					JON
1962 11 03.44				20.0	L	8	56	4		0.25	125	JON
1962 11 03.44	S	6.5	SC	4.5	R	6	13					JON
1962 11 16.42	S	8.4	C	4.5	R	6	13			1.3	100	JON
1962 11 17.44	S	8.4	S	4.5	R	6	13					JON
1962 11 19.41	S	7.6	SC	4.5	R	5	7					JON
1962 11 19.41	S	8.1	SC	7.8	R	8	30		5	0.3	105	JON
1962 11 21.41	S	7.3	SC	4.5	R	5	7					JON
1962 11 21.41	S	8.2	SC	7.8	R	8	30	1.3	5	0.2	95	JON
1962 12 01.42	S	8.5	S	7	R	10	21				125	JON
1962 12 03.42	S	9.1	S	31.7	L	5	86		4			JON
1963 01 24.66	S	8.4	S	7.8	R	8	30					JON
1963 01 26.65	S	7.9:	SC	20.0	L	8	54	2	3	0.25	225	JON
1963 02 11.69	S	8.0	S	7.8	R	8	30					JON
1963 02 13.69	S	9.6	HD	31.7	L	5	86	1.5	3			JON
1963 02 18.69				31.7	L	5	86	1	4	0.1	270	JON
1963 02 18.69	S	9.4	VN	7.8	R	8	30					JON
1963 02 21.69	S	9.3	VN	7.8	R	8	30		4		240	JON
1963 02 23.68				20.0	L	8	96	1.5	4	0.2	235	JON
1963 02 23.68	S	8.0	VN	4.5	R	6	13					JON
1963 02 25.69	S	8.5	VN	7.8	R	8	30		4	?		JON
1963 02 26.69	S	9.1	VN	7.8	R	8	30		4		240	JON
1963 02 28.70	S	9.2	VN	7.8	R	8	30			0.4	250	JON
1963 03 06.68				31.7	L	5	86		5	0.2	255	JON
1963 03 06.68	S	9.5	VN	7.8	R	8	30					JON
1963 03 15.72	S	8.9	VN	7.5	R	12	23					JON
1963 03 16.72				20.0	L	8	54	2	4	?	260	JON
1963 03 16.72	S	8.5	VN	4.5	R	6	13					JON
1963 03 22.73				31.7	L	5	86	1	4	?	252	JON
1963 03 22.73	S	8.5	VN	7.8	R	8	30					JON
1963 03 27.73				31.7	L	5	86		6	?0.05	235	JON
1963 03 27.73	S	8.7	VN	7.8	R	8	30					JON
1963 03 29.73	S	8.5	VN	4.5	R	6	13					JON
1963 04 03.73				31.7	L	5	86		5	0.1	310	JON
1963 04 03.73	S	8.5	VN	4.5	R	6	13					JON
1963 04 04.74				31.7	L	5	86	2.5			300	JON
1963 04 04.74	S	8.3	VN	4.5	R	6	13			?		JON
1963 04 17.48	S	9.4	S	4.5	R	6	13					JON
1963 04 22.49				31.7	L	5	86		4	0.5	345	JON
1963 04 22.49	S	8.9	VN	4.5	R	6	13				345	JON
1963 04 24.47				31.7	L	5	86		4	0.3	345	JON
1963 04 24.47	S	8.9	VN	4.5	R	6	13					JON
1963 04 26.49	S	8.8	VN	4.5	R	6	13					JON
1963 04 29.46				31.7	L	5	86	2	6	0.6	15	JON
1963 04 29.46	S	8.9	VN	4.5	R	6	13					JON
1963 04 30.48				31.7	L	5	86		6	0.5	28	JON
1963 05 05.73				31.7	L	5	86	1	6	0.25	50	JON
1963 05 05.73	S	9.4	VN	7.8	R	8	30					JON
1963 05 14.45	S	10.3	VN	7.8	R	8	30					JON
1963 05 18.51				31.7	L	5	86			0.2	65	JON
1963 05 18.51	S	9.2	VN	7.8	R	8	30					JON
1963 05 19.33	S	9.2	RC	7.8	R	8	30					JON
1963 05 19.33				31.7	L	5	86			0.25	75	JON

Comet Humason 1962 VIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1963 05 21.50				31.7	L	5	86		6	0.1	90	JON
1963 05 21.50	S	9.4	RC	7.8	R	8	30					JON
1963 05 27.50	S	9.7	RC	7.8	R	8	30					JON
1963 05 27.50				31.7	L	5	86		5	0.2	85	JON
1963 05 30.47	S	9.4	RC	7.8	R	8	30					JON
1963 05 30.47				31.7	L	5	86		4	0.2	105	JON
1963 06 16.45	S	10.0	VN	7.8	R	8	30					JON
1963 07 12.38	S	11.4	VN	31.7	L	5	86		3			JON
1963 07 20.35	S	11.4	VN	31.7	L	5	86		4			JON
1963 07 22.31	S	11.3	VN	31.7	L	5	86		4			JON

Comet Barbon 1966 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 08 27.74	S	11.3	VN	31.7	L	5	86	& 1				JON
1966 09 07.69	S	12.3	VN	31.7	L	5	86		7			JON
1966 09 11.71	S	12.3	VN	31.7	L	5	86		6			JON
1966 10 08.51	S	11.7	VN	31.7	L	5	86		6			JON
1966 10 16.43	S	11.9	VN	31.7	L	5	86					JON
1966 10 19.65	S	12.1	VN	31.7	L	5	48		5			JON
1966 11 12.47	S	12.6	VN	31.7	L	5	86		3			JON

Comet Kilston 1966 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 08 16.41	S	10.5	V	31.7	L	5	86	1	5			JON
1966 08 17.42	S	10.1	V	31.7	L	5	48		6			JON
1966 08 18.44	S	10.3	V	31.7	L	5	86		5/			JON
1966 08 20.44	S	10.4	V	31.7	L	5	48	1	6			JON
1966 09 01.34	S	10.2	V	31.7	L	5	86		5			JON
1966 09 03.36	S	10.0	V	31.7	L	5	86		6			JON
1966 10 03.38				31.7	L	5	86	1.5	6			JON
1966 10 03.38	S	9.6	AC	7.8	R	8	30					JON
1966 10 08.39	S	9.2	AC	7.8	R	8	30					JON
1966 10 17.41	S	9.1	AC	7.8	R	8	30					JON
1966 12 03.40	S	10.3	V	31.7	L	5	86		5			JON

Comet Rudnicki 1967 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1966 11 12.42				31.7	L	5	62	2	4			JON
1966 11 12.42	S	10.6	VN	31.7	L	5	48					JON
1966 11 19.60	S	8.6	VN	7.8	R	8	30	& 5	3			JON
1966 12 03.47				31.7	L	5	86	5	4		62	JON
1966 12 03.47	S	7.0	VN	2.8	R	10	15					JON
1966 12 07.44	S	7.3	AA	2.8	R	10	15					JON
1966 12 11.40				31.7	L	5	86			0.16	70	JON
1966 12 11.40	S	7.2	AA	4.5	R	5	7					JON
1966 12 14.45	S	7.1	AA	4.5	R	5	7					JON
1966 12 15.44				31.7	L	5	86		5	0.16	70	JON
1966 12 15.44	S	7.6:	S	4.5	R	5	7					JON
1967 02 10.68	S	9.0	VN	12.7	R	15	30		5			JON
1967 02 11.67	S	8.6	VN	12.7	R	15	30		4			JON
1967 02 17.69	S	9.8	VN	31.7	L	5	86		4/			JON
1967 02 20.69	S	10.5	VN	31.7	L	5	86		2			JON

Comet Whitaker-Thomas 1968 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 06 25.45	S	11.0	MV	31.7	L	5	86		3			JON
1968 06 30.46	S	11.5	MV	31.7	L	5	86		2			JON

Comet Honda 1968 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 09 17.37				31.7	L	5	86		5	?	90	JON
1968 09 17.37	S	7.3	SC	4.5	R	5	7					JON
1968 09 20.42	S	7.1	S	4.5	R	6	13		5			JON
1968 09 23.38	S	7.9	SC	12.7	R	15	30		6			JON
1968 09 27.40	S	7.8	SC	7.8	R	8	30		5			JON
1968 10 09.39				31.7	L	5	86		4		75	JON
1968 10 09.39	S	8.4	S	7.8	R	8	30					JON

Comet Bally-Clayton 1968 VII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 09 10.38	S	10.8:	MV	31.7	L	5	86					JON
1968 09 14.34	S	11.6	MV	31.7	L	5	86		2			JON

Comet Honda 1968 IX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 09 02.72	S	10.5	AC	31.7	L	5	86	2	2			JON
1968 09 10.72	S	10.3	AC	31.7	L	5	86		4			JON
1968 09 14.67	S	9.3	VN	7.8	R	8	30		3			JON
1968 09 16.72	S	9.4	VN	7.8	R	8	30		3			JON
1968 09 17.71	S	8.9	VN	7.8	R	8	30		3			JON
1968 09 18.69				31.7	L	5	86	3	4		265	JON
1968 09 18.69	S	8.7	VN	7.8	R	8	30					JON
1968 09 20.71	S	8.4	VN	4.5	R	6	13					JON
1968 09 20.71	S	8.6	VN	7.8	R	8	30					JON
1968 09 24.69	S	8.0	VN	4.5	R	6	13					JON
1968 09 24.69	S	8.1	VN	7.8	R	8	30					JON
1968 09 27.68				31.7	L	5	62	3	6		270	JON
1968 09 27.68	S	7.8	VN	4.5	R	6	13					JON
1968 09 29.68	S	7.7	VN	4.5	R	6	13					JON
1968 09 30.68				31.7	L	5	86		6	0.1	285	JON
1968 09 30.68	S	7.7	VN	4.5	R	6	13					JON
1968 10 06.50	S	7.6	VN	4.5	R	6	13					JON
1968 10 09.41	S	7.8	VN	4.5	R	6	13					JON
1968 10 09.41	S	8.1	VN	7.8	R	8	30					JON
1968 10 11.49	S	7.8	VN	4.5	R	6	13					JON
1968 10 14.48	S	7.7	VN	7.8	R	8	30					JON
1968 10 16.47	S	7.8	VN	4.5	R	6	13					JON
1968 10 18.68	S	7.2	S	4.5	R	6	13					JON
1968 10 21.46				31.7	L	5	86		5		185	JON
1968 10 21.46	S	7.9	SC	4.5	R	6	13					JON
1968 10 28.39	S	7.7	HD	7.8	R	8	30					JON
1968 11 03.39	S	9.5	VN	31.7	L	5	86		3			JON
1968 11 05.37	S	9.4	VN	31.7	L	5	86		3			JON
1968 11 08.44	S	9.0	VN	7.8	R	8	30					JON
1968 11 08.44	S	9.4	VN	31.7	L	5	86		4			JON
1968 11 09.46	S	9.4	VN	7.8	R	8	30		4			JON
1968 11 19.45	S	10.0	VN	31.7	L	5	86		4			JON
1968 11 21.41	S	9.8	VN	7.8	R	8	30					JON
1968 11 21.41	S	10.4	VN	31.7	L	5	86					JON
1968 11 23.41	S	10.4	VN	31.7	L	5	86		3			JON

Comet Honda 1968 IX [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1968 11 26.41	S	10.6	VN	31.7	L	5	86					JON
1968 11 27.39	S	10.4	VN	31.7	L	5	86					JON
1968 11 28.39	S	10.6	VN	31.7	L	5	86					JON
1968 11 30.39	S	10.6	VN	31.7	L	5	86					JON

Comet Tago-Sato-Kosaka 1969 IX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 10 19.35	S	10.3	VN	31.7	L	5	86					JON
1969 10 26.35	S	9.7	VN	31.7	L	5	86			?	0	JON
1969 10 29.35	S	9.5	VN	31.7	L	5	86	2				JON
1969 12 09.40	S	5.7	SC	8.0	B		11					JON
1969 12 20.41	S	4.1	SC	2.3	B		2					JON
1969 12 20.41	S	5.0	SC	8.0	B		11			1.0	159	JON
1969 12 26.42	S	4.5	SC	2.3	B		2			3	160	JON
1969 12 27.42				8.0	B		11			3	158	JON
1969 12 27.42				31.7	L	5	86	3	5			JON
1969 12 27.42	S	3.8	SC	2.3	B		2					JON
1969 12 28.42	S	3.7	SC	2.3	B		2		5	3	160	JON
1969 12 29.42				8.0	B		11			3.5	156	JON
1969 12 29.42	S	3.8	SC	2.3	B		2					JON
1969 12 30.42	S	3.8	SC	2.3	B		2					JON
1970 01 02.42	S	3.6	SC	2.3	B		2			4		JON
1970 01 03.42	S	3.7	SC	2.3	B		2					JON
1970 01 03.42	S	4.7	SC	8.0	B		11			4	146	JON
1970 01 09.46				8.0	B		11		5	5	126	JON
1970 01 09.46	S	4.3	SC	2.3	B		2					JON
1970 01 10.46				31.7	L	5	86		5	5.25	131	JON
1970 01 10.46	S	4.9	SC	2.3	B		2					JON
1970 01 11.43	S	4.4	SC	2.3	B		2					JON
1970 01 14.44				8.0	B		11			2.5	118	JON
1970 01 14.44	S	4.0	SC	2.3	B		2					JON
1970 01 20.43	S	4.3	SC	2.3	B		2					JON
1970 01 25.41				31.7	L	5	86	2.5	6			JON
1970 01 25.41	S	4.5	SC	2.3	B		2					JON
1970 01 27.41	S	4.6	SC	2.3	B		2					JON

Comet Bennett 1970 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 01 02.47				31.7	L	5	86	2.5	4			JON
1970 01 02.47	S	8.5	VN	8.0	B		11					JON
1970 01 09.48	S	8.4	VN	8.0	B		11					JON
1970 01 10.49	S	8.4	VN	8.0	B		11					JON
1970 01 11.47	S	8.4	VN	8.0	B		11		5			JON
1970 01 12.42	S	8.3	VN	8.0	B		11		5			JON
1970 01 14.46	S	8.3	VN	8.0	B		11		5			JON
1970 01 20.45				31.7	L	5	86		5		100	JON
1970 01 20.45	S	7.9	VN	8.0	B		11					JON
1970 01 25.44	S	7.4	VN	8.0	B		11					JON
1970 01 27.43	S	7.5	VN	8.0	B		11					JON
1970 02 01.42				31.7	L	5	86		5	0.5	125	JON
1970 02 01.42	S	7.2	SC	8.0	B		11					JON
1970 02 03.43				31.7	L	5	86		6	0.4	125	JON
1970 02 03.43	S	6.8	SC	4.5	R	6	13					JON
1970 02 03.43	S	7.0	SC	8.0	B		11					JON
1970 02 08.42				8.0	B		11		5	1.0	125	JON
1970 02 08.42	S	6.1	SC	2.3	B		2					JON

Comet Bennett 1970 II [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 02 09.40	S	5.4	SC	2.3	B		2					JON
1970 02 10.35	S	5.5	SC	2.3	B		2					JON
1970 02 15.40	S	4.8	SC	2.3	B		2					JON
1970 02 15.40	S	5.0	SC	4.5	R	5	7					JON
1970 02 17.40	S	4.9	SC	2.3	B		2					JON
1970 02 21.41	S	4.0	SC	2.3	B		2					JON
1970 02 23.37				31.7	L	5	86			1.0	165	JON
1970 02 23.37	S	4.1	SC	2.3	B		2					JON
1970 02 28.71				8.0	B		11			2.2	172	JON
1970 02 28.71		3.6	SC	0.0	E		1					JON
1970 02 28.71	S	3.9	SC	2.3	B		2					JON
1970 03 03.70	S	3.6	SC	2.3	B		2					JON
1970 03 04.70	S	3.3	SC	2.3	B		2					JON
1970 03 15.71				31.7	L	5	86			6	215	JON
1970 03 15.71		1.0	SC	0.0	E		1					JON
1970 03 16.72		1.2	SC	0.0	E		1					JON
1970 03 18.72				31.7	L	5	86			7	225	JON
1970 03 18.72		1.0	SC	0.0	E		1					JON
1970 03 21.72		1.0	SC	0.0	E		1			6		JON

Comet White-Ortiz-Bolelli 1970 VI

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 05 26.27	S	8.1	SC	31.7	L	5	86		5		115	JON
1970 05 30.27				8.0	B		11			13		JON
1970 05 30.27	S	8.4:	S	31.7	L	5	86		5	7.5	110	JON
1970 05 31.27				8.0	B		11		5	4	120	JON
1970 05 31.27	S	8.2	SC	31.7	L	5	86			0.8		JON
1970 06 07.28	S	9.2	HD	31.7	L	5	86			0.3	120	JON

Comet Abe 1970 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1970 07 08.76	S	10.0	V	31.7	L	5	86	2				JON
1970 07 15.77	S	9.9	V	31.7	L	5	86					JON
1971 01 18.64	S	10.4	VN	31.7	L	5	86					JON
1971 01 23.62	S	8.9	VN	8.0	B		11					JON
1971 01 23.62	S	9.0	VN	7.8	R	8	30					JON
1971 01 23.62	S	9.6	VN	31.7	L	5	86	2.5	4			JON
1971 01 24.65	S	8.8	VN	8.0	B		11					JON
1971 01 24.65	S	8.9	VN	12.7	R	15	30		5			JON
1971 01 26.65	S	8.8	VN	8.0	B		11					JON
1971 01 27.65	S	8.7	VN	8.0	B		11					JON
1971 01 29.64	S	8.8	VN	8.0	B		11					JON
1971 02 03.65	S	8.5	VN	8.0	B		11					JON
1971 02 07.65	S	8.9	VN	8.0	B		11					JON
1971 02 28.69	S	10.4	VN	31.7	L	5	86		6			JON
1971 03 08.68	S	10.4	VN	31.7	L	5	86		6			JON
1971 03 20.45	S	10.2	VN	31.7	L	5	86		6			JON
1971 03 24.44	S	10.4	VN	31.7	L	5	86		6			JON
1971 03 27.49	S	10.5	VN	31.7	L	5	86		5			JON
1971 03 28.46	S	10.5	VN	31.7	L	5	86		5			JON
1971 03 30.53	S	10.6	VN	31.7	L	5	86		5	?	20	JON
1971 04 03.46	S	10.6	VN	31.7	L	5	86		6			JON
1971 04 05.67	S	10.7	VN	31.7	L	5	86		4			JON
1971 04 18.39	S	10.9	VN	31.7	L	5	86		6			JON
1971 04 22.44	S	11.1	V	31.7	L	5	86					JON
1971 04 23.45	S	11.1	V	31.7	L	5	86		6			JON

Comet Abe 1970 XV [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1971 04 24.43	S	11.1	V	31.7	L	5	86	1				JON
1971 04 25.42	S	11.5	V	31.7	L	5	86		5			JON
1971 04 26.44	S	12.5	V	31.7	L	5	86		8			JON
1971 04 27.41	S	12.4	V	31.7	L	5	86		5			JON
1971 04 28.41	S	12.5	V	31.7	L	5	86		5			JON
1971 05 16.31	S	12.7	V	31.7	L	5	86		5			JON
1971 05 17.42	S	13.0	VN	31.7	L	5	86		5			JON
1971 05 22.33	S	13.3	VN	31.7	L	5	86					JON
1971 05 23.33	S	13.4	VN	31.7	L	5	86					JON

Comet Toba 1971 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1971 04 03.73	S	8.9	S	7.8	R	8	30					JON
1971 04 05.73	S	9.6	MP	7.8	R	8	30		4			JON
1971 04 08.74	S	8.8	MP	7.8	R	8	30		5			JON
1971 04 18.73	S	8.5	V	8.0	B		11		6			JON
1971 04 23.71	S	8.4	V	7.8	R	8	30		5			JON
1971 04 25.74	S	8.3	S	7.8	R	8	30		6			JON
1971 04 26.73	S	8.3	V	7.8	R	8	30		6			JON
1971 04 27.73	S	7.7	S	4.5	R	6	13		6			JON
1971 05 07.74	S	7.6	S	4.5	R	6	13			?		JON
1971 05 08.74	S	7.6	MP	4.5	R	6	13		5			JON
1971 05 18.73	S	9.0	S	7.8	R	8	30				260	JON
1971 05 21.75	S	7.7	MP	4.5	R	6	13		5		265	JON
1971 05 22.75	S	7.8	MP	4.5	R	6	13		6		265	JON
1971 05 23.76	S	8.3	S	4.5	R	6	13		6			JON
1971 05 24.76				31.7	L	5	86		6		288	JON
1971 05 24.76	S	7.6	S	4.5	R	6	13					JON
1971 05 24.76	S	7.9	AA	4.5	R	6	13					JON
1971 05 26.75	S	7.4	S	4.5	R	6	13		5			JON
1971 05 28.75	S	7.6	SC	4.5	R	6	13					JON
1971 06 04.73	S	7.5	SC	4.5	R	6	13				295	JON
1971 06 12.35	S	8.1	VN	8.0	B		11					JON
1971 06 12.35	S	9.7	VN	31.7	L	5	86		4		290	JON
1971 06 13.40	S	8.4	VN	7.8	R	8	30		5			JON
1971 06 14.46	S	9.0	VN	7.8	R	8	30					JON
1971 06 14.46	S	10.0	VN	31.7	L	5	86		4	0.18	290	JON
1971 06 15.48	S	9.3	VN	7.8	R	8	30					JON
1971 06 16.46	S	9.2	VN	7.8	R	8	30		4			JON
1971 06 19.46	S	8.6	VN	8.0	B		11		5		285	JON
1971 06 19.76	S	8.7	VN	8.0	B		11					JON
1971 06 20.50				31.7	L	5	86		5	0.5	305	JON
1971 06 20.50	S	9.3	VN	8.0	B		11					JON
1971 06 20.50	S	9.4	VN	7.8	R	8	30					JON
1971 06 26.42				31.7	L	5	86		5	0.08	40	JON
1971 06 26.42	S	9.1	VN	8.0	B		11					JON
1971 06 26.42	S	9.3	VN	7.8	R	8	30					JON
1971 06 29.48				31.7	L	5	86		5	0.07	90	JON
1971 06 29.48	S	10.2	VN	7.8	R	8	30					JON
1971 07 03.77	S	11.9	VN	31.7	L	5	86		5			JON
1971 07 05.75	S	10.7	VN	7.8	R	8	30					JON
1971 07 05.75	S	11.8	VN	31.7	L	5	86		6			JON
1971 07 10.31	S	9.3	VN	7.8	R	8	30					JON
1971 07 17.37	S	10.6	VN	31.7	L	5	86		6			JON
1971 07 18.38	S	11.3	VN	31.7	L	5	86		6			JON
1971 07 19.42	S	11.4	VN	31.7	L	5	86		6			JON
1971 07 28.42	S	11.4	VN	31.7	L	5	86		4			JON

Comet Toba 1971 V [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1971 07 31.32	S	11.6	VN	31.7	L	5	86	1	4			JON
1971 08 13.45	S	12.6	VN	31.7	L	5	86					JON
1971 08 14.32	S	12.4	VN	31.7	L	5	86					JON

Comet Bradfield 1972 III

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 03 30.73	S	8.6	S	31.7	L	5	86		4			JON
1972 03 31.72	S	8.7	HD	7.8	R	8	30		3			JON
1972 04 01.72				31.7	L	5	48	2	3			JON
1972 04 01.72	S	8.2	VN	8.0	B		11					JON
1972 04 02.72	S	8.2	VN	8.0	B		11					JON
1972 04 08.73				31.7	L	5	86	2	5			JON
1972 04 08.73	S	8.1	VN	8.0	B		11					JON
1972 04 09.32				31.7	L	5	86	3	6			JON
1972 04 09.32	S	8.0	VN	8.0	B		11					JON
1972 04 11.72	S	8.1	VN	8.0	B		11					JON
1972 04 14.73	S	8.1	VN	8.0	B		11		6			JON
1972 04 15.73	S	8.2	VN	8.0	B		11					JON
1972 04 16.32				31.7	L	5	48	3.5	6			JON
1972 04 16.32	S	8.3	VN	8.0	B		11					JON
1972 04 18.38	S	8.2	VN	8.0	B		11					JON
1972 04 22.39	S	8.0	VN	8.0	B		11		6			JON
1972 04 30.31	S	8.0	SC	8.0	B		11		4			JON
1972 05 02.37	S	8.2	VN	8.0	B		11		5			JON
1972 05 03.39	S	8.2	VN	8.0	B		11		4			JON
1972 05 07.35	S	8.7	VN	8.0	B		11		5			JON
1972 05 10.38				31.7	L	5	48	2	4			JON
1972 05 10.38	S	9.2	VN	8.0	B		11					JON
1972 05 18.38	S	10.5	VN	31.7	L	5	48	2	2			JON
1972 05 20.34	S	10.4	VN	31.7	L	5	48		2			JON
1972 05 21.31	S	10.5	VN	31.7	L	5	48	2.5				JON

Comet Kojima 1973 II

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1972 11 18.65	S	11.4	VN	31.7	L	5	86		3			JON
1972 12 01.61	S	11.0	VN	31.7	L	5	86		4			JON
1972 12 03.60	S	11.0	VN	31.7	L	5	86		5			JON
1972 12 06.45	S	10.6	VN	31.7	L	5	86		5			JON
1972 12 09.45	S	11.0	VN	31.7	L	5	86		6			JON
1972 12 11.43	S	10.6	VN	31.7	L	5	86		5			JON
1972 12 15.60	S	10.5	VN	31.7	L	5	86		5			JON
1972 12 22.42	S	10.8	VN	31.7	L	5	86		6			JON
1972 12 25.45	S	10.4	VN	7.8	R	8	30					JON
1972 12 25.45	S	10.5	VN	31.7	L	5	86		6		90	JON
1972 12 26.48	S	10.4	VN	7.8	R	8	30		6		90	JON
1972 12 28.45	S	11.1	VN	31.7	L	5	86		6			JON
1972 12 29.45	S	10.5	VN	31.7	L	5	86		5			JON
1972 12 30.46	S	10.5	VN	7.8	R	8	30					JON
1972 12 31.48	S	10.4	VN	7.8	R	8	30					JON
1973 01 01.47	S	10.6	VN	7.8	R	8	30		5			JON
1973 01 02.59				31.7	L	5	86	2	6	0.05	105	JON
1973 01 02.59	S	10.6	VN	7.8	R	8	30					JON
1973 01 03.45	S	10.5	VN	7.8	R	8	30		6			JON
1973 01 22.43	S	12.6	VN	31.7	L	5	86		5			JON
1973 02 03.41	S	12.1	VN	31.7	L	5	86					JON
1973 02 04.89	S	11.7	VN	31.7	L	5	86		5			JON

Comet Kojima 1973 II [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 02 09.42	S	11.2	VN	31.7	L	5	86		2			JON

Comet Kohoutek 1973 XII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1973 10 25.67	S	9.0	S	31.7	L	5	86		3			JON
1973 10 27.67	S	9.0	S	31.7	L	5	86		4			JON
1973 11 08.66	S	8.6	S	31.7	L	5	86		6		290	JON
1973 11 19.65	S	7.7	VN	7.8	R	8	30		6	0.13	290	JON
1973 11 22.64	S	7.6	VN	7.8	R	8	30		6	0.5	290	JON
1973 11 27.64	S	7.1	SC	8.0	B		11		6		270	JON
1973 12 08.64	S	6.0	SC	8.0	B		11		6	0.18	285	JON
1973 12 20.39	S	5.9	SC	8.0	B		11		6			JON
1973 12 22.39	S	6.3	SC	8.0	B		11		6			JON
1973 12 24.40	S	6.0	SC	8.0	B		11		6			JON
1974 01 30.40	S	6.3:	SC	8.0	B		11		6			JON
1974 02 19.38	S	9.2:	S	31.7	L	5	86		4			JON

Comet Bennett 1974 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1974 11 17.65	S	10.6	VN	31.7	L	5	86		5			JON
1974 11 19.63	S	10.7	VN	31.7	L	5	86		3			JON

Comet Bradfield 1975 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 04 09.32	S	9.2	S	31.7	L	5	86		4			JON

Comet Sato 1976 I

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 12 13.62	S	9.1	S	7.8	R	8	30					JON
1976 01 04.47	S	9.3	VN	4.5	R	6	13		2			JON

Comet Sugano-Saigusa-Fujikawa 1983 V

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 06 07.78	S	7.5	AA	3.0	R		8		1			LOV
1983 06 09.72	S	6.5	AA	3.0	R		8		1			LOV
1983 06 15.45	S	8.0	AA	3.0	R		8		1			LOV

Comet Shoemaker 1983 XV

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1983 09 19.10	S	11.7	A	29.8	L	5	62	0.6	3			KEI
1983 10 04.93	S	12.0	A	29.8	L	5	62	1.0	3			KEI
1983 10 07.95	S	11.7	A	29.8	L	5	62	1.6	3			KEI
1983 10 13.97	S	11.5	A	29.8	L	5	62	1.3	3			KEI

Comet Austin 1984 XIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 07 21.47	S	6.4	AA	41	L	4	86	5.5	6	0.66	140	CLA
1984 07 22.44	S	5.8	AA	3.0	R		6					CLA
1984 07 22.45	M	6.2	AA	41	L	4	86					CLA
1984 07 22.45	S	6.3	AA	41	L	4	86	5.5	6	0.66	137	CLA
1984 07 23.45	S	5.7	AA	3.0	R		6					CLA

Comet Austin 1984 XIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 07 23.46	M	6.2	AA	41	L	4	86					CLA
1984 07 23.46	S	6.2	AA	41	L	4	86	6	7	0.83	138	CLA
1984 07 23.47	B	6.4	AA	41	L	4	86					CLA
1984 08 27.78	S	6.0	A	15	L	6	28	& 2.5	7			KAN
1984 08 28.79	S	6.1	A	15	L	6	28	2	7/			KAN
1984 08 31.79	B	6.6	A	6	R	12	22	4	7	?	315	NAK01
1984 09 02.14	B	6.7	AA	8.0	B		20					KEI
1984 09 02.14	S	6.4	AA	8.0	B		20	2.1	7/	0.5	308	KEI
1984 09 02.78	S	6.4	A	15	L	6	28	& 2.5	7			KAN
1984 09 02.79	S	6.7	A	6	R	12	22					NAK01
1984 09 02.79	S	6.7	S	13	L	6	24	4	5	0.17		ISH02
1984 09 02.80	B	6.4	A	10	L	10	56					ICH
1984 09 05.79	S	7.3	A	6	R	12	22	5.5	5	?	315	NAK01
1984 09 06.15	B	7.0	AA	8.0	B		20					KEI
1984 09 06.15	S	6.8	AA	5.0	B		10					KEI
1984 09 06.15	S	6.8	AA	8.0	B		20	3.6	6	0.33	301	KEI
1984 09 22.74	S	7.9	A	15	L	6	28	5.5	5			KAN
1984 09 22.75	S	7.8	A	20	C	10	50	& 3.5	2			OHT
1984 09 23.73	S	8.5	A	10	L	10	25	& 4	2	?		ICH
1984 09 23.74	S	7.9	A	15	L	6	28	5.0	4			KAN
1984 09 23.80	S	7.9	A	20	C	10	50	4	1/			OHT
1984 09 23.80	S	9.0	A	20	L	5	40	5.5	2			NAK01
1984 09 24.15	S	7.4	AA	5.0	B		10	9.5		0.17	298	KEI
1984 09 24.74	S	7.8	A	26	L	5	41	4.7	4	?	110	KAN
1984 09 25.79	S	8.8	A	20	L	5	40	5.5	2	0.13	120	NAK01
1984 09 26.77	S	7.9	A	26	L	5	41	4.4	5	0.15	120	KAN
1984 09 26.79	M	7.8	A	20	C	10	50	4	3	0.25	130	OHT
1984 09 26.80	S	8.9	A	20	L	5	40	5	2/			NAK01
1984 09 27.76	S	8.0	A	13	L	6	24	6	4			ISH02
1984 09 28.75	M	8.2	A	20	C	10	50	4	2			OHT
1984 09 28.80	S	9.0	A	10	L	10	56	2.7	2			ICH
1984 09 30.79	S	9.1	A	20	L	5	40	4.5	2			NAK01
1984 10 04.74	S	8.7	A	13	L	6	24	5	3			ISH02
1984 10 04.79	S	8.3	A	20	C	10	50	6	1			OHT
1984 10 04.79	S	8.4	A	26	L	5	41	5.5	3/	0.12	124	KAN
1984 10 04.79	S	9.3	A	20	L	5	40	4	2			NAK01
1984 10 08.82	S	8.6	A	15	L	6	50	4.8	2			KAN
1984 10 17.79	S	9.3	A	15	L	6	50	4.7	0			KAN
1984 10 18.89	S	8.8	AA	29.8	L	5	62	9.4	2/			KEI
1984 10 19.96	S	8.9	AA	8.0	B		20	4.6	3/			KEI
1984 10 20.92	S	8.4	AA	5.0	B		10	11.6			112	KEI
1984 10 20.92	S	9.0	AA	8.0	B		20	6.6	3			KEI
1984 10 21.57	S	9.8	A	20	L	5	40	4.5	1			NAK01
1984 10 21.61	S	9.4	A	13	L	6	24	5	2			ISH02
1984 10 22.74	S	9.4	A	26	L	5	41	4.5	0/			KAN
1984 10 22.96	S	8.7	AA	5.0	B		10	8.1				KEI
1984 10 22.96	S	9.3	AA	8.0	B		20	6.8			112	KEI
1984 10 24.99	S	8.8	AA	5.0	B		10	5.3				KEI
1984 10 25.60	S	9.7	A	20	L	5	40	4	1/			NAK01
1984 10 25.78	S	10.5	A	26	L	5	73	2.9	0			KAN
1984 10 25.81	S	8.8	AA	5.0	B		10	8.4				KEI
1984 10 25.81	S	9.0	AA	8.0	B		20	7.4	0/			KEI
1984 10 26.96	S	9.0	AA	5.0	B		10	6.5				KEI
1984 10 26.96	S	9.3	AA	8.0	B		20	6.5	0/	?	90	KEI
1984 10 29.52	S	10.0	A	20	L	5	40	4.5	2			NAK01
1984 10 30.53	S	10.4	A	26	L	5	73	3.4	0			KAN
1984 11 01.77	S	9.8	A	13	L	6	24	4	2			ISH02
1984 11 02.55	S	10.6	A	26	L	5	73	3.1	0			KAN

Comet Meier 1984 XX

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 09 24.83	S	11.5:	V	29.8	L	5	89	0.7				KEI

Comet Levy-Rudenko 1984 XXIII

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1984 11 16.38	S	9.1	A	13	L	6	44	2	4			ISH02
1984 11 16.38	S	9.5	A	15	L	6	50	2.7	2			KAN
1984 11 17.38	B	9.2	A	13	L	6	44	2	3			ISH02
1984 11 17.39	S	9.5	A	15	L	6	50	2.2	3			KAN
1984 11 21.42	S	9.4	A	20	L	5	40	4	4			NAK01
1984 11 22.41	S	9.5	A	13	L	6	44	1.5	4			ISH02
1984 11 23.37	S	9.6	A	15	L	6	50	1.5	3			KAN
1984 11 23.38	S	9.2	A	13	L	6	44	2	3			ISH02
1984 11 25.37	S	9.2	A	16	L	6	29	1.8	2			OHT
1984 11 25.39	S	9.2	A	13	L	6	44	2.7	4			ISH02
1984 11 25.42	S	9.6	A	10	L	10	56	2.7				ICH
1984 11 26.39	S	9.4	A	13	L	6	64	1.5	3			ISH02
1984 11 26.40	S	9.4	A	10	L	10	56	3				ICH
1984 11 26.42	S	9.6	A	20	C	10	80	2				OHT
1984 11 27.38	S	9.3	A	13	L	6	64	2.2	3			ISH02
1984 11 27.40	S	9.6	A	10	L	10	56	2.8				ICH
1984 11 28.37	S	9.4	A	16	L	6	42		2			OHT
1984 11 28.38	S	9.4	A	13	L	6	44	2.5	4			ISH02
1984 11 29.41	S	9.1	A	10	L	10	56	3.9				ICH
1984 11 30.40	S	9.2	A	10	L	10	56	4.0				ICH
1984 12 02.40	S	9.0	A	20	L	5	40	4	4			NAK01
1984 12 03.39	S	9.0	A	13	L	6	44	2.5	4			ISH02
1984 12 03.42	S	9.3	A	10	L	10	56	2.0				ICH
1984 12 04.38	M	9.0	A	10	L	10	56	3				ICH
1984 12 05.36	M	8.6	A	10	L	10	56	2.7		0.06	45	ICH
1984 12 07.41	M	8.5	A	10	L	10	56	3.1				ICH
1984 12 12.36	S	8.5	A	16	L	6	29					OHT
1984 12 12.40	S	8.8	A	15	L	6	28	3.7	4			KAN
1984 12 12.41	S	8.5	A	20	L	5	80	3.5	3			NAK01
1984 12 14.38	S	8.9	A	15	L	6	50	2.4	3/			KAN
1984 12 15.40	S	8.3	A	20	L	5	40	4	5			NAK01
1984 12 19.37	S	8.4	A	16	L	6	29	& 2.5	3			OHT
1984 12 19.37	S	8.8	A	13	L	6	44	3	5			ISH02
1984 12 19.40	S	8.5	A	10	L	10	56	3.8				ICH
1984 12 23.37	S	8.7	A	13	L	6	44	3	4			ISH02
1984 12 23.40	S	8.0	A	20	L	5	40	5	4			NAK01
1984 12 23.87	S	8.3	A	26	L	5	53	3.1	5			KAN
1984 12 24.38	S	8.5	A	13	L	6	44	3.5	4			ISH02
1984 12 25.86	B	8.3	A	26	L	5	53	3.1	5			KAN
1984 12 30.37	S	8.6	A	13	L	6	44	2.5	3			ISH02
1984 12 31.85	S	8.4	A	13	L	6	44	3.5	4			ISH02
1985 01 01.84	S	8.3	A	13	L	6	24	3.3	4			ISH02
1985 01 04.84	S	8.3	A	13	L	6	24	3.5	5	?		ISH02
1985 01 08.84	S	8.1	A	15	L	6	28	3	5			KAN
1985 01 10.83	S	8.6	A	20	L	5	80	3.5	4			NAK01
1985 01 13.84	S	8.4	A	15	L	6	28	5.9	4			KAN
1985 01 14.84	S	8.2	A	13	L	6	24	4	4			ISH02
1985 01 16.84	S	8.6	A	20	L	6	44	6	5			NAK01
1985 01 16.85	S	8.1	A	13	L	6	24	4	4	?		ISH02
1985 01 17.85	S	8.1	A	13	L	6	24	5	4	0.08		ISH02
1985 01 20.80	S	8.6	A	20	L	6	44	5.5	4			NAK01
1985 01 20.81	S	8.5	A	26	L	5	53	4.8	5			KAN
1985 01 21.81	S	8.1	A	26	L	5	53	4.7	5			KAN

Comet Levy-Rudenko 1984 XXIII [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1985 01 21.84	S	8.1	A	13	L	6	24	5	4	?		ISH02
1985 01 24.84	S	8.1	A	13	L	6	24	5.5	4			ISH02
1985 01 25.81	S	8.9	A	20	L	6	44	5.5	4			NAK01
1985 01 25.84	S	8.2	A	13	L	6	24	5.5	4			ISH02
1985 01 26.84	S	8.2	A	13	L	6	24	6	3			ISH02
1985 01 29.81	S	8.6	A	20	L	6	44	5.5	4			NAK01
1985 01 30.84	S	8.2	A	13	L	6	24	7	4			ISH02
1985 02 01.80	S	7.9	A	15	L	6	28	14.6	4			KAN
1985 02 01.82	S	8.3	A	13	L	6	24	6	3			ISH02
1985 02 12.83	S	9.0	A	15	L	6	28	4.2				KAN
1985 02 13.75	S	9.2	A	20	L	6	44	6	2/			NAK01
1985 02 14.74	S	9.1	A	20	L	6	44	6.5	3			NAK01
1985 02 14.82	S	8.9	A	15	L	6	28	5.2	2			KAN
1985 02 21.73	S	9.6	A	20	L	6	44	4	3			NAK01
1985 02 23.58	S	8.8	A	15	L	6	28	9.6	2			KAN

Comet Churyumov-Solodovnikov 1986i

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 08 04.18	S	12.5	AC	44.5	L	4	80	1.1	0			MOR03

Comet Levy 1987a

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 01 09.47	S	11.1:	AA	25	L	4	82	& 2.1	2			JAC01
1987 01 12.27	S	11.2	V	29.8	L	5	89	1.2	2			PEA
1987 01 28.46	S	11.2:	AA	25	L	4	82	3.4	2			JAC01
1987 01 30.47	S	11.2:	AA	25	L	4	82					JAC01
1987 02 05.45	S	12.3	AC	44.5	L	4	80	2.0	0			MOR03
1987 02 09.44	S	11.4	L	25	L	4	82					JAC01
1987 02 11.47	S	11.1	L	25	L	4	82	3.5	5			JAC01
1987 02 11.49	S	11.4	L	25	L	4	179	3.1	7			JAC01
1987 02 24.44	S	11.9	L	25	L	4	82	1.1	2			JAC01
1987 03 08.43	S	12.7	L	25	L	4	179	1	1			JAC01

Comet Terasako 1987d

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 01 29.40	S	8.1	SC	8.0	B		11	5				JON
1987 01 31.40	S	7.9	SC	8.0	B		11	& 5				JON
1987 02 19.02	S	9.6	AC	44.5	L	4	80	2.8	1			MOR03
1987 02 19.39	S	9.5	MP	31.7	L	5	86	2	1			JON
1987 02 20.02	S	10.0	AC	44.5	L	4	80	2.0	1			MOR03
1987 02 20.38	S	9.7	MP	31.7	L	5	86	3	1/			JON
1987 02 21.38	S	9.9	MP	31.7	L	5	86	2.5				JON
1987 02 22.02	! S	10.9	AC	44.5	L	4	80	2.0	0			MOR03
1987 02 23.37	S	10.2	MP	31.7	L	5	86	2	2			JON
1987 02 24.37	S	10.1	MP	31.7	L	5	86	2.5				JON
1987 02 25.37	S	10.0	MP	31.7	L	5	86	3				JON

Comet Wilson 1986l

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 08 29.12	S	12.0	AC	15	R	5	62	1.3	4			MOR03
1986 08 29.49	S	12.0	V	31.7	L	5	86		3			JON
1986 08 30.40	S	11.7	V	31.7	L	5	86		3			JON
1986 09 01.14	S	12.0	AC	15	R	5	62	1.2	4			MOR03
1986 09 03.40	S	11.9	V	31.7	L	5	86	& 1	4			JON

Comet Wilson 19861 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 09 04.45	S	12.0	V	31.7	L	5	86	& 1	4/			JON
1986 09 05.50	S	12.1	V	31.7	L	5	86	0.6	4			JON
1986 09 06.14	S	12.0	AC	15	R	5	62	1.0	5			MOR03
1986 09 07.47	S	11.9	V	31.7	L	5	86	0.7	4			JON
1986 09 10.43	S	12.1	V	31.7	L	5	86		3			JON
1986 09 13.23	S	12.0	AC	15	R	5	62	1.3	4			MOR03
1986 09 20.35	S	11.9	V	31.7	L	5	86		2			JON
1986 09 25.05	S	12.0	AC	15	R	5	111	0.7	5			MOR03
1986 09 26.42	S	12.0	V	31.7	L	5	86	0.8	2			JON
1986 09 30.36	S	12.0	V	31.7	L	5	86	0.7				JON
1986 10 01.43	S	11.9	V	31.7	L	5	86	1	2			JON
1986 10 08.01	S	11.6	AC	15	R	5	62	1.3	4			MOR03
1986 10 22.37	S	11.4	L	31.7	L	5	86	1	2/			JON
1986 10 24.01	S	11.6	AC	15	R	5	62	0.9	6			MOR03
1986 10 25.05	S	11.8	AC	15	R	5	111	0.9	5			MOR03
1986 10 26.37	S	11.4	L	31.7	L	5	86					JON
1986 10 28.42	S	11.4	L	31.7	L	5	86					JON
1986 10 31.18	S	11.0:	AA	25	L	4	82	1.5	3			JAC01
1986 10 31.37	S	11.7	L	31.7	L	5	86					JON
1986 11 01.03	S	11.7	AC	15	R	5	62	1.1	5			MOR03
1986 11 05.00	S	11.7	AC	15	R	5	62	0.8	5			MOR03
1986 11 05.38	S	10.4	L	31.7	L	5	86	1	1/			JON
1986 11 20.38	S	11.0	L	31.7	L	5	86					JON
1986 11 21.39	S	12.0	L	31.7	L	5	86					JON
1986 11 26.00	S	11.8	AC	15	R	5	62	0.8	5			MOR03
1986 11 27.98	S	11.6	AC	15	R	5	62	0.7	3			MOR03
1986 11 28.05	S	10.7:	AA	25	L	4	82	1.2	2			JAC01
1986 11 28.06	S	10.8:	AA	8.0	B		20					JAC01
1986 11 30.98	S	11.8	AC	15	R	5	62	0.9	4			MOR03
1986 12 05.98	S	11.2	AC	15	R	5	62	1.1	4			MOR03
1986 12 05.98	S	11.4	AC	15	R	5	111	1.0	4			MOR03
1987 02 17.77	S	8.5:	AA	12.0	B		20	2	3			MCN
1987 02 18.77	S	8.2	AA	12.0	B		20	4	3	?0.27	270	MCN
1987 02 21.77	S	8.1	AA	12.0	B		20	2	5			MCN
1987 02 22.77	S	8.3	AA	12.0	B		20	2	5			MCN
1987 02 24.69	S	8.8	SC	31.7	L	5	86	1.6	3			JON
1987 02 27.49	M	8.9:	AA	8.0	B		20					JAC01
1987 02 28.48	M	8.4:	AA	25	L	4	46					JAC01
1987 02 28.48	M	8.7:	AA	8.0	B		20					JAC01
1987 03 05.69	S	8.4	SC	31.7	L	5	86	3.5	4/			JON
1987 03 05.70	S	8.3	SC	7.8	R	8	30					JON
1987 03 10.69	S	7.4	SC	4.5	R	6	13					JON
1987 03 11.69	S	7.8	SC	4.5	R	6	13					JON
1987 03 13.69	S	7.5	SC	4.5	R	6	13					JON
1987 03 18.73	S	7.3	SC	7.8	R	8	30					JON
1987 03 19.71	S	7.1	SC	4.5	R	6	13					JON
1987 03 21.73	S	6.9	SC	4.5	R	6	13					JON
1987 03 25.72	S	6.9	SC	4.5	R	6	13					JON
1987 03 26.67				31.7	L	5	86	3	6/		270	JON
1987 03 26.67	S	6.9	SC	4.5	R	6	13					JON
1987 03 27.70				31.7	L	5	86	3	6/		272	JON
1987 03 27.70	S	6.7	SC	4.5	R	6	13					JON
1987 03 28.70				31.7	L	5	86	3	6		260	JON
1987 03 28.70	S	6.7	SC	4.5	R	6	13					JON
1987 04 01.72				31.7	L	5	86	4	7	0.1	285	JON
1987 04 01.72	S	6.4	SC	5.0	B		7					JON
1987 04 02.74	S	6.6	SC	5.0	B		7					JON
1987 04 03.72	S	6.4	SC	5.0	B		7					JON

Comet Wilson 19861 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 04 05.70	S	6.5	SC	5.0	B		7					JON
1987 04 06.74	S	6.2	SC	4.5	R	6	13					JON
1987 04 07.73	S	6.0	SC	5.0	B		7					JON
1987 04 10.73	S	6.1	SC	4.9	B		3					JON
1987 04 11.73	S	6.1	SC	4.9	B		3					JON
1987 04 12.74	S	6.1	SC	4.9	B		3					JON
1987 04 16.75	S	6.0	SC	4.5	R	6	13					JON
1987 04 17.74	S	5.7	SC	4.9	B		3					JON
1987 04 17.74	S	5.8	SC	5.0	B		7					JON
1987 04 22.73	S	5.8	SC	4.9	B		3					JON
1987 04 23.44	S	5.7	SC	4.9	B		3					JON
1987 04 23.73				7.8	R	8	30			0.2		JON
1987 04 23.73				31.7	L	5	86	5	7		262	JON
1987 04 23.73	S	5.7	SC	4.9	B		3					JON
1987 04 27.31	S	5.4	SC	4.9	B		3					JON
1987 04 28.72				31.7	L	5	86		7	0.3	228	JON
1987 04 28.72	S	5.3	SC	4.9	B		3	10				JON
1987 04 29.40	S	5.4	SC	4.9	B		3	13				JON
1987 05 01.33				31.7	L	5	86		8	0.5	210	JON
1987 05 01.33	S	5.4	SC	4.9	B		3	14				JON
1987 05 01.70	S	5.3	SC	4.9	B		3					JON
1987 05 02.44				31.7	L	5	86		7	0.4	180	JON
1987 05 02.44	S	5.4	SC	4.9	B		3					JON
1987 05 05.34				31.7	L	5	86		7/	0.6	159	JON
1987 05 05.34	S	5.4	SC	4.9	B		3	16	3			JON
1987 05 07.31	S	5.4	SC	4.9	B		3					JON
1987 05 07.49	S	5.4	SC	4.9	B		3					JON
1987 05 08.37	S	5.4	SC	4.9	B		3					JON
1987 05 09.34				31.7	L	5	86		7	0.2	130	JON
1987 05 09.34	S	5.5	SC	5.0	B		7	6				JON
1987 05 11.38	S	6.3	SC	4.5	R	6	13	5	2/			JON
1987 05 12.38	S	6.1	SC	4.5	R	6	13	5	3			JON
1987 05 13.31	S	6.4	SC	4.5	R	6	13	4	2			JON
1987 05 14.33	S	6.6	SC	4.5	R	6	13	4	2			JON
1987 05 15.38	S	6.5	SC	4.5	R	6	13	7	2			JON
1987 05 20.36	S	6.0	SC	5.0	B		7	6	3			JON
1987 05 24.33				31.7	L	5	86		6/	0.3	155	JON
1987 05 24.33	S	6.7	SC	4.9	B		3					JON
1987 05 28.38	S	6.8	AA	5.0	B		7		4			GAR01
1987 05 29.32				7.8	R	8	30		3	0.2	125	JON
1987 05 29.32	S	6.1	SC	5.0	B		7	5	2			JON
1987 05 29.42	S	6.8	AA	5.0	B		7		5			GAR01
1987 05 30.42	S	6.9	AA	5.0	B		7					GAR01
1987 05 31.37	S	7.1	AA	5.0	B		7					GAR01
1987 06 01.15	B	6.7:	AA	25	L	4	46					JAC01
1987 06 01.32				31.7	L	5	86		5	0.5	145	JON
1987 06 01.32	S	6.8	SC	4.5	R	6	13	5	3			JON
1987 06 01.42	S	7.1	AA	5.0	B		7					GAR01
1987 06 02.35	S	7.2	AA	5.0	B		7		5			GAR01
1987 06 02.38				15	L	5	54	4	6	0.42	140	GAR01
1987 06 05.16	B	7.0	AA	25	L	4	46					JAC01
1987 06 05.29				7.8	R	8	30	3	3	0.3	140	JON
1987 06 05.29				31.7	L	5	86	2	5/	0.3	140	JON
1987 06 05.29	S	6.9	SC	4.5	R	6	13	5	1			JON
1987 06 07.34	S	7.6	SC	7.8	R	8	30	4				JON
1987 06 07.35	S	8.6	S	31.7	L	5	86	2.5	3			JON
1987 06 08.17	B	7.0	AA	25	L	4	46	& 2	2/			JAC01
1987 06 08.17	M	6.9	AA	8.0	B		20					JAC01

Comet Wilson 19861 [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 06 08.32	S	7.7	SC	7.8	R	8	30	4	1/			JON
1987 06 09.31	S	7.6	SC	7.8	R	8	30		1			JON
1987 06 09.32	S	8.5	S	31.7	L	5	86	2	2/			JON
1987 06 11.32	S	8.8	S	31.7	L	5	86		2			JON
1987 06 16.35				31.7	L	5	86	2.5		0.25	130	JON
1987 06 16.35	S	7.6	SC	7.8	R	8	30					JON
1987 06 17.30				31.7	L	5	86	3	3	0.3	125	JON
1987 06 17.30	S	7.6	SC	7.8	R	8	30					JON
1987 06 20.28				31.7	L	5	86	2.5	2/	0.3	140	JON
1987 06 20.28	S	8.7	S	7.8	R	8	30					JON
1987 06 21.32	S	8.1	MP	7.8	R	8	30					JON
1987 06 30.29	S	9.8	MP	31.7	L	5	86					JON
1987 07 01.30	S	9.3	MP	31.7	L	5	86	2	2/			JON
1987 07 05.47	S	9.8	AA	32	L	4	60	1.8	3			PEA
1987 07 06.46	S	9.8	AA	32	L	4	60	1.5	3			PEA
1987 07 16.28	S	9.5	S	31.7	L	5	86	& 1	2			JON
1987 07 17.45	S	9.5	AA	32	L	4	60	3	3			PEA
1987 09 20.49	I	[10 :	AC	41	L	4	83					HAL

Comet Sorrells 1986n

DATE (UT)		MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 11 26.03		S	11.0	AC	15	R	5	62	1.6	5			MOR03
1986 11 28.00		S	10.8	AC	15	R	5	62	1.8	5			MOR03
1986 11 28.44		S	10.1	S	31.7	L	5	86					JON
1986 11 29.44		S	10.2	MS	31.7	L	5	86	0.5	2			JON
1986 11 30.13		S	10.9	AC	15	R	5	62	1.5	6			MOR03
1986 12 05.46		S	10.5	MV	31.7	L	5	86	0.5				JON
1986 12 06.03		S	10.8	AC	15	R	5	62	1.7	5			MOR03
1986 12 06.42		S	10.7	MV	31.7	L	5	86					JON
1986 12 07.17		S	10.8	AC	15	R	5	62	1.8	5			MOR03
1986 12 23.41		S	10.3	MV	31.7	L	5	86	1	2			JON
1986 12 29.10		S	11.0	A	40.6	L	5	90		3			SIM01
1986 12 29.14		S	11.0	A	40.6	L	5	90	0.5	3	?		SIM
1987 01 17.98		S	10.5	AC	15	R	5	62	2.6	4			MOR03
1987 01 22.01		S	10.7	AC	15	R	5	62	2.7	4			MOR03
1987 01 24.03		S	10.1:	AA	25	L	4	46	2	2			JAC01
1987 01 27.04		S	10.2:	AA	25	L	4	82	1.4	1			JAC01
1987 02 01.01		S	10.8	AC	15	R	5	62	1.9	4			MOR03
1987 02 17.01	!	S	10.5	AC	15	R	5	62	1.9	3			MOR03
1987 02 19.01	!	S	10.7	AC	15	R	5	62	1.7	2			MOR03
1987 02 20.01	!	S	10.5	AC	15	R	5	62	1.8	2			MOR03
1987 02 21.01	!	S	10.8	AC	15	R	5	62	1.5	2			MOR03
1987 05 01.75		S	10.9	MV	31.7	L	5	86	& 1	1			JON
1987 05 04.36		S	10.5	AC	44.5	L	4	80	1.8	3			MOR03
1987 05 05.76		S	10.7	MV	31.7	L	5	86					JON
1987 05 07.75		S	10.9	MV	31.7	L	5	86		1			JON
1987 05 08.75		S	11.3	MV	31.7	L	5	86		1			JON
1987 05 10.75		S	11.1	MV	31.7	L	5	86		1			JON
1987 05 24.33		S	11.1	MV	31.7	L	5	86	& 1	2			JON
1987 05 25.74		S	11.1	MV	31.7	L	5	86	1.2	2			JON
1987 05 26.04		S	10.2	A	20.5	L	6	38	4	3			WEG
1987 05 26.75		S	11.3	MV	31.7	L	5	86	& 1	1			JON
1987 05 29.40		B	9.4	L	15	S	4	22	3	3			JAC01
1987 05 29.40		M	9.5	L	25	L	4	82					JAC01
1987 05 29.42		M	9.9	L	29	L	4	89					JAC01
1987 05 29.75		S	11.3	MV	31.7	L	5	86	1	2			JON
1987 05 31.74		S	11.3	MV	31.7	L	5	86	1	3			JON

Comet Sorrells 1986n [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 06 01.76	S	11.1	MV	31.7	L	5	86	1	3			JON
1987 06 04.36	M	9.5:	L	8.0	B		20	2.5	2			JAC01
1987 06 04.36	M	9.7:	L	25	L	4	82	2	3			JAC01
1987 06 04.37	M	9.9:	L	6	R	13	32	1.2	1			JAC01
1987 06 04.74	S	11.3	V	31.7	L	5	86	1.5	1/			JON
1987 06 05.75	S	11.3	V	31.7	L	5	86	1.5	2/			JON
1987 06 06.73	S	11.1	V	31.7	L	5	86	1.6	2			JON
1987 06 07.75	S	11.0	V	31.7	L	5	86	2	3			JON
1987 06 08.76	S	11.1	V	31.7	L	5	86	1.5	2/			JON
1987 06 16.99	S	9.6	A	20.5	L	6	38	4.5	2/			WEG
1987 06 16.99	S	10.4	A	20.0	T	10	50	& 2	2/			COM
1987 06 18.98	S	10.4	A	20.0	T	10	50	& 2	3			COM
1987 06 19.31	M	9.9:	L	25	L	4	82	2	3			JAC01
1987 06 20.73	S	11.2	V	31.7	L	5	86	1.5	2			JON
1987 06 24.30	S	11.2	AC	44.5	L	4	80	1.7				MOR03
1987 06 26.32	M	10.2	L	25	L	4	82					JAC01
1987 06 27.99	S	9.6	AC	15.5	L	5	25	6	5			ZAN
1987 06 28.06	S	10.5	AC	20.3	T	10	85	1.4	2			HAS02
1987 06 28.31	S	10.8	AC	15	R	5	62	2.6	2			MOR03
1987 06 29.03	B	10.4	A	35.0	T	6	96	0.12	7			AMO
1987 06 30.30	M	10.4	L	25	L	4	82					JAC01
1987 06 30.74	S	11.6	L	31.7	L	5	86	1	2/			JON
1987 06 30.97	S	10.6	AC	20.3	T	10	85	1.4	3			HAS02
1987 07 01.32	M	10.0	AC	41	L	4	83					HAL
1987 07 01.73	S	11.5	L	31.7	L	5	86	1.5	2/			JON
1987 07 01.92	S	10.6:	AC	15.2	L	5	44	1.2	3			MOE
1987 07 01.99	S	10.1	A	20.5	L	6	38	3	4/	0.04	100	WEG
1987 07 02.71	S	11.6	L	31.7	L	5	86	1	3			JON
1987 07 02.79	S	10.7	VN	32	L	4	60					PEA
1987 07 03.71	S	11.7	L	31.7	L	5	86	< 1	2/			JON
1987 07 03.90	S	10.7	A	20.0	T	10	50	& 2	2/			COM
1987 07 03.98	S	10.5:	AC	15.2	L	5	44	1.4	3			MOE
1987 07 04.37	M	10.2	L	25	L	4	82					JAC01
1987 07 04.95	S	10.6	AC	15.2	L	5	44	1.2	3			MOE
1987 07 04.98	S	10.1	A	20.5	L	6	38	4	2/			WEG
1987 07 05.71	S	11.2	L	31.7	L	5	86	1	2			JON
1987 07 05.99	S	9.9	A	20.5	L	6	38	5	3	?0.08	100	WEG
1987 07 06.39	M	10.2	AC	41	L	4	83					HAL
1987 07 06.97	S	10.6	AC	15.2	L	5	44	1.3	3			MOE
1987 07 08.98	S	10.8:	AC	15.2	L	5	44	& 1	3			MOE
1987 07 15.23	S	11.0	AA	31.8	L	4	63	2.0	2			KEE
1987 07 16.51	S	11.2	V	25.4	L	4	114	2	4			SEA
1987 07 17.59	S	11.3	VN	32	L	4	60	2	3			PEA
1987 07 18.26	M	10.7	AC	40.6	L	5	102		6			SCO01
1987 07 18.28	M	10.3	AC	41	L	4	83					HAL
1987 07 18.30	M	10.4	L	25	L	4	82					JAC01
1987 07 19.30	M	10.3	NP	25.6	L	4	67	3.5	4	0.10	100	MOR
1987 07 19.93	S	10.2	AC	30.5	L	5	47	2.5	4/			ZAN
1987 07 19.93	S	10.5	L	40.0	L	5	222	& 1.0	3/	&0.02	132	BOA
1987 07 20.42	S	10.9	L	31.7	L	5	86	& 1	1			JON
1987 07 20.92	S	10.7	L	40.0	L	5	222	& 1.0		&0.02	135	BOA
1987 07 25.29	M	10.4	AC	41	L	4	83					HAL
1987 07 25.37	M	11.1	AC	25.6	L	4	67	1.8	4	0.03	100	MOR
1987 07 25.60	S	11.8	VN	32	L	4	60	1	5			PEA
1987 07 25.61	S	11.5	VN	12.5	R	5	89					PEA
1987 07 25.72	S	11.7	AC	31	L	4	51	1	1			CLA
1987 07 26.28	M	10.8	AC	25.6	L	4	67	2.8	3/			MOR
1987 07 26.90	S	10.6	AC	30.5	L	5	47	3	4/			ZAN

Comet Sorrells 1986n [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 28.30	S	10.7	L	25	L	4	82					JAC01
1987 07 28.88	S	10.8	AC	30.5	L	5	47	3	4/			ZAN
1987 08 01.95	S	10.8	AC	30.5	L	5	47	3	4/			ZAN
1987 08 02.00	S	11.0	AC	40.6	L	4	57	2.5	3/			ZAN
1987 08 02.92	S	10.8	AC	30.5	L	5	47	3	4			ZAN
1987 08 04.38	S	10.6	L	25	L	4	82					JAC01
1987 08 12.85	S	11.1	AC	25.4	L	4	36	3	3			ZAN
1987 08 13.17	S	11.5	AC	41	L	4	83					HAL
1987 08 14.20	M	10.8	AC	40.6	L	5	102		3			SCO01
1987 08 15.23	S	11.7	AC	41	L	4	83					HAL
1987 08 15.86	S	11.1	AC	40.6	L	4	57	3	4/			ZAN
1987 08 16.25	M	11.5	NP	25.6	L	4	67	2.0	4			MOR
1987 08 17.19	M	10.9	AC	40.6	L	5	102		3			SCO01
1987 08 17.22	S	11.9	L	25	L	4	179	0.9	4/			JAC01
1987 08 19.28	S	11.5	L	25	L	4	179	1.1	3			JAC01
1987 08 19.90	B	12.3	AC	35.0	T	6	96	0.2	6			AMO
1987 08 20.21	S	11.4	L	25	L	4	82	1	2			JAC01
1987 08 23.16	S	11.9	NP	25.6	L	4	111	2.1	2/			MOR
1987 08 23.22	S	11.6	L	25	L	4	82					JAC01
1987 08 23.24	S	11.7	L	29	L	4	179					JAC01
1987 08 28.22	S	12.2	AC	41	L	4	83					HAL
1987 08 30.24	S	12.5	NP	25.6	L	4	111	1.7	2/			MOR
1987 08 31.20	C	14.9	FA	91.4	L	4		1.03	6	0.06	90	SCO02
1987 08 31.21	S	11.7	L	25	L	4	179	1.2	2			JAC01
1987 08 31.22	c	16.5	FA	91.4	L	4						SCO02

Comet Nishikawa-Takamizawa-Tago 1987c

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 01 22.04	S	8.0	AA	8.0	B		20	7	3			JAC01
1987 01 23.04	S	8.2	AA	5.0	B		10	6.5	2			JAC01
1987 01 23.04	S	8.4	AA	8.0	B		20	7	2			JAC01
1987 01 23.05	S	8.6	AA	6.0	R	13	32	2.6	3			JAC01
1987 01 26.03	S	7.9	AA	8.0	B		20	5	2			JAC01
1987 01 28.06	S	8.3	AA	8.0	B		20	4.5	0			JAC01
1987 02 01.00	S	8.9	AC	15	R	5	31	4	3			MOR03
1987 02 01.00	S	9.0	AC	15	R	5	62	3.4	3			MOR03
1987 02 02.05	S	8.2	AA	8.0	B		20	3	1			JAC01
1987 02 02.05	S	8.3	AA	15	S	4	22	2	0			JAC01
1987 02 03.05	S	8.6:	AA	15	S	4	22	2.2	0			JAC01
1987 02 03.05	S	8.7:	AA	25	L	4	46	3.4	1			JAC01
1987 02 11.01	S	8.6	AC	15	R	5	31	3	2			MOR03
1987 02 15.01	S	8.5	AC	15	R	5	31	2.5	2			MOR03
1987 02 17.01	S	8.4	AC	15	R	5	31	3	3			MOR03
1987 02 19.01 !	S	8.3	AC	15	R	5	31	3	3			MOR03
1987 03 29.77	S	7.2	AA	5.0	B		7	3				GAR01
1987 04 05.78	S	7.0	AA	5.0	B		10					GAR01
1987 04 06.79	S	7.0	AA	5.0	B		7					GAR01
1987 04 11.72	S	7.1	SC	4.5	R	6	13					JON
1987 04 12.73	S	7.1	SC	4.5	R	6	13					JON
1987 04 12.80	S	7.0	AA	5.0	B		7					GAR01
1987 04 16.74	S	7.6	SC	7.8	R	8	30					JON
1987 04 17.73	S	7.4	SC	7.8	R	8	30	3	3/			JON
1987 04 18.71	S	7.4	SC	4.5	R	6	13					JON
1987 04 23.74	S	7.2	SC	4.5	R	6	13					JON
1987 04 27.73	S	7.1	SC	4.5	R	6	13					JON
1987 04 29.44	S	7.0	AA	15	S	4	22					JAC01
1987 04 29.44	S	7.2	AA	25	L	4	82					JAC01

Comet Nishikawa-Takamizawa-Tago 1987c [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 04 29.44	S	7.5	AA	6.0	R	13	80					JAC01
1987 05 01.73	S	7.2	SC	4.5	R	6	13	5	4			JON
1987 05 02.70	S	7.3	SC	4.5	R	6	13	5				JON
1987 05 04.77	S	7.2	AA	7.5	R	7	20	11	4			HAS03
1987 05 05.75	S	7.4	SC	4.5	R	6	13	5				JON
1987 05 07.71	S	7.3	SC	4.5	R	6	13	6				JON
1987 05 08.71				31.7	L	5	86	4	2	?	255	JON
1987 05 08.71	S	7.3	SC	4.5	R	6	13	7	1			JON
1987 05 09.78	S	7.6	S	15	L	8	52	6	2			HAS03
1987 05 10.72				31.7	L	5	86		2		240	JON
1987 05 10.72	S	7.7	SC	4.5	R	6	13	5	1			JON
1987 05 12.75	S	8.2	S	7.8	R	8	30	5				JON
1987 05 23.54				15	L	5	54	8	2			GAR01
1987 05 23.54	S	7.0	AA	5.0	B		7		1			GAR01
1987 05 24.49	S	7.0	AA	5.0	B		7		1			GAR01
1987 05 25.72	S	6.4	SC	5.0	B		7					JON
1987 05 26.49				15	L	5	54	9	2			GAR01
1987 05 26.50	S	6.9	AA	5.0	B		7		0			GAR01
1987 05 29.47	S	8.3	S	7.8	R	8	30	5	0/			JON
1987 05 31.70	S	9.2	S	7.8	R	8	30	7	1			JON
1987 06 01.48				15	L	5	54	8	1			GAR01
1987 06 01.49	S	7.6	AA	5.0	B		7		0			GAR01
1987 06 01.85	S	8.5	S	7.8	R	8	30	7	0/			JON
1987 06 02.35	S	7.7	AA	5.0	B		7		0			GAR01
1987 06 14.25	B	8.8	AA	25	L	4	46	4	3			JAC01
1987 06 15.26	B	8.8	AA	25	L	4	46	4	4			JAC01
1987 06 16.22	B	8.9	AA	25	L	4	46					JAC01
1987 06 16.23	B	8.5:	AA	5.0	B		10					JAC01
1987 06 26.22	B	9.4	L	25	L	4	46					JAC01
1987 06 26.23	B	9.3	L	8.0	B		20	& 5	2			JAC01
1987 06 27.22	B	9.4	L	25	L	4	46	3.1	3/			JAC01
1987 06 27.22	B	9.8	L	29	L	4	250	1.9	5	0.03	135	JAC01
1987 06 28.22	B	9.4	L	25	L	4	46					JAC01
1987 06 28.24	B	9.7	L	29	L	4	250			&0.05	125	JAC01
1987 06 30.24	B	9.5	L	25	L	4	46					JAC01

Comet Bradfield 1987s

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 13.50	S	9.0	AA	12.5	R	5	30	2.5	6			PEA
1987 08 13.51	S	9.4	AA	31	L	4	31	3	6	0.08	114	CLA
1987 08 14.15	! S	9.1	AC	20.3	L	7	71		4			SCO01
1987 08 14.17	! S	9.7	NP	20	L	6	55					HAL
1987 08 14.31	S	9.4	S	31.7	L	5	86	1.4	3			JON
1987 08 14.48	S	9.2	S	12.5	R		27	5	3			MAC
1987 08 14.49	S	9.1	AA	12.5	R	5	30	4	6			PEA
1987 08 15.17	M	9.7	NP	20	L	6	55					HAL
1987 08 15.32	S	9.1	S	31.7	L	5	86					JON
1987 08 15.33	S	9.5	AA	31.7	L	5	86					JON
1987 08 15.44	S	8.8	AA	8.0	B		15	9	4	?	90	SEA
1987 08 15.45	S	9.3	AA	12.0	B		20	4	4			MCN
1987 08 15.49	S	9.0	AA	12.5	R	5	30	4	5/			PEA
1987 08 15.51	S	9.3	AA	31	L	4	31	5	6	0.16	116	CLA
1987 08 16.18	M	8.6	AA	8.0	B		20	6	3	0.10	90	MOR
1987 08 16.19	M	8.7	AA	25.6	L	4	45	3	5	0.10	90	MOR
1987 08 16.32	S	9.0	S	31.7	L	5	86	1.5	3			JON
1987 08 16.34	S	9.5	AA	31.7	L	5	86					JON
1987 08 16.51	S	9.3	AA	31	L	4	31	5	6	0.11	116	CLA

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 16.52	S	9.1	AA	12.5	R	5	30	4	6			PEA
1987 08 16.52	S	9.4	AA	32	L	4	60	4	6	0.07	115	PEA
1987 08 17.15 !	S	8.9	AC	20.3	L	7	71	9	5			SCO01
1987 08 17.16	S	8.8	S	15.2	L	3	16	8	1			KEE
1987 08 17.48	S	9.1	AA	12.5	R	5	30	4	6			PEA
1987 08 18.17 !	S	8.8	AC	15.2	L	8	44		4			SCO01
1987 08 18.47	S	9.0	AA	12.5	R	5	30	4.5	5		115	PEA
1987 08 19.15	S	9.0	S	15.2	L	3	16	8	1			KEE
1987 08 19.33	S	9.1	AA	7.8	R	8	30					JON
1987 08 19.34	S	9.4	S	31.7	L	5	86					JON
1987 08 19.34	S	9.6	AA	31.7	L	5	86	2	5			JON
1987 08 19.51	S	9.1	AA	31	L	4	31	6	6	0.19	116	CLA
1987 08 21.46	S	8.6	AA	8.0	B		15	6				SEA
1987 08 21.94	B	8.4	S	7.0	B		10	3.6				DEA
1987 08 22.05	I	8.9	S	8.0	B		20					GRE
1987 08 22.44	S	8.4	AA	8.0	B		15	6	4			SEA
1987 08 22.93	B	8.4	S	7.0	B		10	4.6				DEA
1987 08 23.18				25.6	L	4	45		6	0.33	112	MOR
1987 08 23.19	S	8.1	AA	8.0	B		20	12	3			MOR
1987 08 23.93	B	8.4	S	7.0	B		10					DEA
1987 08 24.06	O	8.8	S	20	L	6	92	5	6	0.17	105	CHE
1987 08 24.45	S	8.3	AA	8.0	B		15					SEA
1987 08 25.41	S	8.4	AA	8.0	B		15	4	5			SEA
1987 08 26.44	S	8.3	AA	8.0	B		15					SEA
1987 08 26.51	S	8.7	AA	31	L	4	31	7	6	0.55	119	CLA
1987 08 28.13 !	S	8.6	AC	15.2	L	8	44		4			SCO01
1987 08 28.15 !	M	9.3	NP	20	L	6	55					HAL
1987 08 28.51	S	8.6	AA	12.5	R	5	30	4.5	6	0.5	118	PEA
1987 08 30.17	S	8.7	AA	25.6	L	4	67	3.4	3			MOR
1987 09 10.42	S	7.8	AA	8.0	B		15	4	6			SEA
1987 09 10.50	S	8.4	AA	31	L	4	31	5	5	0.83	112	CLA
1987 09 11.11				41	L	4	83			>0.33	140	HAL
1987 09 11.11	M	8.0	NP	5	B		10					HAL
1987 09 11.14 !	S	8.3	AC	15.2	L	8	38		4			SCO01
1987 09 11.42	S	7.5	AA	8.0	B		15	5	6	&0.2	100	SEA
1987 09 12.49	S	8.2	AA	31	L	4	31	7	6	1.05	118	CLA
1987 09 13.33				31.7	L	5	86	1.5	4			JON
1987 09 13.33	S	7.9	SC	4.5	R	6	13					JON
1987 09 13.42	S	7.5	AA	8.0	B		15					SEA
1987 09 14.41	S	7.4	AA	8.0	B		15					SEA
1987 09 14.72	S	7.9	AA	13	R	4	21	3.8	5			CAM
1987 09 15.34				31.7	L	5	86	1.5	5	0.25	120	JON
1987 09 15.34	S	7.5	SC	4.5	R	6	13		3			JON
1987 09 16.12				41	L	4	83			>0.33	115	HAL
1987 09 16.12 !	M	8.1	NP	5	B		10					HAL
1987 09 18.33				31.7	L	5	86	2	6	0.1	115	JON
1987 09 18.33	S	7.4	SC	4.5	R	6	13		3			JON
1987 09 19.35	S	7.9	A	4.5	R	6	13		2			JON
1987 09 19.41	S	7.3	AA	8.0	B		15		5			SEA
1987 09 20.12				41	L	4	83			>0.33	110	HAL
1987 09 20.12 !	M	7.9	NP	5	B		10					HAL
1987 09 21.43	S	7.3	AA	8.0	B		15		5			SEA
1987 09 21.78	S	6.7	SC	5.0	B		10	7		?	115	BOA
1987 09 22.11	M	7.7	S	31.8	L	4	33	2.5	3	0.13	120	KEE
1987 09 22.12	M	7.6	S	4.0	B		8					KEE
1987 09 23.41	S	6.9	AA	8.0	B		15	7	6	0.6	115	SEA
1987 09 24.03	O	7.6	S	20	L	6	92	5	7	&0.20	120	CHE
1987 09 24.11	M	7.6	AA	4.0	B		8	7	2			KEE

Comet Bradfield 1987s [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 25.11	M	8.0	S	31.8	L	4	33	3	2	0.20	110	KEE
1987 09 25.93	B	7.6	S	7.0	B		10	4.6		0.7	105	DEA
1987 09 26.02	O	7.3	S	20	L	6	92	7	7	0.25	115	CHE
1987 09 27.35				31.7	L	5	86	2	5	?0.25	105	JON
1987 09 27.35	S	7.2	SC	4.5	R	6	13					JON
1987 09 27.77	S	6.7	AA	8.0	B		20	7	5	0.42	90	ZAN
1987 09 27.78	S	6.8	AA	25.4	L	4	36	5	6	0.42	90	ZAN
1987 09 29.33	S	7.1	SC	4.5	R	6	13					JON
1987 09 30.78	S	7.2	S	10.0	B	8	14	2.6	5			HAS02
1987 10 01.35	S	7.0	SC	4.5	R	6	13					JON
1987 10 03.34				31.7	L	5	86	1.5	7			JON
1987 10 03.34	S	7.0	SC	4.5	R	6	13					JON
1987 10 04.09	K	7.1	AA	4.0	B		8	3	2			KEE
1987 10 09.77	S	6.6	A	14.0	S	4	25	9	6			LIN02
1987 10 11.96	B	7.1	AA	8.0	B		20	& 6	8			GRE
1987 10 11.96	M	6.4	AA	8.0	B		20					GRE
1987 10 11.96	S	6.4	AA	8.0	B		20	& 6	8	&0.5	100	GRE
1987 10 13.99	S	6.4	AA	8.0	B		20	& 5	7			GRE
1987 10 14.05	O	6.9	S	14	S	4	29	10		0.33	95	CHE
1987 10 14.97	S	6.4	AA	8.0	B		20	& 6	7			GRE
1987 10 15.97	S	6.3	AA	8.0	B		20	& 4.5	7/			GRE
1987 10 16.02	O	6.4	S	5.0	B		7			1	95	CHE
1987 10 16.97	S	6.3	AA	8.0	B		20	& 4	7			GRE

Comet Rudenko 1987u

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 21.24	S	9.9	AA	25.6	L	4	45	3.3	2			MOR
1987 08 22.11	S	9.0	S	20.3	L	6	38	& 4.5	0			GRE
1987 08 22.12	S	10.0	AA	20.3	L	6	38	& 4.5	0			GRE
1987 08 23.23	M	9.8	AA	25.6	L	4	45	3.5	3			MOR
1987 08 23.24	S	9.8	AA	8.0	B		20	5.0	2			MOR
1987 08 25.83	S	9.6	S	10.0	B		14	2.1	4			HAS02
1987 08 26.16	S	10.1:	NP	20	L	6	55					HAL
1987 08 28.14	S	9.8	AC	15.2	L	8	44		2			SCO01
1987 08 28.20 !	S	9.9	NP	20	L	6	55					HAL
1987 08 28.84	M	10.1	AA	19	T	4	38	4	5			MIK
1987 08 29.82	S	9.9	AC	15.2	L	5	44	2	2			MOE
1987 08 30.20	M	9.8	NP	25.6	L	4	67	2.9	3			MOR
1987 08 30.81	M	10.5	AA	19	T	4	38	3.8	5			MIK
1987 08 30.85	S	9.2	AC	8.0	B		20	2.1	5			HAS02
1987 08 31.16	c	17.3	FA	91.4	L	4						SCO02
1987 08 31.81	S	9.7	AC	15.2	L	5	44	2	3			MOE
1987 08 31.89	O	9.8	A	25	L	6	120	4	4			AND01
1987 09 03.87	O	9.8	A	25	L	6	90	4	5			AND01
1987 09 11.13	M	8.6	AC	41	L	4	83					HAL
1987 09 15.82	S	8.7	AA	15.5	L	5	25	4	5			ZAN
1987 09 16.81	O	8.7	A	15	L	5	30	5	5			AND01
1987 09 20.11 !	M	8.1	AC	41	L	4	83					HAL
1987 09 21.77	O	8.5	A	15	L	5	30	4	6			AND01

Comet Levy 1987y

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 10 11.13	S	9.5	AC	20.3	L	7	44	3		?		LEV
1987 10 12.08	S	9.3	AC	20.3	L	7	44	3	3	?		LEV
1987 10 16.00	O	9.3	S	14	S	4	29					CHE

Periodic comet Encke

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 24.34	S	7.1	AA	15	L	5	54	1	8			GAR01
1987 07 24.36	S	6.9	AA	6.3	B		9					MCN
1987 07 24.45	S	7.6	AA	32	L	4	60	1.2	6			PEA
1987 07 25.34	S	7.0	AA	15	L	5	54		8			GAR01
1987 07 25.36	S	7.3	AA	6.3	B		9		8			MCN
1987 07 25.45	S	7.7	AA	32	L	4	60	1	6			PEA
1987 07 25.90	B	6.9	S	7.0	B		10					DEA
1987 07 26.35	S	7.1	AA	15	L	5	54		8			GAR01
1987 07 26.36	S	7.4	AA	6.3	B		9	& 1	8			MCN
1987 07 26.45	S	7.6	AC	31	L	4	31	1	7			CLA
1987 07 26.45	S	7.7	AA	12.5	R	5	31		5			PEA
1987 07 26.90	B	7.1	S	7.0	B		10					DEA
1987 07 29.34	S	7.5:	AA	8.0	B		15					SEA
1987 07 29.45	S	7.8	AA	12.5	R	5	31	2	5			PEA
1987 07 31.35	S	7.7	AA	8.0	B		15					SEA
1987 08 01.35	S	7.9	AA	8.0	B		15	& 1	7			SEA
1987 08 02.46	S	8.6	AA	12.5	R	5	31	2	5/			PEA
1987 08 02.47	S	7.9	AC	31	L	4	31	1.5	5			CLA
1987 08 03.46	S	8.6	AA	12.5	R	5	31	1.8	5			PEA
1987 08 11.49	S	9.2	AA	12.5	R	5	30	3.5	3			PEA
1987 08 13.47	S	9.3	AC	31	L	4	31	5	2			CLA
1987 08 13.48	S	9.3	AA	12.5	R	5	30	4	3			PEA
1987 08 14.48	S	9.4	AA	12.5	R	5	30	4	3			PEA
1987 08 15.48	S	9.5	AA	12.5	R	5	30	3.5	3			PEA
1987 08 15.48	S	9.5	AC	31	L	4	31	4	3			CLA
1987 08 16.49	S	9.6	AA	12.5	R	5	30	4	2			PEA
1987 08 16.49	S	9.6	AA	32	L	4	60	4	2			PEA
1987 08 16.49	S	9.6	AC	31	L	4	31	4	3			CLA
1987 08 17.48	S	9.6	AA	12.5	R	5	30	4	2			PEA
1987 08 18.13	I[	8 :	AC	20	L	6	55					HAL
1987 08 18.47	S	9.7	AA	12.5	R	5	30	4	2			PEA
1987 08 19.33	S	9.7	S	31.7	L	5	86	1.5	1			JON
1987 08 19.48	S	9.8	AC	31	L	4	31	4	2			CLA
1987 08 26.48	S	10.3	AA	31	L	4	31	2	0			CLA
1987 08 28.13	I[	10 :	AC	41	L	4	83					HAL
1987 08 28.48	S	10.4	AA	20.3	L	5	50	3				PEA

Periodic comet Grigg-Skjellerup (1986m)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 06 29.13	S	12.1	AC	44.5	L	4	167	1.7	1			MOR03
1987 06 30.19	S	11.5	AC	41	L	4	83					HAL
1987 07 15.19	S	11 :	AA	31.8	L	4	150	1.7	2			KEE
1987 07 18.18	S	11.6	AC	41	L	4	83					HAL
1987 07 18.22	S	12.1	AC	40.6	L	5	102		2			SCO01
1987 07 19.18	S	12.4	NP	40.6	L	5	102					SCO01
1987 07 19.25	S	12.1	NP	25.6	L	4	67	3.3	0/			MOR
1987 07 25.19	S	12.1	AC	41	L	4	83					HAL
1987 07 26.21	S	12.4	NP	25.6	L	4	67	2.7	1			MOR
1987 08 15.19	I[	13.0	AC	41	L	4	83					HAL
1987 08 18.16	C	16.4	FA	91.4	L	4			7	0.01	102	SCO02
1987 08 18.20	c	19.3	FA	91.4	L	4			7	0.01	102	SCO02
1987 08 19.97	B	13.1	AC	35.0	T	6	96	0.01	8			AMO
1987 09 27.12	C	17.1	FA	91.4	L	4						SCO02

Periodic comet du Toit-Hartley (1986q)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 05 25.17	C	17.4	FA	91.4	L	4			6	0.02	97	SCO02

Periodic comet Kohoutek (1986k)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 20.47		I[13.5	AC	41	L	4	244					HAL
1987 09 27.43		C 17.1	FA	91.4	L	4						SCO02

Periodic comet Borrelly (1987p)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 25.77		S 13.7	AC	31	L	4	51	0.5	1			CLA
1987 07 25.82		S 13.8	VN	32	L	4	113	0.5	3			PEA
1987 08 28.47	!	S 12.5	PC	41	L	4	83					HAL
1987 09 02.48		S 12.5	AC	41	L	4	183					HAL
1987 09 02.83		S 11.0	AC	31	L	4	31	2	4			CLA
1987 09 20.45	!	M 12.1	PC	41	L	4	83		3/			HAL
1987 09 23.41	!	S 11.5	AC	31.8	L	4	150	1.0	1			KEE
1987 09 23.70		S 12.9	VN	31.7	L	5	86	& 0.5	1			JON
1987 09 24.70		S 12.4	VN	31.7	L	5	86	& 0.5	1/			JON
1987 09 25.70		S 12.3	VN	31.7	L	5	86	& 0.5	1			JON
1987 09 28.70		S 12.1	VN	31.7	L	5	86	& 1	1/			JON
1987 09 29.69		S 12.1	VN	31.7	L	5	86	1	2			JON
1987 09 30.70		S 12.0	VN	31.7	L	5	86	1.0	2			JON
1987 10 01.38	!	S 11.3	AC	31.8	L	4	150	1.0	2			KEE
1987 10 01.68		S 11.9	VN	31.7	L	5	86	1.5	5			JON
1987 10 02.67		S 11.8	VN	31.7	L	5	86	1.5	4			JON
1987 10 03.68		S 11.8	VN	31.7	L	5	86	1.5	6			JON

Periodic comet Forbes (1986g)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 01.45		C 18.6	FA	91.4	L	4			8	0.05	247	SCO02
1987 09 01.45		c 20.5	FA	91.4	L	4						SCO02
1987 09 20.44		C 18.8	FA	91.4	L	4				>0.06	251	SCO02

Periodic comet Reinmuth 2 (1987l)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 22.37		C 15	FA	91.4	L	4						SCO02
1987 07 25.34		S 13.5	AC	41	L	4	244					HAL
1987 08 16.23		S 13.6	AC	41	L	4	244					HAL
1987 08 16.26		S 13.5	NP	25.6	L	4	156	1.0	3			MOR
1987 08 23.32		S 13.3	NP	25.6	L	4	156	1.0	3			MOR
1987 08 28.29		S 13.5	AC	41	L	4	244					HAL
1987 08 31.23		c 17.2	FA	91.4	L	4						SCO02
1987 08 31.25		C 15.7	FA	91.4	L	4						SCO02

Periodic comet Harrington (1987n)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 22.33		C 15.6	FA	91.4	L	4			6	0.02	265	SCO02
1987 08 18.17		I[13.5	AC	41	L	4	244					HAL
1987 08 18.24		C 15.5	FA	91.4	L	4						SCO02
1987 08 18.24		c 18.1	FA	91.4	L	4						SCO02
1987 08 28.25		I[13.5	AC	41	L	4	244					HAL
1987 09 13.14		I[13.0	AC	41	L	4	244					HAL
1987 09 19.16		I[13.5	AC	41	L	4	244					HAL

Periodic comet West-Kohoutek-Ikemura (1987x)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 27.48		C 17	FA	91.4	L	4				0.02	291	SCO02

Periodic comet Wild 3 (1987e)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 22.17	C	18.1	FA	91.4	L	4			7	0.01	110	SCO02

Periodic comet Howell (1987h)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 06 29.45	S	13.3:	AC	41	L	4	244					HAL
1987 06 30.45	S	12.9	AC	41	L	4	83					HAL
1987 06 30.45	S	13.2	AC	41	L	4	244		1/			HAL
1987 07 01.45	S	13.0	AC	41	L	4	83					HAL
1987 07 06.45	S	12.9	AC	41	L	4	83		1/			HAL
1987 07 25.43	S	12.7	AC	41	L	4	83					HAL
1987 07 25.74	S	12.9	AC	31	L	4	51	2	1			CLA
1987 07 25.77	S	12.8	VN	32	L	4	60	2	1			PEA
1987 07 26.43	S	12.5	NP	25.6	L	4	67	3.4	1			MOR
1987 08 01.47	S	12.8	AC	41	L	4	83		1/			HAL
1987 08 22.05	S	12.7	L	40.0	L	5	333	& 0.29	2			BOA
1987 08 28.44	S	12.9	AC	41	L	4	83					HAL
1987 09 01.36	c	17.6	FA	91.4	L	4						SCO02
1987 09 01.37	C	15.4	FA	91.4	L	4			6	>0.16	244	SCO02
1987 09 23.39	S	13.7	AC	31.8	L	4	150	1.0	1			KEE
1987 10 01.36	S	13.8	AC	31.8	L	4	150	1.0	0			KEE

Periodic comet Brooks 2 (1987m)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 22.41	C	16.8	FA	91.4	L	4			8	0.03	246	SCO02
1987 08 01.44	I[	13.5	AC	41	L	4	244					HAL
1987 08 17.29	S	12.8:	NP	40.6	L	5	102		2			SCO01
1987 08 28.42	I[	13.5	AC	41	L	4	244					HAL
1987 08 30.48	S	14.2	AC	41	L	4	244					HAL
1987 08 31.26	C	16.1	FA	91.4	L	4						SCO02
1987 08 31.27	c	17.8	FA	91.4	L	4				0.09	248	SCO02
1987 08 31.38	S	14.2	AC	41	L	4	244					HAL
1987 09 17.33	S	13.6	AC	41	L	4	244					HAL
1987 09 20.40	M	13.5	AC	41	L	4	244		5			HAL
1987 09 23.38	S	13.9	AC	31.8	L	4	150	0.8	0			KEE
1987 10 01.34	S	12.5	AC	31.8	L	4	150	0.8	1			KEE
1987 10 12.14	S	13.1	AC	31.7	L	4	150	1.0	1			KEE

Periodic comet Reinmuth 1 (1987r)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 23.44	C	19.6	FA	91.4	L	4			7			SCO02
1987 08 17.44	C	19.6	FA	91.4	L	4			6			SCO02
1987 09 27.39	C	18.3	FA	91.4	L	4				0.01	262	SCO02
1987 09 27.42	c	19.7	FA	91.4	L	4						SCO02

Periodic comet Jackson-Neujmin (1987t)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 18.47	C	18.3	FA	91.4	L	4		0.32				SCO02

Periodic comet Halley (1982i)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 11 27.44	S	12.8	AC	44.5	L	4	167	0.6	0			MOR03
1986 11 30.44	S	12.8	AC	44.5	L	4	167	1.0	1			MOR03
1986 12 08.44	S	13.3	AC	44.5	L	4	167	0.7	0			MOR03

Periodic comet Halley (1982i) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1986 12 13.45	S	12.7	AC	44.5	L	4	167	0.8	3			MOR03
1987 01 08.38	S	13.7	AC	44.5	L	4	167	0.7	1			MOR03
1987 02 05.32	S	13.9	AC	44.5	L	4	167	0.4	0			MOR03
1987 02 20.22	S	14.0	AC	44.5	L	4	167	0.5	0			MOR03
1987 02 21.22	S	14.0	AC	44.5	L	4	167	0.7	0			MOR03
1987 02 21.26	S	12.2	L	25	L	4	82	& 1	0			JAC01
1987 02 22.30	S	12.2	L	25	L	4	82	1	0			JAC01
1987 02 24.26	S	14.0	AC	44.5	L	4	167	0.9	0			MOR03
1987 02 27.31	S	12.5	L	29	L	4	144	1.2	0			JAC01
1987 03 02.34	S	12.5	L	29	L	4	144	0.9	0			JAC01
1987 03 03.32	S	12.5	L	29	L	4	144	1	0			JAC01
1987 03 05.30	S	12.6	L	29	L	4	144	0.9	0			JAC01
1987 03 07.26	S	12.4	L	29	L	4	144	0.9	0			JAC01
1987 03 08.39	S	12.5	L	29	L	4	144	0.9	0			JAC01
1987 03 21.48	S	12.5	L	29	L	4	144	0.8	0			JAC01
1987 03 29.91	S	12.3	A	20.5	L	6	38	& 3	1			WEG
1987 03 30.84	S	12.3	A	25.4	J	6	73	& 3	1/			BUS01
1987 03 31.23	S	12.8	L	29	L	4	144	0.7	0			JAC01
1987 03 31.24	S	12.9	L	29	L	4	89	0.9	0			JAC01
1987 04 05.27	S	12.8	L	29	L	4	144	0.7	1/			JAC01
1987 04 16.20	S	13.0	L	29	L	4	144	0.7	1/			JAC01
1987 04 17.20	S	13.1	L	25	L	4	179					JAC01
1987 04 21.89	S	12.6	A	20.5	L	6	38	2.5	0/			WEG
1987 04 25.22	S	12.9	L	25	L	4	179		3			JAC01
1987 04 28.89	S	12.8:	A	20.5	L	6	38	& 2.5	0			WEG
1987 04 28.90	S	12.5:		30.0	L	5	62					SCH04
1987 05 15.19	M	13.4	L	25	L	4	179					JAC01
1987 05 29.20	M	13.4:	L	29	L	4	288					JAC01
1987 05 29.20	M	13.5:	L	25	L	4	179					JAC01

Periodic comet Schwassmann-Wachmann 1

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 06 29.37	I	[14.0	AC	41	L	4	244					HAL
1987 07 06.36	I	[14.0	AC	41	L	4	244					HAL
1987 07 25.34	I	[13.5	AC	41	L	4	244					HAL
1987 08 16.26	I	[13.0	AC	41	L	4	244					HAL
1987 08 18.20	I	[13.5	AC	41	L	4	244					HAL
1987 08 28.31	I	[13.5	AC	41	L	4	244					HAL
1987 09 02.36	I	[13.0	AC	41	L	4	244					HAL
1987 09 13.19	I	[13.0	AC	41	L	4	244					HAL
1987 09 17.26	I	[13.0	AC	41	L	4	244					HAL

Periodic comet Klemola (1987i)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 07 01.41	S	13.2	AC	41	L	4	83					HAL
1987 07 01.41	S	13.2	AC	41	L	4	244					HAL
1987 07 02.81	S	12.9	VN	32	L	4	113	0.8	2			PEA
1987 07 06.43	S	13.1	AC	41	L	4	83					HAL
1987 07 19.31	S	12.8	AC	40.6	L	5	102		2			SCO01
1987 07 25.39	S	13.0	AC	41	L	4	83					HAL
1987 07 25.40	S	12.8	NP	25.6	L	4	156	1.3	2/			MOR
1987 07 26.38	S	12.8	NP	25.6	L	4	111	1.4	2			MOR
1987 08 01.41	S	12.8	AC	41	L	4	83		4/			HAL
1987 08 02.06	S	12.0	EC	40.6	L	4	73	2	3/			ZAN
1987 08 17.37	C	14.9	FA	91.4	L	4			7	>0.12	242	SCO02
1987 08 17.37	c	17.1	FA	91.4	L	4						SCO02

Periodic comet Klemola (1987i) [cont.]

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 19.93	B	13.4	AC	35.0	T	6	96	& 0.01	8			AMO
1987 08 23.34	S	12.4	NP	25.6	L	4	111	1.4	2			MOR
1987 08 24.60	S	12.5	V	25.4	L	4	88	& 2	3			SEA
1987 08 26.77	S	12.7	AC	31	L	4	31	2	2			CLA
1987 08 28.35	S	12.6	AC	41	L	4	83					HAL
1987 08 29.78	S	12.6	AC	31	L	4	51	1.5	1			CLA
1987 08 30.32	S	12.4	NP	25.6	L	4	111	1.4				MOR
1987 09 02.38	M	12.6	AC	41	L	4	83		5			HAL
1987 09 02.81	S	12.6	AC	31	L	4	51	1.5	1			CLA
1987 09 17.30	S	12.7	AC	41	L	4	244					HAL
1987 09 23.36	S	12.4	AC	31.8	L	4	63	1.2	2			KEE
1987 10 01.33	S	12.9	AC	31.8	L	4	150	1.0	0			KEE
1987 10 12.15	S	13.3	AC	31.7	L	4	150	0.8	1			KEE

Periodic comet Gehrels 1 (1987v)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 08 31.48	C	17.1	FA	91.4	L	4			6	0.02	262	SCO02

Periodic comet Helin (1987w)

DATE (UT)	MM	MAG.	RF	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1987 09 27.30	C	17.5	FA	91.4	L	4						SCO02

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BOOK REVIEWS

Physics of Comets

K. S. Krishna Swamy. Hardbound, 273 pp., US$28.00 (1986, World Scientific Publishing Co., P.O. Box 128, Singapore 9128). [ISBN 9971-978-18-0]

Physics of Comets is another attempt to produce a textbook on the subject of comets. In his "Preface", the author states: "There is a good account about comets in the recent book by Brandt and Chapman and also in the proceedings of conferences. However, I felt the need for a textbook in which the basic physical principles pertaining to various cometary phenomena is discussed." Krishna Swamy's new book is broader in scope than Brandt and Chapman's *Introduction to Comets* (reviewed in *ICQ* **4**, 101), and perhaps better organized. But both books were too hastily written/published.

Physics of Comets appears to be a very good *first draft* to a book — a lot of the right ideas are there, and many of the topics receive good discussion. But it is obvious that Krishna Swamy's first language is *not* English, as the grammar and sentence structure is worse than poor: too often, it is unclear what the author is trying to say (both from the poor English and from poor, ambiguous, and unstructured outlining of ideas and concepts). On page 57, we find more than one ambiguous point in the following: "The molecular bands first to appear are those of CN at $r \sim 3$ au followed by the emission from C_3 and NH_2 at about $r > 2$ au. For $r < 1.5$ au the emissions from C_2, OH, NH and CH appear in the spectrum. They are often strong enough to reveal their structure." Many simple, basic terms are defined, but no definition of "partition functions" can be found despite its prominent mention on page 37. Other typical sentences: "The comets are believed to be the members of the solar system which is deduced from the observed orbital characteristics of comets" (p. 20); "The declination is the angular distance from the north to the south of the celestial equator" (p. 22).

There is inconsistent use of symbols: for example, μ is used as units and variables without distinction or definition. In short, I am amazed that this book made it into print, with an average of perhaps 5 or 6 typographical and grammatical errors per page. The typesetting job is neat, however. Each chapter ends with some problems for the student, followed by a list of references for further reading. The reference lists are incomplete and far too short. The book has many figures, mostly graphs taken from other publications (sometimes not even from original sources). The few photographs are reproduced very poorly.

Various chapters in *Physics of Comets* discuss orbital dynamics, spectroscopy, gas production rates, dust particle physics, tail structure, and cometary origin. The observation and theory of the coma are discussed in detail, while the other topics receive much less (often too little) attention.

My recommendation for an appropriate textbook on comets would be to have 4 or 5 authors working together (each specializing in areas including spectrophotometry of comets, discovery circumstances and orbital aspects concerning comets, plasma physics and solar wind interactions, the physical chemistry of the nucleus and coma, cometary dust,

meteroids, and other dynamical problems), and starting with *Introduction to Comets* and *Physics of Comets* as rough first drafts. This would help assure that the correct balance is included in a proper overall review of the study of comets. And now all the information learned from the current return of P/Halley can be added to such a book!

— Daniel W. E. Green

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Dust in Space and Comets

G. E. Morfill, C. T. Russell, and M. S. Hanner, Eds. *Advances in Space Research*, Vol. 4, No. 9, 316 pp., paperbound, £31.00/US$54.00 (1985, Pergamon Press, Ltd., Headington Hill Hall, Oxford OX3 0BW, England). [ISBN 0-08-032745-1]

Published proceedings from comet conferences have been quite bountiful during the last few years, and several more will appear during the next 2–3 years based on our greatly expanded knowledge of comets following P/Halley's recent return to perihelion. *Dust in Space and Comets* represents the proceedings of the Committee on Space Research (COSPAR) Interdisciplinary Scientific Commission B Meetings held in Graz, Austria, in June and July 1984. The volume is divided into two parts, "Dust-Magnetosphere Interactions" and "Halley Update", and this review concentrates on the latter section. The former section contains mostly articles concerning the rings of the Jovian planets, and also a few papers with titles such as "Charges on Dust Particles".

The second half of *Dust in Space and Comets* is divided into two sections, "Physical Processes in Comets" and "Planned Observations of Halley", with the latter section containing now-outdated descriptions of planned observations of P/Halley by spacecraft, rocket, and radio, interrupted by Jürgen Rahe's very brief history of P/Halley observations.

The first comets section includes a lengthy discussion by Michel Festou of carbon abundances, and a review by Paul Feldman on ultraviolet spectroscopy, in/of cometary comae. Feldman concentrates on results obtained from *IUE* observations of the two close-approaching comets in 1983 and P/Encke in 1980 and 1984. Unexpectedly, the derived H_2O production rates for P/Encke (from observed OH emission) show little or no asymmetry from pre- to post-perihelion — quite unlike the comet's visual lightcurve. In another paper, Ray Newburn discusses results from his revised semi-empirical photometric theory (first published in 1979); as a basis, he uses visual m_1 data published in the *ICQ*. The remaining papers in this section review dust properties, thermal modelling, and plasma processes in comets. The papers in this section still have value after the "P/Halley era", though Pergamon Press should be urged to cut its prices in half (or more!) for such volumes as *Dust in Space and Comets.* — Daniel W. E. Green

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Dynamics of Comets: Their Origin and Evolution

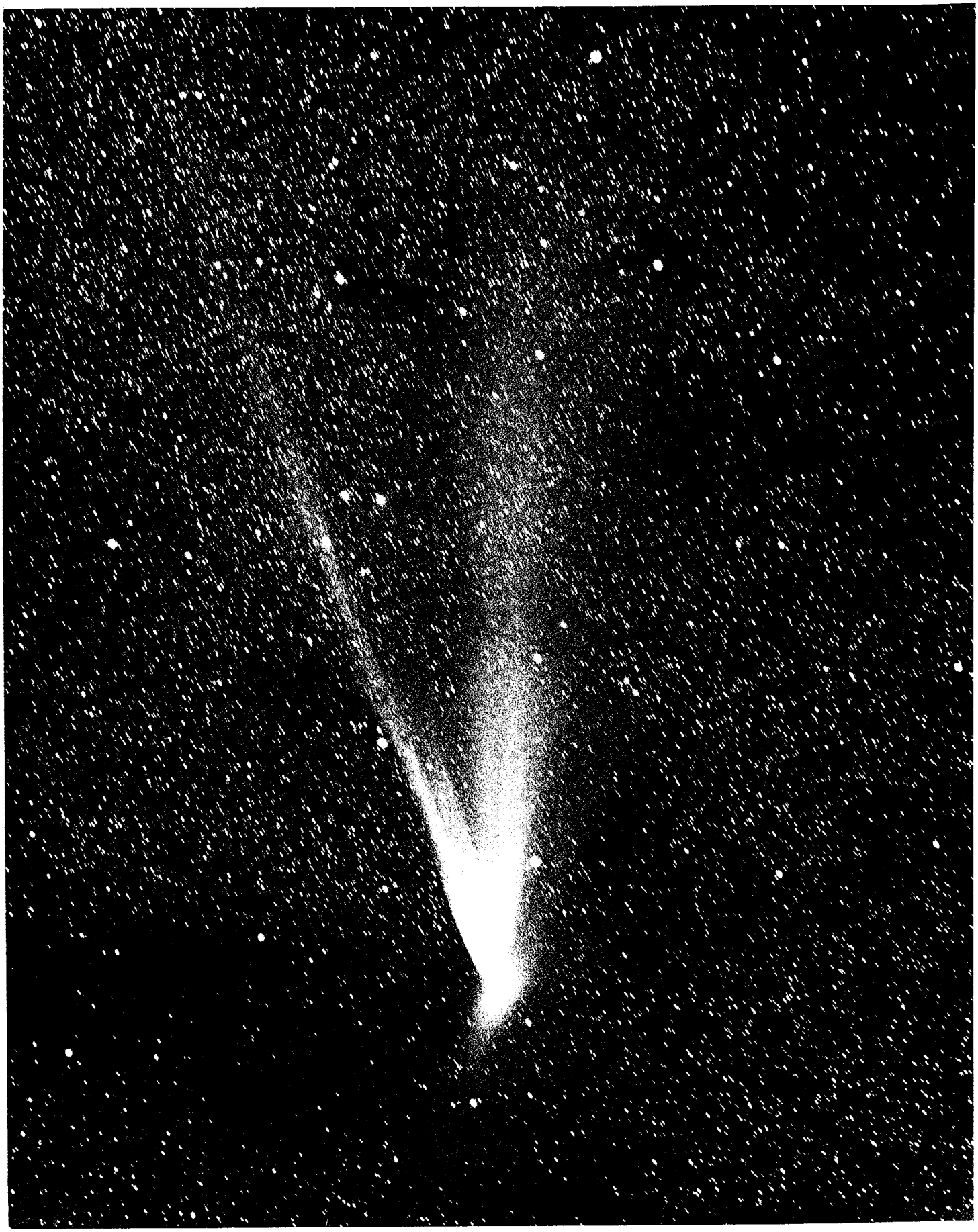
Andrea Carusi and Giovanni B. Valsecchi, Eds., 450 pp. clothbound, US$59.50 (1985, D. Reidel Publ. Co., P.O. Box 989, 3300 AZ Dordrecht, The Netherlands). [ISBN 90-277-2047-9]

This book represents the Proceedings of the 83rd Colloquium of the International Astronomical Union, held in Rome during 1984 June 11-15, and includes 36 papers; 64 scientists from 16 countries attended the meeting. The papers are separated into seven sections, the titles of which give a good idea of the book's content: Origin of Comets, The Oort Cloud of Comets, Meteor Streams and Interrelations with Minor Planets, Dynamics of Comets: Numerical Modelling, Dynamics of Comets, Nongravitational Forces, and Comet Halley and Future Missions to Comets. At the book's end are subject and name (*i.e.*, author) indices and a listing of participants (with postal addresses). Many of the papers in the book are followed by a discussion which followed the oral paper readings at the meeting, and these discussions are often very interesting and highly informative; an index to scientists who contributed to the discussions may be found at the end of the book.

The editors state in their Preface that previous meetings concerning comets that were held in the 1970s and early 1980s "emphasized the physical aspects, and did not cover satisfactorily matters related to dynamics, origin, and early evolution. . . . It was therefore felt necessary to organize a meeting centered on the dynamics, a field which still comprises such a large fraction of all [that] is known about comets." The content of *Dynamics of Comets* attests to the success of the organizers/editors in their venture. Several invited papers provide updated reviews along the lines of the section headings mentioned above.

In many conference proceedings, one will find papers which are nearly identical to other papers (written by the same authors) presented at other conferences and published in other volumes. Perhaps because of the usefulness and timeliness of this particular colloquium, there is much original and unique material in *Dynamics of Comets* which will not be easily found elsewhere. Edgar Everhart discusses "An Efficient Integrator that Uses Gauss-Radau Spacings" which calculates orbital elements over long periods of time using variable step sizes to allow high orders of accuracy with relatively few function evaluations — a very useful technique when considering comets. In Brian Marsden's review concerning nongravitational forces, his Table I conveniently lists the status, by comet, of investigations into these forces; 12 short-period comets are listed as having no nongravitational effects, and 7 such objects are listed as having "significantly increasing or wild nongravitational effects" (4 of which have apparently disappeared). In his paper titled "The Selection of Comets for Future Space Missions", Donald Yeomans discusses problems to be concerned with in choosing a comet for a spacecraft rendezvous, and lists 10 comets listed as potential targets for such a mission. One of the longest and best written papers is Hans Rickman's "Interrelations Between Comets and Asteroids", which discusses the problems associated with trying to link these two groups together; Rickman devotes a whole section to the puzzling nature of P/Schwassmann-Wachmann 1.

I can highly recommend *Dynamics of Comets: Their Origin and Evolution* as a source of many good discussions on this wide-ranging topic. — Daniel W. E. Green



— Comet Seki-Lines 1962 III —

The photographs at left (p. 174) and above were both taken by well-known astrophotographer Alan McClure from Frazier Mountain (elevation 7300 feet) in California, using a 5.5-inch $f/5$ Zeiss triplet aerial lens and panchromatic plates. The photograph at left is a 15-min exposure beginning on 1962 Apr. 23 at 4^h25^m UT. The view above is a 10-min exposure on Apr. 10 UT, when a 5-day-old moon was in the sky and two airplanes passed across the field. These photographs and the cover photo were supplied courtesy of Dennis Milon, *Sky and Telescope*, and of the photographers.

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ICQ COMET REPORT FORM

On page 176 we again publish the standard *ICQ* comet report form. We ask that all observers use this form to expedite the processing and publication of data; photocopies of this form should be made by the contributor (though we will supply, at $0.10 per copy, extra copies to individuals who lack access to a photocopy machine).

There are four major points which we would like to stress to contributors concerning this form, based on recurring problems:

• *Standard Abbreviations.* Very often the *ICQ*-adopted abbreviations (for magnitude method, for instrument type, and for reference) are not used. Contributors should obtain a complete copy of the Key to Abbreviations used in the *ICQ*, available for $4.00 postpaid from the Editor. It is helpful is observers provide their 3-letter, 2-digit *ICQ* name abbreviation along with their full name. Also, some contributors fail to use the *ICQ* conventions for time (include *year* on each form, write out the month, and give the time to 0.01 day in decimals of a day), and units of instrument aperture (always give in cm).

• *Significant figures and proper units.* Contributors sometimes do not use the proper units for coma diameter and tail length (always give in arcmin and degrees, respectively; give to 0.01 arcmin and 0.01 degree, if necessary, *but do not give insignificant figures*). Also, if coma diameter measurement is known to worse than ± 0.3 arcmin, always provide an approximate (~) sign.

• *Illegible handwriting.* Too many times the figures are illegible; the contributor should type or print very neatly and should provide originals (not copies) of each form.

• *Accuracy of data.* Contributors are often too hasty in filling out report forms, leading to very noticeable errors of all kinds (such as obvious mistakes in instrumentation or time information). We worry about the non-obvious mistakes (and the obvious mistakes which we miss) which might be avoided if more time and care is spent in preparing the forms before they are sent to the *ICQ* for publication. Please check and re-check *all* data before mailing the completed report forms to the *ICQ*; we'd rather have accurate forms a year later than have inaccurate forms sent promptly.