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# COMET

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Photograph of comet Bennett 1969i as it passed through the Milky Way in Cygnus (Deneb and North American nebula are near the right) on 1970 April 12 (12.5-min exposure beginning at 12:16 UT). Photograph taken by Alan McClure from Mount Piños, California, using a blue-sensitive plate and a Voigtlander f/2.8 lens of 105-mm focal length. P/Halley may have its tail somewhat obscured or outshined by the southern Milky Way in a similar manner next April.

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Manuscripts will be reviewed for possible publication; send typed, double-spaced copy to the Editor (Cambridge address above). 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.

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## CHASE 1986

### Comet Halley American Southern (Hemisphere) Expedition

### Australia

*Catch the best views of the most famous of comets, P/Halley, from one of two expeditions to Australia. The tours, lasting from 14 to 16 days (leaving the United States during the first week in April 1986), will be led by such well-known comet experts as John Bortle, Daniel Green, and Charles Morris.*

In Australia, choose between one of two tours, which include visits to Australia's major observatories, the Outback surrounding Alice Springs and Ayers Rock (including the Henbury Meteor Craters), the continent's diverse wildlife reserves, and the cities of Sydney and Melbourne. Expeditions are planned to make the most of the splendid southern skies for observing Halley's Comet, with visits to various locations being a complement to the night observing.

**NOTE THE CHANGE OF ADDRESS AND PHONE NUMBER;**  
THOSE PRINTED IN PREVIOUS ISSUES ARE NO LONGER VALID.

*Further information and a detailed itinerary are available from:*

Astronomy Tours International  
4311 Overland Ave.  
Culver City, CA 90230  
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## RECENT NEWS AND RESEARCH CONCERNING COMETS

Daniel W. E. Green

*Harvard-Smithsonian Center for Astrophysics*

Just after this column for the last issue was written, comet 1985a was found as the recovery of P/Ashbrook-Jackson by A. C. Gilmore and P. M. Kilmartin at the Mount John University Observatory in New Zealand. They reported a nuclear magnitude of 18 for the stellar-like object on March 20 UT. Perihelion occurs next January, and an ephemeris is provided so that visual observers with large telescopes will be encouraged to try observing this difficult object.

On April 9 and 10, Jim Gibson obtained CCD recovery images of P/Russell 1 with the 60-inch (1.5-m) reflector at Palomar Mountain. Denoted comet 1985b, this object then appeared well-condensed (magnitude about 19.5), with a tenuous coma of diameter around 8"-10" and a hint of tail east-northeastward some 20" long. This object remains quite faint, not detectable visually with small telescopes.

Reports from Australia from David Seargent and Robert McNaught say that Andrew Pearce and Maurice Clark have possibly sighted P/Honda-Mrkos-Pajdušáková in March and April. In late March, using a 20-inch reflector, Pearce glimpsed a small, diffuse glow ( $< 0.5'$  in size) near magnitude 13 close to the ephemeris position published in the ICQ. Clark was more certain about seeing the comet with a 40-cm reflector on April 18.9 UT; the object appeared diffuse, diameter about 40", mag 10.8 to 11.0. On Apr. 20.885 UT, Clark, Pearce, and James Athanasou of Western Australia observed the comet as a "difficult but certain" and diffuse object near total visual magnitude 10 using a 41-cm f/4.2 reflector at 150x; there was apparently no visible central condensation. This is an extremely poor apparition for the comet, with elongations from the sun remaining well under 30 degrees for many months surrounding perihelion on May 23 of this year. Brian G. Marsden assigned the letter designation 1984c to these reported visual sightings.

Besides Charles Morris' recovery of P/Faye last year, one must go back to

1956 (when Ludmilla Pajdušáková recovered P/Crommelin) and to 1952 (when Albert Jones of New Zealand recovered P/Grigg-Skjellerup) to find the last two cases of visual recoveries of comets. It has been a much longer time, however, since a visual recovery was not jointly shared with a photographic recovery of the same comet.

Gibson, using the same equipment as for the recovery of P/Russell 1, found images of P/Tsuchinshan 2 on May 8 to confirm his April 10 detection of this very faint comet at nuclear magnitude 22 (the object was stellar within the limits of seeing). Designated comet 1985d, P/Tsuchinshan 2 had not brightened by more than half a magnitude by May 8.

Donald E. Machholz of San Jose, California, discovered his second comet while observing at the Riverside amateur telescope maker's conference near Big Bear City, CA, on May 27. The object appeared diffuse, with no condensation or tail, and of magnitude about 9.5 in Machholz's 10-inch f/3.8 reflector. Astrometric positions arrived within a week from observers at 3 sites in the U.S. and 3 sites in Japan, enabling the author to compute an orbit indicating that this new comet Machholz 1985e would pass less than 0.11 AU from the sun on June 28. An extrapolation of the magnitude of the comet to late June, using a simple inverse-fourth-power law and an absolute magnitude of 8.5, gave a value of brighter than magnitude 0 at perihelion. Despite a conservative approach by the IAU's Central Bureau for Astronomical Telegrams not to stir excitement about the object, since it would be for weeks much too close to the sun for visual observing, a flurry of excitement began after Sky and Telescope released news (via their telephone recording service) that the comet might get brighter than P/Halley will be in 1986. John Bortle quickly noted that comets fainter than absolute magnitude 8 do not usually survive a close perihelion passage such as 0.1 AU. Indeed, the comet brightened

## RECENT NEWS AND RESEARCH CONCERNING COMETS

only very slowly, and had not reached total magnitude 7 when last seen visually some 9 days before perihelion.

Edward Ney of the University of Minnesota reported infrared observations of comet 1985e obtained on June 24.75 UT which indicated that the comet was 100 times fainter than comet Kohoutek 1973 XII at the same distance. The only positive post-perihelion observations (amidst many negative reports) appear to be those of T. Seki, who reported seeing the comet both visually and photographically on July 8.48 UT at total magnitude 10.0-10.5 and 11, respectively. Eleanor Helin and colleagues obtained exposures on 3 nights during July 16-19 with the 18-inch Schmidt telescope at Palomar, but preliminary searches had revealed no image of the comet. If there is any solid nucleus left of comet 1985e, it must surely be quite small and faint.

Machholz notes that to find comet 1985e it took 1742.25 search hours since his discovery of comet Machholz 1978 XIII; this makes a total of 3442.25 hrs for two comet discoveries! Machholz has also recently published an interesting 115-page monograph entitled A Decade of Comets: A Study of the 33 Comets Dis-

covered by Amateur Astronomers between 1975 and 1984; the publication is spiral-bound and published by the author himself, and copies may be purchased directly from Machholz (address: 5234 Camden Ave.; San Jose, CA 95124) for \$8.00 domestic and \$12.00 foreign air mail. He provides extensive statistical analyses of the discovery circumstances for the comets mentioned, and a textual description of each comet (mainly with respect to its visual appearance) is also provided. While highly interesting, this document will be of more interest when and if it is updated to include visual discoveries over a much longer period of time.

Malcolm Hartley reported his discovery of a new comet from plates taken June 13 with the 1.2-m U.K. Schmidt telescope at Siding Spring, Australia. He only noted the comet as having a prominent tail > 1' long to the southeast, with the comet's total magnitude being about 16. As of this writing, precise positions were only available from the discoverer for comet Hartley 1985f on three nights, June 13, 21, and July 10; (continued on page 82)

## ROMAN NUMERAL DESIGNATIONS OF COMETS IN 1983.

The following tabulation continues that in ICQ 6, 11.

| Comet      | T         | Name                       | Year/letter | Ref.      |
|------------|-----------|----------------------------|-------------|-----------|
| 1983 I     | Jan. 19.0 | IRAS                       | 1983f       | MPC 8052  |
| 1983 II    | Mar. 15.2 | P/Bowell-Skiff             | 1983c       | MPC 8052  |
| 1983 III   | Apr. 2.2  | P/Kowal-Vávrová            | 1983t       | MPC 8272  |
| 1983 IV    | Apr. 7.5  | P/Pons-Winnecke            | 1983b       | IAUC 3765 |
| 1983 V     | May 1.3   | Sugano-Saigusa-Fujikawa    | 1983e       | MPC 8052  |
| 1983 VI    | May 2.7   | IRAS                       | 1983k       | MPC 8671  |
| 1983 VII   | May 21.3  | IRAS-Araki-Alcock          | 1983d       | MPC 8272  |
| 1983 VIII  | May 22.4  | P/Arend                    | 1983q       | IAUC 3867 |
| 1983 IX    | June 1.3  | P/du Toit-Neujmin-Delporte | 1983g       | IAUC 3816 |
| 1983 X     | June 1.5  | P/Tempel 2                 | 1982d       | IAUC 3676 |
| 1983 XI    | July 9.8  | P/Tempel 1                 | 1982j       | IAUC 3757 |
| 1983 XII   | July 21.2 | Černis                     | 1983l       | MPC 8272  |
| 1983 XIII  | Aug. 10.3 | P/Kopff                    | 1982k       | IAUC 3757 |
| 1983 XIV   | Aug. 23.8 | P/IRAS                     | 1983j       | MPC 8386  |
| 1983 XV    | Nov. 23.7 | Shoemaker                  | 1983p       | MPC 8387  |
| 1983 XVI   | Nov. 28.0 | IRAS                       | 1983o       | MPC 8671  |
| 1983 XVII  | Dec. 1.7  | P/Harrington-Abell         | 1983r       | IAUC 3867 |
| 1983 XVIII | Dec. 3.2  | P/Johnson                  | 1983h       | IAUC 3824 |
| 1983 XIX   | Dec. 27.8 | P/Bradfield                | 1984a       | MPC 9025  |

## TABULATION OF COMET OBSERVATIONS

## DESCRIPTIVE INFORMATION CONCERNING COMETS (to complement the tabulated data):

Shoemaker (1984f): Charles Morris (MOR) found the coma elongated with a fan tail centered at p.a. 225 degrees on Apr. 13 and May 18. Terry Lovejoy (LOV) noted the comet as "very impressive" in late May, with "a bright nucleus and a broad, beautiful tail" in a DS16 telescope; "this tail was only faintly visible in a 20-cm reflector". M. Clark (CLA) noted a "possible very faint tail" on Apr. 18. Andrew R. Pearce (PEA) found the comet on Mar. 19 to be "decidedly brighter than in early March"; on May 13, he found the coma fanned toward p.a. 35 degrees.

Levy-Rudenko (1984t): Morris (MOR) noted that the coma was large and involved with field stars on Mar. 17.

Machholz (1985e): Morris (MOR) notes concerning his June 9 observation: "When comet was 6 degrees above the horizon, its magnitude was 8.5 when compared to field stars. By the time it had risen to 11 degrees, it had 'brightened' to 8.0." Richard Ducoty (DUC) states concerning his June 8 observation: "near stellar condensation with averted vision, inner 1' brighter than outer part of coma".

P/Giacobini-Zinner (1984e): Morris (MOR) notes that his Apr. 13 observation was made jointly with Steve Edberg; on May 18, the brightness increase with increased magnification "was real": "At 244x, the comet was a uniform disk, but at 375x the comet was more condensed. Although the comet's apparent size was the same, the apparent brightness using the same comparison stars decreased when the lower magnification was used." On June 23, Morris noted: "Comet had a well condensed central region (about 1') surrounded by an extremely diffuse and faint outer coma. The Lumicon comet filter enhanced the outer coma, suggesting a strong gas component." Ducoty (DUC) noted on June 16 an "elongated parabolic head, stellar-like nuclear region?". M. V. Zanotta (ZAN) found "the coma was circular at 60x, but at 94x, 150x, and 250x it appeared fan-shaped with axis on p.a. 225 degrees" on June 17.94; on June 20.96, "at 94x I found DC = 5, and with 150x I was able to see a star-like nuclear region. At 300x I found a central condensation with diameter 0'.5." On June 22.98, Zanotta noted "the comet appeared diffuse with central condensation fainter than on June 20, but with more obvious star-like nuclear region of magnitude around 13.5; the coma appeared elongated at 60x, and there was a probable short tail or coma elongation (2') in p.a. 225 degrees at 250x."

P/Honda-Mrkos-Pajdušáková (1985c): Clark (CLA) notes of his Mar. 23 observation: "doubtful; only suspected", and of his Apr. 18 observation: "magnitude estimate little more than a guess due to twilight". Of his Apr. 20 observation, he noted: "definitely seen although very difficult."

NEW ADDITION TO THE METHOD KEY: T = magnitude estimated from a TV monitor.

NOTE: A complete set of the Keys for the ICQ tabulated cometary photometric data, including description of the headings listed below, is available to all subscribers for US\$2.00 postpaid. Write to the Editor at the address given on the second page of this issue for such a computer print-out.

NOTE ALSO THAT ALL PHOTOMETRIC COMETARY DATA (visual and non-visual) SHOULD BE SUBMITTED TO THE EDITOR ON THE ICQ REPORT FORMS. We simply receive too much data to be able to handle data given in any form other than our formatted standard report form; such forms are available for \$0.05 each.

## Comet Wild (1967 III)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA  | DC | TAIL | PA | OBS.  |
|---------------|---------|----|------|------|-----|-------|----|------|----|-------|
| 1967 02 13.17 | 9.5:    |    | 24.1 | R    |     | & 1.5 |    |      |    | MCC03 |
| 1967 02 23.01 | 10.5    | AC | 20.3 | L    | 39  | < 1   | 3  |      |    | SIM   |
| 1967 02 24.09 | 10.6    | AC | 20.3 | L    | 39  | < 0.5 | 3  |      |    | SIM   |
| 1967 02 26.08 | 11.0    | AC | 20.3 | L    | 39  | < 0.5 | 0  |      |    | SIM   |
| 1967 03 01.24 | 10 :    |    | 24.1 | R    | 100 | 2     | 3/ |      |    | MCC03 |
| 1967 03 02.04 | 11.0    | AC | 20.3 | L    | 40  | < 0.5 | 3  |      |    | SIM   |
| 1967 03 11.01 | 11.5    | AC | 20.3 | L    | 39  | & 1   | 0  |      |    | SIM   |
| 1967 03 11.13 | 10.5:   | UL | 25.4 | L    | 50  | 2     | 5  |      |    | MCC03 |
| 1967 03 12.07 | 12.5:   | AC | 20.3 | L    | 39  | & 2.5 | 0  | ?    | 0  | SIM   |

## Comet Seki (1967 IV)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA  | DC | TAIL | PA | OBS.  |
|---------------|---------|----|------|------|-----|-------|----|------|----|-------|
| 1967 02 04.81 | 10.5:   |    | 12.0 | B    | 20  |       |    |      |    | SEK   |
| 1967 02 09.25 | 10.0:   |    | 24.1 | R    |     |       |    |      |    | MCC03 |
| 1967 02 11.44 | 10.2    | AC | 20.3 | L    | 39  | < 0.5 | 6  |      |    | SIM   |
| 1967 02 17.83 | 8.5:    |    | 12.0 | B    | 20  |       |    |      |    | SEK   |
| 1967 02 21.48 | 10 :    |    | 20.3 | L    | 55  | & 2.0 | 4  |      |    | MID   |

## Comet Mitchell-Jones-Gerber (1967 VII)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA  | OBS.  |
|---------------|---------|----|------|------|-----|------|----|------|-----|-------|
| 1967 07 03.28 |         |    | 31.8 | L    | 86  | 2    | 7/ |      |     | JON   |
| 1967 07 03.28 | 5.1     | HD | 4.6  | R    |     |      |    |      |     | JON   |
| 1967 07 03.28 |         |    | 7.6  | R    |     |      |    | >0.5 | 110 | JON   |
| 1967 07 04.33 | 4.3     | S  | 5.0  | B    | 7   |      |    | 5    | 296 | MAT01 |
| 1967 07 05.11 | 4 :     | UX | 5.0  | B    | 7   | 15   | 3  | 0.5  | 110 | MCC03 |
| 1967 07 05.31 | 4.8     | S  | 5.0  | B    | 7   |      |    | 3    | 308 | MAT01 |
| 1967 07 06.28 | 6.2     | HD | 4.6  | R    |     |      |    |      |     | JON   |
| 1967 07 06.28 |         |    | 31.8 | L    | 86  |      |    | 0.75 | 118 | JON   |
| 1967 07 06.28 |         |    | 7.6  | R    |     |      | 5/ | 1.67 | 118 | JON   |
| 1967 07 07.34 | 5.9     | S  | 5.0  | B    | 7   |      |    |      |     | MAT01 |
| 1967 07 07.34 | 5.4     | S  | 15.2 | L    |     |      |    | 0.67 | 121 | BUT   |
| 1967 07 07.35 | 5.5     | V  | 5.0  | B    | 7   |      |    | 0.75 | 110 | SUM   |
| 1967 07 07.37 | 5.7     | S  | 3.0  | B    | 8   |      |    |      |     | MEA   |
| 1967 07 08.11 | 5.5     |    | 5.0  | B    | 7   |      |    |      |     | OLI   |
| 1967 07 08.30 |         |    | 31.8 | L    | 86  |      | 5  | 1.5  | 115 | JON   |
| 1967 07 08.30 | 6.2     | HD | 4.6  | R    |     |      |    |      |     | JON   |
| 1967 07 08.35 | 5.8     | S  | 5.0  | B    | 7   |      |    |      |     | MAT01 |
| 1967 07 08.37 | 5.9     | P  | 3.5  | A    |     |      |    | 6    | 118 | LOC   |
| 1967 07 09.29 | 5.3     | HD |      | B    |     |      |    |      |     | JON   |
| 1967 07 09.29 |         |    | 31.8 | L    | 62  | 3    | 6/ | 1.5  | 120 | JON   |
| 1967 07 09.41 | 6.0     | S  | 15.2 | L    |     |      |    | 0.50 | 120 | BUT   |
| 1967 07 10.37 | 6.3     | P  | 3.5  | A    |     |      |    | 3    | 119 | LOC   |
| 1967 07 11.29 | 7.3     | HD | 4.6  | R    |     |      |    |      |     | JON   |
| 1967 07 11.29 |         |    | 31.8 | L    | 86  |      | 7/ | 0.5  |     | JON   |
| 1967 07 11.35 | 6.5     | V  | 5.0  | B    | 7   |      |    | 0.50 | 105 | SUM   |
| 1967 07 11.38 | 6.5     | S  | 3.0  | B    | 8   |      |    |      |     | MEA   |
| 1967 07 11.40 | 6.5     | S  | 15.2 | L    |     |      |    | 0.33 | 121 | BUT   |
| 1967 07 12.30 | 7.0     | HD | 4.6  | R    |     |      | 7/ |      |     | JON   |
| 1967 07 13.34 | 7.0     | V  | 5.0  | B    | 7   |      |    | 0.25 |     | SUM   |

## Comet Mitchell-Jones-Gerber (1967 VII)

Cont.

| DATE (UT)     | MM | MAG.  | RF  | AP.  | T F/ | PWR | COMA | DC | TAIL  | PA  | OBS.  |
|---------------|----|-------|-----|------|------|-----|------|----|-------|-----|-------|
| 1967 07 14.34 |    | 7.3   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 15.30 |    | 7.1   | HD  | 4.6  | R    |     |      | 7/ | 0.17  | 125 | JON   |
| 1967 07 15.34 |    | 7.4   | S   | 15.2 | L    |     |      |    | 0.17  | 122 | BUT   |
| 1967 07 15.35 |    | 6.8   | S   | 3.0  | B    | 8   |      |    |       |     | MEA   |
| 1967 07 15.36 |    | 7.5   | V   | 5.0  | B    | 7   |      |    | 0.10  |     | SUM   |
| 1967 07 15.39 |    | 7.4   | S   | 15.2 | L    |     |      |    | 0.17  | 122 | BUT   |
| 1967 07 16.28 |    | 7.5   | HD  | 4.6  | R    |     |      | 7/ | &0.17 | 120 | JON   |
| 1967 07 16.35 |    | 7.3   | S   | 3.0  | B    | 8   |      |    |       |     | MEA   |
| 1967 07 16.36 |    | 7.5   | S   | 5.0  | B    | 7   |      |    |       |     | MAT01 |
| 1967 07 17.35 |    | 7     | : S | 3.0  | B    | 8   |      |    |       |     | MEA   |
| 1967 07 17.36 |    | 8.5   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 17.38 |    | 7.8   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 17.41 |    | 8.5   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 18.34 |    | 8.0   | V   | 5.0  | B    | 7   |      |    | 0.10  |     | SUM   |
| 1967 07 18.35 |    | 7.9   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 19.36 |    | 8.2   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 19.38 |    | 8.1   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 20.38 |    | 8.3   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 22.30 |    | 8.8   | HD  | 7.6  | R    |     |      |    |       | 115 | JON   |
| 1967 07 22.36 |    | 8.9   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 22.37 |    | 8.4   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 23.29 |    | 8.8   | HD  | 7.6  | R    |     |      | 5/ | ?     |     | JON   |
| 1967 07 23.34 |    | 8.2   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 24.29 |    | 8.3   | HD  | 7.6  | R    |     |      | 6/ | ?     |     | JON   |
| 1967 07 26.38 |    | 8.2   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 27.38 |    | 8.3   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 28.45 |    | 7.2   | S   | 5.0  | B    | 7   |      |    |       |     | MAT01 |
| 1967 07 29.30 |    | 8.1   | HD  | 7.6  | R    |     |      | 6/ |       |     | JON   |
| 1967 07 29.42 |    | 8.6   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 30.39 |    | 9.2   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 07 30.42 |    | 8.8   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 07 31.37 |    | 8.8   | V   | 5.0  | B    | 7   |      |    |       |     | SUM   |
| 1967 08 01.36 |    | 9.5   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 08 02.37 |    | 8.6   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 08 03.41 |    | 9.0   | S   | 30.5 | L    |     |      |    |       |     | MAT01 |
| 1967 08 04.41 |    | 9.1   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 08 05.30 |    | 9.0   | HD  | 7.6  | R    |     |      | 5  | ?     | 100 | JON   |
| 1967 08 06.30 |    | 10.2  | HD  | 7.6  | R    |     |      |    |       |     | JON   |
| 1967 08 06.30 |    |       |     | 31.8 | L    | 86  | 1.5  | 5  |       | 105 | JON   |
| 1967 08 06.33 |    | 9.2   | S   | 30.5 | L    |     |      |    |       |     | MAT01 |
| 1967 08 07.31 |    | 10.5  | HD  | 7.6  | R    |     |      | 5  | ?     | 105 | JON   |
| 1967 08 08.35 |    | 8.4   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 08 10.37 |    | 8.4   | S   | 15.2 | L    |     |      |    |       |     | BUT   |
| 1967 08 12.35 |    | 10.9  | HD  | 31.8 | L    | 86  |      | 4  |       |     | JON   |
| 1967 08 13.33 |    | 10.1  | HD  | 31.8 | L    | 86  |      | 4  |       |     | JON   |
| 1967 08 24.4  |    | 11.7: |     | 30.5 | L    |     |      |    |       |     | MAT01 |

## Comet Austin (1984i)

| DATE (UT)     | MM | MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA  | OBS. |
|---------------|----|------|----|------|------|-----|------|----|------|-----|------|
| 1984 10 03.90 |    |      |    | 15.0 | L    | 5   |      |    | 0.15 | 329 | MER  |
| 1984 10 03.90 | B  | 7.7  | S  | 15.0 | L    | 5   | 10   | 2  | 0.22 | 80  | MER  |
| 1984 11 28.78 | B  | 11.6 | A  | 26.0 | L    | 6   | 2.0  | 1  | 0.06 | 148 | MER  |

## Comet Levy-Rudenko (1984t)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL  | PA  | OBS.  |
|---------------|----|-------|----|------|---|----|-----|------|----|-------|-----|-------|
| 1984 11 28.73 | B  | 8.7   | S  | 26.0 | L | 6  | 39  | 4.0  | 2  | 0.03  | 148 | MER   |
| 1984 11 28.74 | B  | 9.0:  | S  | 12.7 | T | 10 | 60  | 2.7  | 5  |       |     | HAS02 |
| 1984 11 29.73 | S  | 8.3   | S  | 20.5 | L | 4  | 52  | 5    | 3  |       |     | KOC01 |
| 1984 11 29.76 | B  | 8.5   | S  | 12.7 | T | 10 | 60  | 2.8  |    |       |     | HAS02 |
| 1984 11 30.74 | S  | 7.8   | A  | 10.0 | L | 9  | 22  | 4    | 6  |       |     | WEG   |
| 1984 11 30.75 | B  | 8.6   | S  | 26.0 | L | 6  | 39  | 3.7  | 2  |       |     | MER   |
| 1984 12 03.73 | S  | 7.6   | A  | 10.0 | L | 9  | 22  | 4.5  | 7  |       |     | WEG   |
| 1984 12 11.75 | B  | 8.3   | S  | 12.7 | T | 10 | 60  | 3.7  | 4  |       |     | HAS02 |
| 1984 12 13.72 | S  | 7.7   | A  | 10.0 | L | 9  | 22  |      |    |       |     | WEG   |
| 1984 12 17.75 | B  | 8.3   | S  | 7.0  | R | 12 | 28  |      | 3  |       |     | MER   |
| 1984 12 17.76 |    |       |    | 60.0 | L | 4  | 84  | 4.5  | 3  | 0.05  | 1   | MER   |
| 1984 12 17.97 | S  | 8.1   | AC | 5.0  | B |    | 10  | 5    |    |       |     | BOR   |
| 1984 12 17.97 | S  | 8.3   | AC | 32   | L | 6  | 68  | 3.3  | 6  |       |     | BOR   |
| 1984 12 19.72 | B  | 8.7   | S  | 10.0 | B |    | 14  | 2.9  | 4  |       |     | HAS02 |
| 1984 12 19.76 | B  | 8.6   | S  | 7.0  | R | 12 | 28  |      | 3  |       |     | MER   |
| 1984 12 19.77 |    |       |    | 60.0 | L | 4  | 84  | 4.9  | 3  |       |     | MER   |
| 1984 12 21.76 | B  | 8.3   | S  | 7.0  | R | 12 | 28  |      | 3  |       |     | MER   |
| 1984 12 21.77 |    |       |    | 60.0 | L | 4  | 84  | 3.6  | 3  | 0.05  | 52  | MER   |
| 1984 12 22.76 | B  | 8.7   | S  | 7.0  | R | 12 | 28  |      | 3  |       |     | MER   |
| 1984 12 22.77 |    |       |    | 60.0 | L | 4  | 84  | 3.6  | 3  |       |     | MER   |
| 1984 12 23.98 | S  | 8.1   | AC | 32   | L | 6  | 68  | 3.4  | 5/ |       |     | BOR   |
| 1984 12 23.98 | S  | 8.1   | AC | 5.0  | B |    | 10  | 3    |    |       |     | BOR   |
| 1984 12 25.74 | S  | 7.5   | A  | 10.0 | L | 9  | 22  | 6    | 6  |       |     | WEG   |
| 1984 12 25.74 | B  | 7.7   | A  | 10.0 | L | 9  | 22  |      |    |       |     | WEG   |
| 1984 12 26.71 | S  | 8.9   | S  | 8.0  | B |    | 20  | 4.4  | 3  |       |     | KOC01 |
| 1984 12 26.73 | B  | 8.6   | S  | 10.0 | B |    | 14  | 4.0  | 4  |       |     | HAS02 |
| 1984 12 26.73 | B  | 8.6   | S  | 12.7 | T | 10 | 60  | 3.1  | 3  |       |     | HAS02 |
| 1985 01 08.98 | S  | 8.0   | AC | 8.0  | B |    | 20  | 5    |    |       |     | BOR   |
| 1985 01 09.97 | S  | 8.0   | AC | 8.0  | B |    | 20  | 5    | 3  |       |     | BOR   |
| 1985 01 22.76 | S  | 8.2   | A  | 10.0 | L | 9  | 22  | 4    | 2  |       |     | WEG   |
| 1985 01 23.22 | S  | 8.0   | A  | 10.0 | L | 9  | 22  | 4.5  | 3  |       |     | WEG   |
| 1985 01 23.22 | B  | 8.3   | A  | 10.0 | L | 9  | 22  | 4.5  | 3  |       |     | WEG   |
| 1985 01 23.23 | S  | 8.1   | A  | 6.8  | R | 4  | 14  | 7    | 3  |       |     | WEG   |
| 1985 01 23.43 | S  | 7.9   | AC | 5.0  | B |    | 10  | 7.5  | 3  |       |     | BOR   |
| 1985 01 24.23 | B  | 8.4   | A  | 10.0 | L | 9  | 22  |      |    |       |     | WEG   |
| 1985 01 24.23 | S  | 8.1   | A  | 10.0 | L | 9  | 22  | 8    | 2  | &0.25 | 315 | WEG   |
| 1985 01 29.76 | S  | 9.4   | S  | 12.7 | T | 10 | 31  | 3.6  | 1  |       |     | HAS02 |
| 1985 02 09.92 | S  | 8.5   | A  | 10.0 | L | 9  | 22  | 8.5  | 2  |       |     | WEG   |
| 1985 02 10.88 | S  | 8.6   | A  | 10.8 | L |    | 17  | 5.5  | 2  |       |     | BOU   |
| 1985 02 10.89 | S  | 9.4   | A  | 11.0 | R | 10 | 22  |      | 2/ |       |     | COM   |
| 1985 02 11.89 | S  | 9.3   | A  | 11.0 | R | 10 | 40  |      | 3  |       |     | COM   |
| 1985 02 12.10 | S  | 9.1   | A  | 25.4 | L |    | 70  | 6    | 3/ |       |     | KUI   |
| 1985 02 13.01 | S  | 9.3   | A  | 11.0 | R | 10 | 22  |      | 3  |       |     | COM   |
| 1985 02 14.85 | S  | 9.5   | A  | 11.0 | R | 10 | 40  |      | 2/ |       |     | COM   |
| 1985 02 16.02 | S  | 8.8   | AC | 32   | L | 6  | 68  | 6    | 2  |       |     | BOR   |
| 1985 02 17.96 | S  | 9.6   | A  | 25.4 | J | 6  | 59  |      | 2/ |       |     | FEI   |
| 1985 02 17.96 | S  | 9.2   | A  | 11.0 | R | 10 | 40  |      | 1/ |       |     | COM   |
| 1985 02 17.98 | S  | 9.6   | A  | 25.4 | L | 5  | 70  | 4    | 4  |       |     | KUI   |
| 1985 02 18.80 | S  | 10.0: | S  | 12.7 | T | 10 | 31  | 1.5  | 2  |       |     | HAS02 |
| 1985 02 18.87 | S  | 8.7   | A  | 8.0  | B |    | 20  | 5    | 1  |       |     | BOU   |
| 1985 02 18.98 | S  | 9.5   | A  | 25.4 | L | 5  | 70  | 4.5  | 4/ |       |     | KUI   |
| 1985 02 18.99 | S  | 9.2   | A  | 11.0 | L | 5  | 37  |      |    |       |     | FEI   |
| 1985 02 18.99 | S  | 9.4   | A  | 25.4 | L | 6  | 59  |      | 2/ |       |     | FEI   |
| 1985 02 19.01 | S  | 9.3   | A  | 11.0 | R | 10 | 40  |      | 2  |       |     | COM   |
| 1985 02 20.02 | S  | 8.8   | AC | 32   | L | 6  | 68  | 5    | 2  |       |     | BOR   |

## Comet Levy-Rudenko (1984t)

Cont.

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|----|-------|----|------|---|----|-----|------|----|------|----|------|
| 1985 02 21.11 | S  | 8.8   | AC | 32   | L | 6  | 68  | 6    | 3  |      |    | BOR  |
| 1985 02 21.11 | S  | 8.7   | AC | 8.0  | B |    | 20  | 8    |    |      |    | BOR  |
| 1985 02 28.30 | S  | 9.5   | AC | 32   | L | 6  | 68  | 4.5  | 1  |      |    | BOR  |
| 1985 03 10.07 | S  | 10.4  | AC | 32   | L | 6  | 68  | 3.5  | 0/ |      |    | BOR  |
| 1985 03 17.27 | S  | 11.0: | NP | 25.6 | L | 4  | 45  | ?    | 0  |      |    | MOR  |
| 1985 03 17.90 | S  | 11.5  | A  | 25.4 | J | 6  | 59  | 3    | 0  |      |    | BOU  |
| 1985 03 19.90 | S  | [13.7 | AC | 30.5 | L | 5  | 94  |      |    |      |    | ZAN  |
| 1985 04 10.84 | S  | [14.5 | AC | 30.5 | L | 5  | 94  |      |    |      |    | ZAN  |

## Comet Shoemaker (1984f)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL  | PA  | OBS. |
|---------------|----|-------|----|------|---|----|-----|------|----|-------|-----|------|
| 1985 02 23.84 | S  | 12.4  | AC | 20.3 | L | 6  | 116 | 0.6  | 5  |       |     | PEA  |
| 1985 02 24.83 | S  | 12.5  | AC | 20.3 | L | 6  | 116 | 0.7  | 4  |       |     | PEA  |
| 1985 02 25.87 | S  | 12.4  | AC | 20.3 | L | 6  | 116 |      | 4  |       |     | PEA  |
| 1985 02 25.87 |    |       |    | 20.3 | L | 6  | 38  | 0.8  | 3  |       |     | PEA  |
| 1985 02 26.83 | S  | 12.5  | AC | 20.3 | L | 6  | 116 |      | 4  |       |     | PEA  |
| 1985 02 27.83 | S  | 12.6  | AC | 20.3 | L | 6  | 116 | 1    | 4/ |       |     | PEA  |
| 1985 02 27.84 | S  | 12.6: | AC | 20.3 | L | 6  | 48  | 1    |    |       |     | PEA  |
| 1985 03 04.84 | S  | 12.4  | AC | 20.3 | L | 6  | 116 | 0.7  | 4  |       |     | PEA  |
| 1985 03 04.84 |    |       |    | 20.3 | L | 6  | 38  | 1    | 3  |       |     | PEA  |
| 1985 03 16.56 | S  | 12 :  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 03 17.56 | S  | 11.9  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 03 19.85 | S  | 12.0  | AC | 20.3 | L | 6  | 116 | 1    | 4  |       |     | PEA  |
| 1985 03 20.83 | S  | 12.1  | AC | 20.3 | L | 6  | 48  | 0.8  |    |       |     | PEA  |
| 1985 03 20.83 | S  | 12.1  | AC | 20.3 | L | 6  | 116 | 0.8  | 4  |       |     | PEA  |
| 1985 03 22.56 | S  | 12.0  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 03 23.54 | S  | 12.0  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 03 23.73 | S  | 11.9  | AC | 50.0 | L | 4  | 98  |      | 3/ |       |     | PEA  |
| 1985 03 23.75 | S  | 11.9  | AC | 50   | L | 4  | 98  | 1    | 5  |       |     | CLA  |
| 1985 03 24.47 | M  | 12.0  | AC | 25.6 | L | 4  | 111 | 0.85 | 7  |       |     | MOR  |
| 1985 03 25.54 | S  | 11.8  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 03 25.54 | S  | 12.0  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 03 26.81 | S  | 11.9  | AC | 20.3 | L | 6  | 116 | 1    | 3/ |       |     | PEA  |
| 1985 03 27.54 |    |       |    | 15.2 | L | 5  | 76  |      | 5/ |       |     | SEA  |
| 1985 03 27.54 | S  | 11.7  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 03 27.81 | S  | 11.9  | AC | 20.3 | L | 6  | 116 | 1    | 4  |       |     | PEA  |
| 1985 03 27.81 | S  | 11.8  | AC | 20.3 | L | 6  | 48  |      |    |       |     | PEA  |
| 1985 03 28.52 | S  | 11.8  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 03 28.81 | S  | 11.8  | AC | 20.3 | L | 6  | 116 | 1.1  | 3  |       |     | PEA  |
| 1985 03 29.82 | S  | 11.8  | AC | 20.3 | L | 6  | 48  | 1.0  | 3  |       |     | PEA  |
| 1985 03 31.52 | S  | 11.7  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 02.82 | S  | 11.7  | AC | 20.3 | L | 6  | 48  | 1    | 3  |       |     | PEA  |
| 1985 04 03.98 | S  | 11.6  | AC | 20.3 | L | 6  | 48  | 1.3  | 3/ |       |     | PEA  |
| 1985 04 11.46 | S  | 11.4  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 11.46 | S  | 11.4  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 04 12.48 | S  | 11.4  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 13.37 | M  | 11.0  | AC | 61.0 | C | 16 | 244 | 0.59 | 7  | <0.01 | 225 | MOR  |
| 1985 04 15.49 | S  | 11.5  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 16.46 | S  | 11.3  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 17.48 | S  | 10.9  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 04 17.48 | S  | 10.9  | AC | 8.0  | B |    | 15  |      |    |       |     | SEA  |
| 1985 04 18.79 | S  | 10.9  | VN | 41   | L | 4  | 67  | 1    | 4  | 0.03  | 5   | CLA  |
| 1985 04 19.46 | S  | 11.1  | AC | 15.2 | L | 5  | 15  |      |    |       |     | SEA  |
| 1985 04 19.79 | S  | 10.8  | AC | 20.3 | L | 6  | 48  | 1.2  | 4/ |       |     | PEA  |

## Comet Shoemaker (1984f) Cont.

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL  | PA  | OBS. |
|---------------|----|-------|----|------|---|----|-----|------|----|-------|-----|------|
| 1985 04 20.77 | S  | 10.8  | AC | 41   | L | 4  | 86  | 1.3  | 5  | 0.03  | 5   | PEA  |
| 1985 04 20.79 | S  | 10.8  | AC | 41   | L | 4  | 67  | 1.2  | 4  | ?0.02 | 5   | CLA  |
| 1985 04 25.45 | S  | 10.9  | AC | 15.2 | L | 5  | 76  |      |    |       |     | SEA  |
| 1985 04 25.79 | S  | 10.6  | AC | 20.3 | L | 6  | 48  |      |    |       |     | PEA  |
| 1985 05 09.44 | S  | 10.9: | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 05 12.66 | S  | 10.5  | AC | 20.3 | L | 6  | 48  | 2.4  | 4/ |       | 35  | PEA  |
| 1985 05 13.67 | S  | 10.5  | VN | 20.3 | L | 6  | 48  | 2.2  | 4/ | ?     | 35  | PEA  |
| 1985 05 17.44 | S  | 10.4  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 05 18.26 | M  | 10.9  | AC | 61.0 | C | 16 | 244 | 0.5  | 5  | 0.02  | 225 | MOR  |
| 1985 05 22.44 | S  | 10.5  | AC | 15.2 | L | 5  | 29  |      |    |       |     | SEA  |
| 1985 06 12.22 | M  | 11.4  | AC | 25.6 | L | 4  | 67  | 2.3  | 5  |       |     | MOR  |

## Comet Shoemaker (1984s)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA  | DC | TAIL | PA  | OBS.  |
|---------------|----|-------|----|------|---|----|-----|-------|----|------|-----|-------|
| 1984 11 28.78 | S  | 11.0: | S  | 20.5 | L | 4  | 52  | < 0.6 | 9  |      |     | HAS02 |
| 1984 11 28.79 | S  | 11.2  | A  | 26.0 | L | 6  | 63  | 2.3   | 4  | 0.03 | 221 | MER   |
| 1984 11 28.79 | S  | 11.0: | S  | 20.5 | L | 4  | 52  | 1     |    |      |     | KOC01 |
| 1984 12 19.75 | S  | 10.4  | AC | 12.7 | T | 10 | 60  | 0.9   | 8  |      |     | HAS02 |
| 1985 01 27.72 | S  | 11.7  | VN | 41   | L | 4  | 86  | 1.1   | 2  |      |     | CLA   |

## Comet Machholz (1985e)

| DATE (UT)     | MM | MAG. | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL | PA  | OBS. |
|---------------|----|------|----|------|---|----|-----|------|----|------|-----|------|
| 1985 05 27.47 | S  | 9.5: |    | 25.4 | L | 4  | 32  | 3    | 6  |      |     | MAC  |
| 1985 05 28.47 | M  | 9.2  | S  | 25.6 | L | 4  | 45  | 4.1  | 5/ |      |     | MOR  |
| 1985 05 28.47 | S  | 9.3  | S  | 25.4 | L | 4  | 32  | 3    | 5  |      |     | MAC  |
| 1985 05 28.47 | M  | 9.2  | AC | 20.0 | L | 6  | 61  |      |    |      |     | MOR  |
| 1985 05 29.48 | S  | 9.5  | AA | 15.2 | L | 8  | 76  | 3    | 5  |      |     | MAC  |
| 1985 05 29.88 | S  | 8.8  | AA | 20.3 | L | 6  | 38  | 3    | 3  |      |     | PEA  |
| 1985 05 30.46 | S  | 9.2  | S  | 25.4 | L | 4  | 32  | 3    | 5  |      |     | MAC  |
| 1985 05 30.88 | S  | 8.7  | AA | 20.3 | L | 6  | 38  |      |    |      |     | PEA  |
| 1985 06 01.48 | S  | 9.1  | S  | 15.2 | L | 8  | 76  | 3    | 5  |      |     | MAC  |
| 1985 06 03.48 | S  | 9.0  | S  | 15.2 | L | 8  | 76  | 3    | 4  |      |     | MAC  |
| 1985 06 05.46 | S  | 8.4  | S  | 25.4 | L | 4  | 32  | 2    | 5  |      |     | MAC  |
| 1985 06 06.46 | S  | 8.4  | S  | 25.4 | L | 4  | 32  | 2    | 5  |      |     | MAC  |
| 1985 06 08.48 | S  | 8.4  | S  | 20   | T | 10 | 83  | & 3  | 6  |      |     | DUC  |
| 1985 06 09.45 | S  | 8.2  | S  | 25.4 | L | 4  | 32  | 2    | 5  |      |     | MAC  |
| 1985 06 09.46 | M  | 8.0  | S  | 25.6 | L | 4  | 45  | 2.1  | 7  | 0.05 | 270 | MOR  |
| 1985 06 10.48 | S  | 8.2  | S  | 15.2 | L | 8  | 76  | 2    | 5  |      |     | MAC  |
| 1985 06 12.34 | B  | 8.3  | S  | 7.0  | B |    | 10  |      |    |      |     | DEA  |
| 1985 06 13.47 | S  | 8.0  | S  | 25.4 | L | 4  | 32  | 2    | 6  | 0.05 | 267 | MAC  |
| 1985 06 15.47 | S  | 7.9  | S  | 25.4 | L | 4  | 32  | 2    | 6  | 0.05 | 270 | MAC  |
| 1985 06 17.34 | B  | 7.8  | S  | 7.0  | B |    | 10  |      |    |      |     | DEA  |
| 1985 06 18.47 | S  | 7.7  | S  | 25.4 | L | 4  | 64  | 2    | 6  |      |     | MAC  |
| 1985 06 19.48 | S  | 7.6  | S  | 25.4 | L | 4  | 64  | 2    | 5  |      |     | MAC  |

## Periodic comet Encke (1967 XIII)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA  | DC | TAIL | PA | OBS. |
|---------------|----|-------|----|------|---|----|-----|-------|----|------|----|------|
| 1967 08 25.38 |    | 10.5: | AC | 20.3 | L |    | 40  | & 1.5 | 0  |      |    | SIM  |

## Periodic comet Tempel 2 (1967 X)

| DATE (UT)     | MM     | MAG. | RF | AP.  | T F/ | PWR | COMA   | DC | TAIL | PA  | OBS.  |
|---------------|--------|------|----|------|------|-----|--------|----|------|-----|-------|
| 1967 06 10.25 | 13     | :    |    | 31.8 | L    |     | & 3.5  | 2  |      |     | MCC03 |
| 1967 06 12.81 | 12.5:  | UP   |    | 20.3 | L    |     | 3      |    |      |     | BOE   |
| 1967 06 12.99 | 11.8   |      |    | 30.5 | L    | 54  | & 1.8  |    |      |     | BRO02 |
| 1967 06 14.00 | 11.8   |      |    | 30.5 | L    | 54  | 1.5    |    |      |     | BRO02 |
| 1967 06 15.81 | 12.5:  | UP   |    | 20.3 | L    |     | 8      |    |      |     | BOE   |
| 1967 06 19.04 | 11.5   |      |    | 30.5 | L    | 54  | 1.5    |    |      |     | BRO02 |
| 1967 06 19.83 | 12.3:  | UP   |    | 20.3 | L    |     | & 6.5  |    |      |     | BOE   |
| 1967 06 26.1  | 12     | :    |    | 20.3 | L    | 120 | & 0.5  | 6  |      |     | MID   |
| 1967 06 27.01 | 11.5:  |      |    | 30.5 | L    | 54  | 1.5    |    |      |     | BRO02 |
| 1967 06 27.13 | 11.8:  | UM   |    | 20.3 | L    | 120 | & 0.75 | 6/ |      |     | MID   |
| 1967 06 28.02 | 11.5   |      |    | 30.5 | L    | 54  | & 1.8  |    |      |     | BRO02 |
| 1967 06 29.99 | 10.8   |      |    | 21.6 | L    | 28  | 3      |    |      |     | BRO02 |
| 1967 06 29.99 | 11.0   |      |    | 30.5 | L    | 54  | 2      |    |      |     | BRO02 |
| 1967 06 29.99 | 10.6   |      |    | 10.5 | B    | 25  |        |    |      |     | BRO02 |
| 1967 07 03.76 | 12.0:  | UP   |    | 20.3 | L    |     |        |    |      |     | BOE   |
| 1967 07 07.22 | 11.0   | AC   |    | 20.3 | L    | 39  | 1.5    | 0  |      |     | SIM   |
| 1967 07 07.74 | 12.0:  | UP   |    | 20.3 | L    |     | & 6.5  |    |      |     | BOE   |
| 1967 07 08.18 | 10.6   | AC   |    | 20.3 | L    | 39  | 2.5    | 2  |      |     | SIM   |
| 1967 07 09.17 | 11.0:  |      |    | 20.3 | L    |     | & 1    | 6/ |      |     | MID   |
| 1967 07 09.73 | 12.0:  | UP   |    | 20.3 | L    |     |        |    |      |     | BOE   |
| 1967 07 11.17 | 11     | :    |    | 20.3 | L    |     | & 1    | 6/ |      |     | MID   |
| 1967 07 12.18 | 10.6   | AC   |    | 20.3 | L    | 39  | 2      | 5  |      |     | SIM   |
| 1967 07 13.16 | 10.5   | AC   |    | 20.3 | L    | 39  | 3      | 2  |      |     | SIM   |
| 1967 07 15.2  | 10.5:  |      |    | 25.4 | L    |     |        |    |      |     | MCC03 |
| 1967 07 24.13 | 11     | :    |    | 20.3 | L    |     | & 2    | 6/ |      |     | MID   |
| 1967 07 25.23 | 10.7   | AC   |    | 20.3 | L    | 39  | 3      | 0  |      |     | SIM   |
| 1967 07 29.10 | 10.5   | AC   |    | 20.3 | L    | 39  | 2      | 0  |      |     | SIM   |
| 1967 07 29.19 | 9.5:   | UM   |    | 25.4 | L    | 50  | 5      | 7/ | 0.17 | 340 | MCC03 |
| 1967 07 29.19 | 8.5:   | UM   |    | 5.0  | R    | 8   |        |    |      |     | MCC03 |
| 1967 07 29.19 | 8.0:   | S    |    | 5.0  | B    | 7   | &10    |    | 0.04 | 340 | OLI   |
| 1967 07 30.16 | 10.1:  |      |    | 20.3 | L    | 60  |        |    |      | 10  | OLI   |
| 1967 07 31.17 | 9.5    | S    |    | 20.3 | L    | 60  |        |    |      | 0   | OLI   |
| 1967 08 02.1  | 11     | :    |    | 20.3 | L    | 360 | & 3    | 5  |      |     | MID   |
| 1967 08 03.45 | 9.0    | S    |    | 30.5 | L    |     |        |    |      |     | MAT01 |
| 1967 08 07.41 | 0 9.3  | AC   |    | 7.8  | R    |     | 2      | 1/ |      |     | JON   |
| 1967 08 08.11 | 10.4   | AC   |    | 20.3 | L    | 39  | 3      | 3  |      |     | SIM   |
| 1967 08 12.45 | 9.4    | AC   |    | 31.7 | L    | 86  |        | 3  |      |     | JON   |
| 1967 08 21.09 | 0 10.8 | AC   |    | 20.3 | L    | 120 | & 0.75 | 3  |      |     | MID   |
| 1967 08 26.42 | 8.4    | S    |    | 30.5 | L    |     |        |    |      |     | MAT01 |
| 1967 08 27.18 | 8.5:   | UM   |    | 5.0  | B    | 7   |        |    |      |     | MCC03 |
| 1967 08 27.18 |        |      |    | 25.4 | L    |     | 6      | 7  |      |     | MCC03 |
| 1967 08 27.47 | 8.5    | S    |    | 30.5 | L    |     |        |    |      |     | MAT01 |
| 1967 08 28.48 | 8.2    | V    |    | 30.5 | L    |     |        |    |      |     | MAT01 |
| 1967 09 03.44 | 0 8.1  | AC   |    | 5.0  | R    |     |        | 4/ |      |     | JON   |
| 1967 09 04.48 | 0 7.8  | AC   |    | 5.0  | R    |     | 3      | 4/ |      |     | JON   |
| 1967 09 05.46 | 8.1    | AC   |    | 5.0  | R    |     | 3      | 4/ |      |     | JON   |
| 1967 09 07.17 | 9.5:   |      |    | 25.4 | L    |     | 4      | 5  |      |     | MCC03 |
| 1967 09 07.17 | 8.5:   |      |    | 5.0  | L    | 8   |        |    |      |     | MCC03 |
| 1967 09 27.45 | 8.9    | AC   |    | 7.8  | R    |     |        | 4/ |      |     | JON   |
| 1967 09 30.09 | 10.5:  |      |    | 25.4 | L    |     | 4      | 7  |      |     | MCC03 |
| 1967 09 30.44 | 9.5    | AC   |    | 7.8  | R    |     |        | 5/ |      |     | JON   |
| 1967 10 01.47 | 9.2    | AC   |    | 7.8  | R    |     |        | 5  |      |     | JON   |
| 1967 10 04.44 | 9.5    | AC   |    | 7.8  | R    |     |        | 6  |      |     | JON   |
| 1967 10 05.10 | 10.5:  |      |    | 25.4 | L    |     | 4      |    |      |     | MCC03 |

## Periodic comet Tempel 2 (1967 X) Cont.

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|----|-------|----|------|---|----|-----|------|----|------|----|------|
| 1967 10 16.10 |    | 11.0: | AC | 10.2 | R |    | 50  | & 2  | 0  |      |    | SIM  |
| 1967 10 18.44 |    | 11.3  | AC | 31.7 | L |    | 86  |      |    |      |    | JON  |
| 1967 10 21.07 |    | 11.0: | AC | 10.2 | R |    | 40  | 2.5  | 0  |      |    | SIM  |
| 1967 10 25.47 |    | 11.3  | AC | 31.7 | L |    | 86  |      | 5  |      |    | JON  |
| 1967 10 28.46 |    | 11.4  | AC | 31.7 | L |    | 86  |      | 3/ |      |    | JON  |
| 1967 10 30.42 |    | 11.4  | AC | 31.7 | L |    | 86  | 2    | 1/ |      |    | JON  |
| 1967 11 01.43 |    | 11.3  | AC | 31.7 | L |    | 86  |      | 3  |      |    | JON  |
| 1967 11 06.44 |    | 12.0  | AC | 31.7 | L |    | 86  |      | 1  |      |    | JON  |
| 1967 11 25.49 |    | 12.1  | AC | 31.7 | L |    | 86  |      | 0/ |      |    | JON  |

## Periodic comet Honda-Mrkos-Pajdušáková (1985c)

| DATE (UT)     | MM | MAG.  | RF | AP. | T | F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|----|-------|----|-----|---|----|-----|------|----|------|----|------|
| 1985 03 23.87 |    | 12.5: |    | 50  | L | 4  | 98  | 0.5  | 0  |      |    | CLA  |
| 1985 04 18.88 |    | 10.8: |    | 41  | L | 4  | 67  | 0.75 | 0  |      |    | CLA  |
| 1985 04 20.88 |    | 10.5: |    | 41  | L | 4  | 125 | & 1  | 0  |      |    | CLA  |

## Periodic comet Giacobini-Zinner (1984e)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T | F/ | PWR | COMA  | DC | TAIL  | PA  | OBS. |
|---------------|----|-------|----|------|---|----|-----|-------|----|-------|-----|------|
| 1985 04 13.47 | S  | 15.5  | EB | 61.0 | C | 16 | 375 | 0.25  | 1/ |       |     | MOR  |
| 1985 05 18.35 | S  | 13.4  | AC | 61.0 | C | 16 | 375 | 0.50  | 3/ |       |     | MOR  |
| 1985 05 18.36 | S  | 14.2  | AC | 61.0 | C | 16 | 244 | 0.50  | 2? |       |     | MOR  |
| 1985 05 18.39 | S  | 13.0  | AC | 25.6 | L | 4  | 156 |       |    |       |     | MOR  |
| 1985 05 26.47 | S  | 13.2  | AC | 20.0 | L | 16 | 117 | 0.7   | 4  |       |     | MOR  |
| 1985 06 12.29 | M  | 11.9  | NP | 25.6 | L | 4  | 111 | 1.2   | 4  |       |     | MOR  |
| 1985 06 12.29 | M  | 11.9  | NP | 25.6 | L | 4  | 67  | 1.2   | 4  |       |     | MOR  |
| 1985 06 16.28 |    |       |    | 154  | C | 14 | 600 | 0.42  | 7  | 0.07  | 230 | MOR  |
| 1985 06 16.42 | S  | 12.3  | AA | 40.6 | L | 4  | 76  | 0.7   | 3  |       |     | DUC  |
| 1985 06 17.31 | M  | 11.9  | NP | 40.6 | L | 5  | 156 | 1.2   | 5  | 0.03  | 230 | MOR  |
| 1985 06 17.94 | S  | 11.6  | AC | 30.5 | L | 5  | 60  | 1.6   | 4  | ?     | 225 | ZAN  |
| 1985 06 18.31 | M  | 11.8  | NP | 40.6 | L | 5  | 156 | 1.2   | 5  |       |     | MOR  |
| 1985 06 18.31 | M  | 11.8  | NP | 40.6 | L | 5  | 64  | 1.2   | 5  | 0.03  | 230 | MOR  |
| 1985 06 20.95 | S  | 11.5  | AC | 30.5 | L | 5  | 60  | 2.2   | 4  |       |     | ZAN  |
| 1985 06 21.00 | S  | 11.5  | AC | 25.4 | L | 4  | 71  | 1.9   |    |       |     | ZAN  |
| 1985 06 21.38 | S  | 11.6  | AA | 40.6 | L | 4  | 76  | 1     | 3  |       |     | DUC  |
| 1985 06 22.28 | S  | 11.7  | NP | 25.4 | L | 4  | 111 | & 2   | 2  |       |     | GRE  |
| 1985 06 22.29 | S  | 11.4: | NP | 25.6 | L | 4  | 45  | 1.9   | ?  |       |     | MOR  |
| 1985 06 22.98 | S  | 11.5  | AC | 30.5 | L | 5  | 60  | 1.9   | 3/ | ?0.03 | 225 | ZAN  |
| 1985 06 23.33 | S  | 10.7  | AC | 25.6 | L | 4  | 45  | 5     | 2  |       |     | MOR  |
| 1985 06 23.36 | S  | 11.2  | AC | 25.6 | L | 4  | 111 | 1.1   | 5  |       |     | MOR  |
| 1985 06 23.36 | S  | 11.0  | AC | 25.6 | L | 4  | 67  | 2.1   | 5  |       |     | MOR  |
| 1985 06 23.37 | S  | 11.4  | AC | 25.6 | L | 4  | 156 | & 0.5 | 6  |       |     | MOR  |
| 1985 06 23.96 | S  | 11.3  | AC | 30.5 | L | 5  | 60  | 1.5   | 3  |       |     | ZAN  |
| 1985 06 24.98 | S  | 11.3  | AC | 30.5 | L | 5  | 60  | 1.4   | 4  |       |     | ZAN  |
| 1985 06 26.01 | S  | 11.2  | AC | 30.5 | L | 5  | 60  | 1.8   | 5  |       |     | ZAN  |
| 1985 06 26.04 | S  | 11.3  | AC | 25.4 | L | 4  | 46  | 1.8   | 3/ |       |     | ZAN  |
| 1985 07 18.13 | S  | 9.9   | AA | 22.9 | R | 12 | 96  | & 3   | 4  |       |     | GRE  |

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UNIVERSAL TIME (UT): This time based on the Greenwich meridian is used throughout the ICQ; it is 24-hour time, from midnight to midnight. In North America, add the following numbers to standard times to convert to UT: EST, 5; CST, 6; MST, 7; PST, 8. For daylight savings time, add 4, 5, 6, and 7 hours, respectively.

## Periodic comet Arend-Rigaux (1984k)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1984 11 02.83 | S 12.5  | AC | 15.2 | L 5  | 72  |      |    |      |    | PEA  |
| 1984 11 03.84 | S 12.5  | AC | 15.2 | L 5  | 72  |      |    |      |    | PEA  |
| 1984 12 24.40 | S 11.8  | AC | 32   | L 6  | 88  | 1.4  | 6  |      |    | BOR  |
| 1985 01 27.13 | S 12.0  | AC | 32   | L 6  | 88  | 1.2  | 6  |      |    | BOR  |
| 1985 01 27.73 | S 12.1  | VN | 41   | L 4  | 86  | 1.2  | 4  |      |    | CLA  |
| 1985 01 28.18 | S 12.1  | AC | 32   | L 6  | 88  | 1.1  | 6  |      |    | BOR  |
| 1985 02 21.04 | [12.5   | AC | 32   | L 6  | 110 |      |    |      |    | BOR  |

## Periodic comet Tsuchinshan 1 (1984p)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1985 01 27.14 | S 10.4  | AC | 32   | L 6  | 68  | 2.7  | 1  |      |    | BOR  |
| 1985 01 27.74 | S 11.0  | VN | 41   | L 4  | 67  | 3.2  | 2  |      |    | CLA  |
| 1985 01 28.09 | S 10.3  | AC | 32   | L 6  | 68  | 2.7  | 1  |      |    | BOR  |
| 1985 01 30.30 | S 10.4  | AC | 32   | L 6  | 68  | 2.5  | 0/ |      |    | BOR  |
| 1985 02 10.92 | S 11.2  | A  | 25.4 | J 6  | 48  | 3    | 0/ |      |    | BOU  |
| 1985 02 21.09 | S 11.1  | AC | 32   | L 6  | 68  | 3.2  | 2  |      |    | BOR  |
| 1985 03 15.90 | S 12.3  | A  | 25.4 | J 6  | 59  | 1.5  | 1  |      |    | BOU  |
| 1985 03 17.26 | S 11.6  | NP | 25.6 | L 4  | 45  | 5.2  | 1  |      |    | MOR  |
| 1985 03 24.43 | S 11.8  | NP | 25.6 | L 4  | 67  | 3.2  | 1  |      |    | MOR  |

## Periodic comet Takamizawa (1984j)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1984 08 31.91 | S 11.0  | A  | 26.0 | L 6  | 63  | & 2  |    |      |    | MER  |

## Periodic comet Russell 1 (1985b)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1985 05 18.2  | T[16    |    | 154  | C 14 |     |      |    |      |    | MOR  |
| 1985 05 18.21 | [14.5   |    | 61.0 | C 16 | 375 |      |    |      |    | MOR  |

## Periodic comet Shoemaker 1 (1984q)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1984 11 28.76 | B 12.3  | A  | 26.0 | L 6  | 63  | 2.0  | 0  |      |    | MER  |

## Periodic comet Schaumasse (1984m)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA  | OBS.  |
|---------------|---------|----|------|------|-----|------|----|------|-----|-------|
| 1984 12 01.17 | B 10.5  | AC | 20.5 | L 4  | 52  | 2.3  | 5  |      |     | HAS02 |
| 1984 12 19.17 | B 9.5   | S  | 7.0  | R 12 | 28  |      | 1  |      |     | MER   |
| 1984 12 19.18 |         |    | 60.0 | L 4  | 84  | 4.5  | 1  | 0.07 | 278 | MER   |
| 1984 12 24.42 | S 10.0  | AC | 32   | L 6  | 68  | 3.0  | 2/ |      |     | BOR   |
| 1985 01 27.79 | S 10.6  | AC | 41   | L 4  | 67  | 4    | 1  |      |     | CLA   |
| 1985 02 21.42 | [11.0   | AC | 32   | L 6  | 68  |      |    |      |     | BOR   |

## Periodic comet Halley (1982i)

| DATE (UT)     | MM MAG. | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|---------|----|------|------|-----|------|----|------|----|------|
| 1984 12 21.96 | P 19.0  | UP | 60.0 | L 4  |     | 0.17 |    |      |    | MER  |
| 1984 12 22.96 | P[20.0  | UP | 60.0 | L 4  |     |      |    |      |    | MER  |

## Periodic comet Tuttle (1967 V)

| DATE (UT)     | MM | MAG.  | RF | AP.  | T F/ | PWR | COMA  | DC | TAIL  | PA | OBS.  |
|---------------|----|-------|----|------|------|-----|-------|----|-------|----|-------|
| 1967 02 09.50 |    | 11.5  |    | 20.3 | L    | 39  | 2     |    |       |    | BOE   |
| 1967 02 11.02 |    | 11.0  | AC | 20.3 | L    | 39  | & 4.0 | 0  |       |    | SIM   |
| 1967 02 15.01 |    | 12.8  | AC | 20.3 | L    | 39  | < 0.5 | 5  |       |    | SIM   |
| 1967 02 16.05 |    | 12.5  | AC | 20.3 | L    | 39  | < 0.5 | 3  |       |    | SIM   |
| 1967 02 18.02 |    | 11.8  | AC | 20.3 | L    | 38  | < 0.5 | 0  |       |    | SIM   |
| 1967 02 26.07 |    | 12.5  | AC | 20.3 | L    |     | < 0.5 | 0  |       |    | SIM   |
| 1967 03 01.08 |    | 10.3  |    | 20.3 | L    | 55  | 2     | 3  | 0.08  |    | MID   |
| 1967 03 02.05 |    | 12.0  | AC | 20.3 | L    | 40  | < 0.5 | 0  |       |    | SIM   |
| 1967 03 02.08 |    | 10.3  |    | 20.3 | L    | 55  | 3     | 4  |       |    | MID   |
| 1967 03 03.08 |    | 10.5  |    | 20.3 | L    | 55  | & 2   | 4  | ?0.08 |    | MID   |
| 1967 03 07.08 |    | 10    | :  | 20.3 | L    | 55  | & 3.5 | 4  |       |    | MID   |
| 1967 03 11.02 |    | 10.7  | AC | 20.3 | L    | 39  | & 1   | 0  |       |    | SIM   |
| 1967 03 11.1  |    | 10.0: | UL | 25.4 | L    | 50  | & 2.5 | 4  |       |    | MCC03 |
| 1967 03 12.07 |    | 13.0: | AC | 20.3 | L    | 39  | < 1   | 0  |       |    | SIM   |
| 1967 04 24.07 |    | 9.9   | AC | 20.3 | L    | 39  | 2     | 0  |       |    | SIM   |
| 1967 04 30.50 |    |       |    | 20.3 | L    |     | 3.5   |    |       |    | BOE   |

## Periodic comet Schwassmann-Wachmann 1

| DATE (UT)     | MM | MAG.  | RF | AP.  | T F/ | PWR | COMA | DC | TAIL | PA | OBS. |
|---------------|----|-------|----|------|------|-----|------|----|------|----|------|
| 1985 05 18.38 |    | [13.5 |    | 61.0 | C 16 | 375 |      |    |      |    | MOR  |
| 1985 06 18.3  |    | T[15  |    | 154  | C 14 |     |      |    |      |    | MOR  |

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## RECENT NEWS AND RESEARCH CONCERNING COMETS

(continued from page 72)

from these, Brian Marsden has calculated an orbit showing the comet to be likely a short-period one, having passed perihelion on June 11, with an orbital period of 5.7 years.

Observers are anxiously awaiting the appearance of P/Halley from behind the sun, as of this writing. We provide an ephemeris below for P/Halley 1982i and encourage observers to obtain accurate total visual magnitude estimates on every clear night; we especially encourage attempts when the moon is unavoidable, because fewer people will be trying then to locate the comet.

The launches of all spacecraft to P/Halley have apparently been successful during the past several months. The tours, T-shirts, and books are all selling widely now, with many more business ventures continually popping up all over to exploit the coming of P/Halley. But the ICE mission in early September is the next excitement for cometary scientists, and indeed many observers are following P/Giacobini-Zinner closely.

Periodic comet Giacobini-Zinner 1984e has brightened close to expectations. Charles S. Morris and Stephen J. Edberg observed the comet visually on April 13 with the 24-inch reflector at Table Mountain Observatory near Los Angeles, CA, estimating the diffuse coma (diameter about 15") to be of magnitude 15.5. A month later, the comet had brightened to total visual magnitude 13.4 (May 18, Morris, same telescope), and by mid-June was nearing magnitude 11. As of this writing, the comet was near magnitude 9 and larger than 5' in diameter.

The Comet Giacobini-Zinner Handbook: An Observer's Guide to the First Comet to be Explored by a Spacecraft (by D. K. Yeomans and J. C. Brandt) has recently been published by NASA and the Jet Propulsion Laboratory; the 70-page paperback document may be purchased from the Superintendent of Documents, U.S. Government Print Office, Washington, DC (publication # JPL 400-254 3/85). Another useful NASA/JPL publication recently published is Cometary Astrometry

## RECENT NEWS AND RESEARCH CONCERNING COMETS

(edited by Yeomans, R. M. West, R. S. Harrington, and B. G. Marsden), a 220-page paperback volume including some 30 papers presented at the IHW/ESO astronomy workshop during 1984 June 18-19 in Garching, West Germany. The papers give valuable insight from experienced

observers into the observation and subsequent measuring of cometary positions -- an area which is all too often neglected by professional and amateur astronomers alike. (This is JPL Publication 84-82.)

-- Daniel W. E. Green (7/20/85)

## 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.). Room is given after the first "equal sign" for the Roman numeral designation (usually not yet given for the last 20 comets), which gives the year of perihelion. After the second "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), and the perihelion distance, q (in AU).

|              |                                                  |
|--------------|--------------------------------------------------|
| 1984i = 1984 | = * Austin (T = 8/12, q = 0.3)                   |
| 1984j = 1984 | = * P/Takamizawa (T = 5/24, q = 1.6)             |
| 1984k = 1984 | = P/Arend-Rigaux (T = 12/1, q = 1.4)             |
| 1984l = 1985 | = P/Gehrels 3 (T = 6/3, q = 3.4)                 |
| 1984m = 1984 | = P/Schaumasse (T = 12/6, q = 1.2)               |
| 1984n = 1984 | = * P/Kowal-Mrkos (T = 5/16, q = 2.0)            |
| 1984o = 1984 | = * Meier (T = 10/13, q = 0.9)                   |
| 1984p = 1985 | = P/Tsuchinshan 1 (T = 1/2, q = 1.5)             |
| 1984q = 1984 | = * P/Shoemaker 1 (T = 9/16, q = 2.0)            |
| 1984r = 1984 | = * Shoemaker (T = 9/4, q = 5.5)                 |
| 1984s = 1985 | = * Shoemaker (T = 1/3, q = 1.2)                 |
| 1984t = 1984 | = * Levy-Rudenko (T = 12/14, q = 0.92)           |
| 1984u = 1984 | = * P/Shoemaker 2 (T = 9/26, q = 1.3)            |
| 1984v = 1985 | = * Hartley (T = 9/29, q = 4.0)                  |
| 1985a = 1986 | = P/Ashbrook-Jackson (T = 1/24, q = 2.3)         |
| 1985b = 1985 | = P/Russell 1 (T = 7/5, q = 1.6)                 |
| 1985c = 1985 | = P/Honda-Mrkos-Pajdušáková (T = 5/23, q = 0.54) |
| 1985d = 1985 | = P/Tsuchinshan 2 (T = 7/21, q = 1.8)            |
| 1985e = 1985 | = * Machholz (T = 6/28, q = 0.1)                 |
| 1985f = 1985 | = * P/Hartley (T = 6/11, q = 1.5)                |

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## CORRIGENDA

On page 67 of the April issue, column 2, second paragraph, a typographical error caused Sergei Vsekhsvyatskii's name to be misspelled.

On page 50 of the April issue, line 12 (under comet Bennett), for "was only 3 above" read "was only 3 degrees above". Also on the same page, line 8, for "found a 0.8-long type-II tail" read "found a 0.8-degree-long type-II tail". Again on the same page, lines 25-26 (under comet West), for "15 type-I tail" read "15-degree type-I tail".

## EPHEMERIS FOR PERIODIC COMET ASHBROOK-JACKSON (1985a)

From unpublished two-body-orbit correction by Daniel Green based on 1985 observations. The predicted light curve within  $r = 2.4$  AU is after D. Meisel and C. Morris (1982) in Comets (U. of Ariz. Press); the magnitudes before  $r = 2.4$  AU are after an absolute magnitude of 10.0 and  $n = 4$ .

| Date       | ET | R. A. (1950) | Decl.    | Delta | r     | Elong. | Mag. |
|------------|----|--------------|----------|-------|-------|--------|------|
| 1985 08 03 |    | 19 41.21     | -39 34.3 | 1.658 | 2.605 | 153.5  | 15.3 |
| 1985 08 08 |    | 19 37.06     | -39 18.8 |       |       |        |      |
| 1985 08 13 |    | 19 33.43     | -38 58.2 | 1.678 | 2.575 | 145.1  | 15.2 |
| 1985 08 18 |    | 19 30.45     | -38 33.2 |       |       |        |      |
| 1985 08 23 |    | 19 28.21     | -38 04.1 | 1.719 | 2.547 | 136.1  | 15.2 |
| 1985 08 28 |    | 19 26.77     | -37 31.7 |       |       |        |      |
| 1985 09 02 |    | 19 26.15     | -36 56.5 | 1.778 | 2.519 | 127.2  | 15.3 |
| 1985 09 07 |    | 19 26.35     | -36 19.1 |       |       |        |      |
| 1985 09 12 |    | 19 27.37     | -35 39.7 | 1.850 | 2.493 | 118.5  | 15.3 |
| 1985 09 17 |    | 19 29.18     | -34 58.9 |       |       |        |      |
| 1985 09 22 |    | 19 31.75     | -34 16.8 | 1.933 | 2.468 | 110.3  | 15.4 |
| 1985 09 27 |    | 19 35.04     | -33 33.6 |       |       |        |      |
| 1985 10 02 |    | 19 38.99     | -32 49.5 | 2.024 | 2.444 | 102.5  | 15.4 |
| 1985 10 07 |    | 19 43.55     | -32 04.5 |       |       |        |      |
| 1985 10 12 |    | 19 48.67     | -31 18.6 | 2.120 | 2.422 | 95.1   | 15.5 |
| 1985 10 17 |    | 19 54.32     | -30 31.8 |       |       |        |      |
| 1985 10 22 |    | 20 00.43     | -29 43.9 | 2.219 | 2.402 | 88.1   | 12.6 |
| 1985 10 27 |    | 20 06.97     | -28 55.0 |       |       |        |      |
| 1985 11 01 |    | 20 13.88     | -28 05.0 | 2.319 | 2.384 | 81.5   | 12.7 |
| 1985 11 06 |    | 20 21.12     | -27 13.7 |       |       |        |      |
| 1985 11 11 |    | 20 28.67     | -26 21.1 | 2.419 | 2.367 | 75.1   | 12.8 |
| 1985 11 16 |    | 20 36.49     | -25 27.2 |       |       |        |      |
| 1985 11 21 |    | 20 44.54     | -24 31.8 | 2.518 | 2.353 | 69.0   | 12.8 |
| 1985 11 26 |    | 20 52.79     | -23 34.9 |       |       |        |      |
| 1985 12 01 |    | 21 01.21     | -22 36.6 | 2.614 | 2.340 | 63.1   | 12.9 |

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EPHEMERIS FOR P/HALLEY (from elements by D. K. Yeomans, from Newsletter of the Astrometry Network of the IHW, May 1985). The predicted total visual magnitudes are from Morris and Green 1982, A.J. 87, 918.

| Date       | ET | R. A. (1950) | Decl.    | Delta | r     | Elong. | Mag. |
|------------|----|--------------|----------|-------|-------|--------|------|
| 1985 08 03 |    | 05 53.41     | +18 54.8 | 3.759 | 3.079 | 41.9   | 13.8 |
| 1985 08 08 |    | 05 56.42     | +18 59.7 |       |       |        |      |
| 1985 08 13 |    | 05 59.31     | +19 04.3 | 3.507 | 2.960 | 50.0   | 13.5 |
| 1985 08 18 |    | 06 02.05     | +19 08.7 |       |       |        |      |
| 1985 08 23 |    | 06 04.59     | +19 13.1 | 3.236 | 2.838 | 58.3   | 13.1 |
| 1985 08 28 |    | 06 06.91     | +19 17.5 |       |       |        |      |
| 1985 09 02 |    | 06 08.95     | +19 22.1 | 2.947 | 2.715 | 66.9   | 12.7 |
| 1985 09 07 |    | 06 10.67     | +19 26.9 |       |       |        |      |
| 1985 09 12 |    | 06 11.98     | +19 32.2 | 2.643 | 2.589 | 75.9   | 12.2 |
| 1985 09 17 |    | 06 12.81     | +19 38.2 |       |       |        |      |
| 1985 09 22 |    | 06 13.03     | +19 45.0 | 2.329 | 2.461 | 85.4   | 11.7 |
| 1985 09 27 |    | 06 12.53     | +19 53.1 |       |       |        |      |
| 1985 10 02 |    | 06 11.11     | +20 02.7 | 2.008 | 2.330 | 95.6   | 11.1 |
| 1985 10 07 |    | 06 08.56     | +20 14.2 |       |       |        |      |
| 1985 10 12 |    | 06 04.55     | +20 28.0 | 1.686 | 2.197 | 107.0  | 10.4 |
| 1985 10 17 |    | 05 58.65     | +20 44.4 |       |       |        |      |
| 1985 10 22 |    | 05 50.25     | +21 03.6 | 1.370 | 2.060 | 120.3  | 9.7  |
| 1985 10 27 |    | 05 38.52     | +21 25.4 |       |       |        |      |
| 1985 11 01 |    | 05 22.28     | +21 48.2 | 1.073 | 1.921 | 136.8  | 8.8  |
| 1985 11 06 |    | 04 59.91     | +22 07.5 |       |       |        |      |