



AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue 12

August 1985

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Observations and Bulletin Editor: Stephen J. Edberg

HALLEY AND GIACOBINI-ZINNER UPDATES

Comet Halley was recovered on July 27 by Jim Gibson using the Palomar 1.5 m (60 inch) telescope and a CCD and by Charles Morris and Stephen Edberg visually with a 61 cm (24") Cassegrain at Table Mountain Observatory after its most recent solar conjunction. While quite faint (magnitude 16 CCD; 15.0: visual), it will brighten and become more accessible over the next few months. Analysis of data obtained during the last observing season by astronomers at Arizona State University indicates that P/Halley apparently "turned on" in October 1984.

Meanwhile, the two Soviet Vega spacecraft each successfully dropped off a lander and atmospheric balloon at Venus in June while the main spacecraft continue on to Halley. The European Space Agency's Giotto spacecraft was successfully launched on July 2 and is now on an interplanetary trajectory to Comet Halley. The Japanese Planet-A spacecraft is scheduled for launch in August.

Comet Giacobini-Zinner continues to brighten and is showing a tail. Binocular observations of it commenced in July. The ICE spacecraft remains on target for its fly-through of G-Z's tail on September 11. There is growing concern about the survival of the spacecraft because there may be more dust in G-Z's environment than some investigators originally believed.

Observers are encouraged to monitor Halley and G-Z. All observations MUST be reported on IHW report forms for inclusion in the archives. Submit observations through the U.S./Canada Recorders, the International Recorder,

your National Correspondent, or the National Recorders. Observations should be submitted monthly to recorders or correspondents.

The Problicom Award for the earliest amateur recovery of Halley has gone to Patrick Martinez and Eric Laffont. Their award winning photos were reproduced in Bulletin 10.

NOTES ON METEOR OBSERVING

The most important criterion for all observations is to distinguish carefully between meteors belonging to the Halley showers and those that are background or other shower meteors. It should be stressed that shower counts are at best about equal to background counts and at worst only a small fraction thereof.

Visual observations require an almost instantaneous judgement on a fleeting event, based primarily on extrapolating the trail back to the radiant, and secondarily on consideration of the velocity of the meteor. The greater precision of photographs or photoelectric imaging makes distinction easier. Some radars are able to distinguish on the basis of velocity and/or the geometry of the trail, but for others shower counts are obtained only by subtraction of an assumed background rate.

Although careful counting of shower meteors is deemed paramount, experienced observers are encouraged to estimate magnitudes to the nearest half or whole magnitude. Less importance is attached to ancillary characteristics such as meteor colour or train duration. [Editor's Note: Report forms for estimates of magnitude are being considered.]

Bruce A. McIntosh
Discipline Specialist
IHW Meteor Studies

IHW RECORDERS IN JAPAN

National Chief Recorders

K. Saito
4-20-2, Nozawa
Setagaya, Tokyo 158
JAPAN

K. Tomita
4-11-20, Yoda
Setagaya, Tokyo 158
JAPAN

Photography

T. Urata
8-5, Nishitaka
Shimizu 424
JAPAN

Visual (except near-nucleus) Observations

A. Kamo
5-10, Shimazaki
Wakayama 640
JAPAN

Astrometry

S. Nakano
2-3-30, Sakae-machi
Sumoto 656
JAPAN

Visual (near-nucleus) Observations

T. Seki
2-6-15, Kami-machi
Kochi 780
JAPAN

Physical Observations

J. Watanabe
Dept. of Astronomy
University of Tokyo
Bunkyo, Tokyo 113
JAPAN

THE GIACOBINID METEOR SHOWER

With a favorable approach of Comet Giacobini-Zinner, and memories of a past Giacobinid meteor storm, meteor observers have a natural curiosity about the possible strength of this year's shower.

The shower is normally called the Draconids; in 1985 it will peak on U.T. October 8.55. When a storm occurs, the name of the parent comet is often substituted for that of the shower so that the great storms of 1933 and 1946 are called the Giacobinids. This is unusual; meteor showers are named after the constellations, or stars, near which the radiant lies at the time of maximum strength.

The 1946 shower occurred on the evening of October 9/10 and was very strong over eastern North America. Under the leadership of Isabel K. Williamson, a group of Montreal amateur astronomers observed this storm. Miss Williamson describes the procedure in Fifty Times Around the Sun: A History of the Montreal Centre, Royal Astronomical Society of Canada (Montreal: RASC, 1968, p. 33):

There on the grounds of Lower Canada College twenty-five observers and recorders were astonished and awed by what was to be remembered as one of the most majestic showers since the Leonids of 1833.... They observed through specially constructed frames which allowed them to see only a small portion of the sky. Under these limitations, as many as 30 meteors per frame were sighted in five minutes at the height of the shower, creating a total of 2888 recorded observations between 21:00 and 24:00 hours.

The duration of the shower is short, with maximum strength lasting about an hour in 1946 although there was a longer period of buildup and decline. This presents the negative aspect in our hopes for a storm this year: if the shower is less than 150,000 km in the direction of our planet's motion, then we really should not expect a storm unless the swarm is wider than we thought. According to Donald K. Yeomans and John C. Brandt, in their excellent The Comet Giacobini-Zinner Handbook (Pasadena: NASA-JPL, 1985),

... major Giacobinid meteor showers occur 1) when the Earth closely follows the comet to the comet's descending node, 2) when the Earth passes close to the comet's orbit, and 3) when the Earth passes inside the comet's orbit at the comet's descending node.... Two of these three conditions are satisfied for the possible Giacobinid shower on October 8.55, 1985 (U.T.): the Earth passes inside the comet's orbit at the comet's descending node ... and only 26.5 days after the comet itself passes by this point. If the meteor stream is at least 0.033 AU in radius, there should be a Giacobinid meteor shower on October 8, 1985. However, if the past observations are any guide, the stream is not that wide. Hence, while the Giacobinid meteor shower is worth looking for in October 1985, the activity may turn out to be modest or nonexistent.

Observing the Giacobinids this year is somewhat problematical, since the shower's strength is so uncertain. The observing frames like those used in

Montreal would certainly be helpful if the shower is strong. On the IHW meteor form, be sure to specify the dimensions of the sky area you monitored using a frame. If you choose to watch without limitation, and the strength reaches storm proportions, you may have trouble counting the number of meteors. Frankly, I recommend that you take the chance, look at the sky that morning, and if a storm arrives, enjoy the incredible thrill.

[Reprinted from Tails and Trails, the newsletter of the ALPO Comets and Meteors Sections, Vol. II, No. 2.]

David H. Levy, Recorder
A.L.P.O. Comets and
Meteors Sections

NOTES ON MAKING DRAWINGS OF COMETS

The IHW drawing report form requests that structures in the comet be identified as to Feature Type, ID#, and PA. The purpose in asking for this information is to unambiguously identify what is seen. Feature Type simply means a one or two word description of the structure; fountain, jet, and sheath are examples. ID# is the identification number the observer assigns to the feature and indicated on the drawing so it won't be confused with a similar one nearby and allows a detailed description elsewhere on the report form. PA is the position angle of the feature, or its range of position angles in the comet. Observers' efforts at drawing and identifying features will be most helpful when the drawings are compared with photographs taken at the same time.

S. J. Edberg
International Halley Watch

MAKING TRAVEL PLANS TO SEE HALLEY'S COMET

You should satisfy yourself that the tour you select will provide the services and accommodations you desire, and that you are dealing with a reliable organization. Matters to consider when evaluating the various offerings should include the following:

1. What are your primary goals on the tour: to see the comet, to tour a place, or both, and how intensively will you pursue each goal on the trip?
2. Is there sufficient time scheduled for your primary activities?
3. What are the weather prospects for the area being visited, in particular, at the places where comet observations are planned? Remember that cloud-free does not necessarily mean high transparency.
4. Are the observing sites properly situated for minimal interference from air and light pollution? Can you make your desired observations from these sites?
5. Are the scheduled observing periods properly coordinated with the Moon's phase and with the best dates for observing the comet?

6. What instruments will be available for viewing the comet? Is any provision made for carrying your own observing equipment and what weight or customs restrictions are there? Is an appropriate power supply available?

7. Are there any other events (astronomical or otherwise) that you want to coordinate with your travel plans?

8. Do personal health restrictions limit the places you can visit?

9. Is the local political situation of the country being visited a concern?

10. Besides considering overall cost, look at the modes of transportation offered, the quality of accommodation, the number of meals included, group size, leadership, and the reputation of the organizers.

The primary time for observing Comet Halley at its brightest and greatest extent is in March - April 1986. The south temperate zone contains the favored latitudes at this time. Early in this period Halley rises before sunrise. Its motion causes it to rise earlier and earlier each night, until in mid-April (at opposition) it rises at sunset. Late in the period it will already be high in the sky at sunset and setting in the west in the early morning hours.

Halley's Comet is closest to Earth on April 11. On April 14 it is at opposition. On April 9 a partial eclipse of the sun will be visible from parts of Indonesia, Australia, New Guinea, the South Island of New Zealand, Antarctica, and the Indian Ocean. On April 24 a total lunar eclipse occurs with the comet about 40° away: the pair will be visible together during totality from portions of the eastern hemisphere. The Moon will seriously interfere with comet observing during approximately the last week of March and the first few days of April. It interferes again during the last ten days of April (except during the lunar eclipse).

Visiting a new place and meeting the inhabitants is exciting, especially when combined with an astronomical event. Good luck and clear skies.

S. J. Edberg
International Halley Watch

PHOTOELECTRIC PHOTOMETRY FILTERS

Sets of standard IAU/IHW imaging quality filters are available for US \$930.00 from Barr Associates, 2 Liberty Way, Westford, MA 01886, USA, ATTN: Thomas Mooney. Telephone: (617) 692-7513.

THE IHW AMATEUR OBSERVER'S BULLETIN ON COMPUTER

Call the Star Board at (303) 455-3113 24 hours/day; use 300/1200 baud. For a trial run, at the FIRST and LAST NAME prompts enter "IHW" and "BULLETIN", respectively. For the password, enter "dasbbs". Then, from the main menu, type "M" for the message board. From the message board, type "5" for the astronomy board. From there you may browse around to your heart's content,

and, if you like what you see, log on the next time under your own name and password. Access is free except for long-distance phone call billing, if any.

NOTICES

A new Meteor Recorder for New Zealand has replaced Ken Morse. He is Dennis Goodman, P.O. Box 2240, Wellington 6000, NEW ZEALAND.

The BASIC ephemeris program in Comet Halley Returns - A Teacher's Guide (available from the Superintendent of Documents, U.S. Government Printing Office, Dept. 33, Washington, D.C. 20402, USA; NASA publication EP-197) has an error. H. Boehnhardt and W. Strupat (Federal Republic of Germany) say "In lines Nos. 120, 332 and 385, the variable 'TP' must be changed to 'TPI', or an additional statement 'TP = TPI' has to be inserted between lines 110 and 120." They also note that Kepler's equation does not converge on some dates with some computers.

The Planetary Society publishes and mails the "IHW Amateur Observer's Bulletin" in cooperation with NASA and the Jet Propulsion Laboratory as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extraterrestrial life. Membership is open to all at \$20 per year (US) or \$25 abroad. DON'T FORGET--PBS PLANETARY SOCIETY TV SPECIAL "COMET HALLEY" ON NOVEMBER 26, 1985. For information on the Society's Comet Halley cruise call (818) 793-5100.

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EXPLANATION OF EPHEMERIS ENTRIES

J.D. = JULIAN DATE (TIMES IN THIS EPHEMERIS ARE EPHEMERIS TIMES)
R.A. 1950.0 DEC. = GEOCENTRIC RIGHT ASCENSION AND DECLINATION REFERRED TO THE MEAN EQUATOR AND EQUINOX OF 1950.0 - LIGHT TIME CORRECTIONS HAVE BEEN APPLIED.
R.A. APPN DEC. = APPARENT RIGHT ASCENSION AND DECLINATION - LIGHT TIME, ANNUAL ABERRATION, AND NUTATION CORRECTIONS HAVE BEEN APPLIED AND R.A. AND DEC. HAVE BEEN PRECESSED TO THE EPHEMERIS DATE.
DELTA = GEOCENTRIC DISTANCE OF OBJECT IN AU.
DELDOT = GEOCENTRIC VELOCITY OF OBJECT IN KM/SEC.
R = HELIOCENTRIC DISTANCE OF OBJECT IN AU.
RDOT = HELIOCENTRIC VELOCITY OF OBJECT IN KM/SEC.

TMAG = TOTAL MAGNITUDE ESTIMATES AFTER THE ANALYSIS BY C.S. MORRIS.

PRE-PERHELION

$TMAG = 8.90 + 5 \cdot \log(\Delta) + 11.00 \cdot \log(R)$ FOR $R > 1.3$ AU

$TMAG = 9.60 + 5 \cdot \log(\Delta) + 4.73 \cdot \log(R)$ FOR $R = 1.3$ TO 0.99 AU

POST-PERHELION

$TMAG = 9.65 + 5 \cdot \log(\Delta) + 10.48 \cdot \log(R)$ FOR $R = 0.99$ TO 1.71 AU

IN CASES WHERE TMAG IS NOT COMPUTED, IT IS SET EQUAL TO ZERO.

NMAG = NUCLEAR MAGNITUDE = $16.5 + 5 \cdot \log(\Delta) + 5 \cdot \log(R) + 0.03 \cdot \beta$

THETA = SUN-EARTH-OBJECT ANGLE IN DEGREES.

BETA = SUN-OBJECT-EARTH ANGLE IN DEGREES.

MOON = OBJECT-EARTH-MOON ANGLE IN DEGREES.

THE FOLLOWING OSCULATING ORBITAL ELEMENTS ARE CONSISTENT WITH THE ABOVE EPHEMERIS:

EPOCH	2446320.5	1985	SEPT. 12.0 (E.T.)
PERIHELION PASSAGE	2446313.74907	1985	SEPT. 5.24907 (E.T.)
PERIHELION DISTANCE	1.0282614 AU		
ECCENTRICITY	0.7075300		
ARG. OF PERIHELION	172.48887		
LONG. OF ASCENDING NODE	194.70595		
INCLINATION	31.87829		

IN THE ABOVE ORBITAL ELEMENTS, THE ANGLES ARE IN DEGREES AND REFERRED TO THE ECLIPTIC AND EQUINOX OF 1950.0.

THE NONGRAVITATIONAL PARAMETERS ARE AS FOLLOWS:

$A1 = -0.0543$

$A2 = -0.0465$

FOR THE DEFINITION OF $A1$ AND $A2$ SEE: MARSDEN ET AL, ASTRONOMICAL JOURNAL, 1973, VOL. 78, PP. 211-225.

COMPUTATIONS BY D.K. YEOMANS - JPL

METEOR PHOTOGRAPHY INFORMATION REPORT FORM

UT Date Range _____ Observer _____

1. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

2. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

3. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

Film Name _____ ISO (ASA/DIN) _____

Developed in _____ at _____ °C / _____ °F for _____ minutes

Grating _____ gr/mm Blaze Order _____ Aperture _____

Prism apex angle _____ ° Glass Type _____ Aperture _____

Rotating Shutter Chop Frequency _____ . Other Chopper Info.: _____

Exposures

Negative Number	Meteor or Star Designation	UT Date	UT Start	Instrument No.	Duration	Faintest Star	Site

Triangulation: Second Observer _____ Second Site _____

Paired Negative Numbers _____

(A separate report form should be completed for the second site.)

Notes:

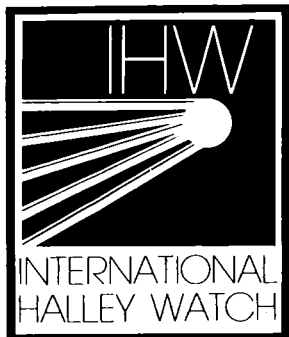
Submit contact prints or duplicate slides with your name and address on them to the Meteor Recorder.

EPHEMERIS (WITH PERTURBATIONS) FOR P/GIACOBINI-ZINNER

YR	MM	DAY	HR	J.D.	R.A. 1950.0 DEC.	R.A. APPN DEC.	DELTA DELDOT	R	RDOT	TMAG	NNAG	THETA	BETA	MOON
1985	3	15	.0	2446139.5	18 35.523 + 4 8.24	18 37.251 + 4 9.82	2.38 -32.19	2.34	-14.88	14.8	21.0	75.7	24.3	31
1985	3	25	.0	2446149.5	18 51.870 + 6 29.50	18 53.571 + 6 31.89	2.19 -31.48	2.25	-15.11	14.5	20.7	80.4	25.9	113
1985	4	4	.0	2446159.5	19 8.273 + 9 13.69	19 9.943 + 9 16.88	2.01 -30.40	2.16	-15.33	14.1	20.5	84.7	27.4	110
1985	4	14	.0	2446169.5	19 24.783 +12 22.08	19 26.417 +12 26.06	1.84 -29.04	2.08	-15.52	13.7	20.3	88.6	28.9	43
1985	4	24	.0	2446179.5	19 41.454 +15 55.70	19 43.050 +16 .47	1.68 -27.41	1.99	-15.69	13.3	20.0	91.9	30.4	121
1985	5	4	.0	2446189.5	19 58.413 +19 54.61	19 59.968 +20 .14	1.53 -25.56	1.89	-15.82	12.9	19.8	94.5	32.0	93
1985	5	14	.0	2446199.5	20 15.905 +24 18.27	20 17.416 +24 24.57	1.38 -23.61	1.80	-15.89	12.4	19.5	96.4	33.9	56
1985	5	24	.0	2446209.5	20 34.262 +29 4.80	20 35.729 +29 11.87	1.25 -21.60	1.71	-15.89	12.0	19.2	97.5	35.9	121
1985	6	3	.0	2446219.5	20 54.078 +34 10.19	20 55.504 +34 18.04	1.13 -19.66	1.62	-15.79	11.5	19.0	97.7	38.4	85
1985	6	13	.0	2446229.5	21 16.342 +39 29.04	21 17.734 +39 37.69	1.03 -17.88	1.53	-15.55	11.0	18.7	97.0	41.3	63
1985	6	23	.0	2446239.5	21 42.588 +44 52.86	21 43.966 +45 2.35	.93 -16.33	1.44	-15.12	10.5	18.5	95.5	44.6	116
1985	7	3	.0	2446249.5	22 15.443 +50 8.48	22 16.851 +50 18.84	.84 -15.03	1.35	-14.44	10.0	18.2	93.4	48.5	86
1985	7	13	.0	2446259.5	22 59.057 +54 55.08	23 .586 +55 6.24	.75 -13.95	1.27	-13.44	9.4	18.0	90.8	52.9	60
1985	7	18	.0	2446264.5	23 26.582 +56 56.06	23 28.231 +57 7.52	.71 -13.44	1.24	-12.79	9.3	17.9	89.4	55.3	85
1985	7	23	.0	2446269.5	23 58.803 +58 32.21	0 .620 +58 43.80	.68 -12.90	1.20	-12.03	9.1	17.8	88.0	57.8	119
1985	7	28	.0	2446274.5	0 35.984 +59 33.08	0 38.017 +59 44.53	.64 -12.30	1.17	-11.14	8.9	17.7	86.5	60.3	124
1985	8	2	.0	2446279.5	1 17.576 +59 46.31	1 19.847 +59 57.25	.60 -11.59	1.14	-10.12	8.8	17.6	85.1	62.9	89
1985	8	7	.0	2446284.5	2 1.895 +58 59.35	2 4.378 +59 9.34	.57 -10.71	1.11	-8.97	8.6	17.5	83.7	65.4	51
1985	8	12	.0	2446289.5	2 46.356 +57 2.41	2 48.979 +57 11.07	.54 -9.62	1.08	-7.69	8.4	17.4	82.4	67.9	42
1985	8	17	.0	2446294.5	3 28.340 +53 51.22	3 31.006 +53 58.33	.52 -8.24	1.06	-6.27	8.3	17.3	81.2	70.1	84
1985	8	22	.0	2446299.5	4 6.077 +49 28.17	4 8.700 +49 33.70	.50 -6.53	1.05	-4.75	8.2	17.2	80.2	72.0	141
1985	8	27	.0	2446304.5	4 38.927 +44 1.87	4 41.454 +44 5.89	.48 -4.52	1.04	-3.13	8.1	17.2	79.5	73.4	140
1985	8	28	.0	2446305.5	4 44.918 +42 50.15	4 47.423 +42 53.89	.48 -4.09	1.03	-2.80	8.1	17.2	79.4	73.6	129
1985	8	29	.0	2446306.5	4 50.724 +41 36.57	4 53.205 +41 40.03	.47 -3.65	1.03	-2.47	8.1	17.2	79.3	73.8	118
1985	8	30	.0	2446307.5	4 56.349 +40 21.26	4 58.806 +40 24.45	.47 -3.20	1.03	-2.13	8.0	17.2	79.3	74.0	107
1985	8	31	.0	2446308.5	5 1.799 +39 4.35	5 4.231 +39 7.29	.47 -2.74	1.03	-1.79	8.0	17.2	79.2	74.1	95
1985	9	1	.0	2446309.5	5 7.078 +37 46.00	5 9.485 +37 48.68	.47 -2.28	1.03	-1.45	8.0	17.1	79.2	74.2	84
1985	9	2	.0	2446310.5	5 12.191 +36 26.35	5 14.573 +36 28.78	.47 -1.81	1.03	-1.11	8.0	17.1	79.1	74.3	73
1985	9	3	.0	2446311.5	5 17.144 +35 5.54	5 19.501 +35 7.73	.47 -1.34	1.03	-.77	8.0	17.1	79.1	74.3	61
1985	9	4	.0	2446312.5	5 21.943 +33 43.73	5 24.274 +33 45.69	.47 -.87	1.03	-.43	8.0	17.1	79.1	74.4	50
1985	9	5	.0	2446313.5	5 26.591 +32 21.07	5 28.898 +32 22.80	.47 -.40	1.03	-.09	8.0	17.1	79.2	74.4	39
1985	9	6	.0	2446314.5	5 31.095 +30 57.70	5 33.377 +30 59.21	.47 .08	1.03	.26	8.1	17.1	79.2	74.3	28
1985	9	7	.0	2446315.5	5 35.460 +29 33.79	5 37.718 +29 35.08	.47 .55	1.03	.60	8.1	17.1	79.3	74.3	17
1985	9	8	.0	2446316.5	5 39.690 +28 9.46	5 41.924 +28 10.54	.47 1.02	1.03	.94	8.1	17.1	79.3	74.2	5
1985	9	9	.0	2446317.5	5 43.790 +26 44.88	5 46.000 +26 45.76	.47 1.49	1.03	1.28	8.1	17.1	79.4	74.1	5
1985	9	10	.0	2446318.5	5 47.765 +25 20.17	5 49.952 +25 20.85	.47 1.95	1.03	1.62	8.1	17.1	79.5	73.9	17
1985	9	11	.0	2446319.5	5 51.620 +23 55.48	5 53.783 +23 55.97	.47 2.40	1.03	1.96	8.2	17.1	79.6	73.7	29
1985	9	12	.0	2446320.5	5 55.357 +22 30.93	5 57.499 +22 31.24	.47 2.85	1.03	2.30	8.2	17.1	79.8	73.5	42
1985	9	13	.0	2446321.5	5 58.983 +21 6.66	6 1.102 +21 6.79	.47 3.29	1.03	2.64	8.2	17.1	79.9	73.3	55
1985	9	14	.0	2446322.5	6 2.499 +19 42.77	6 4.596 +19 42.74	.48 3.72	1.04	2.97	8.2	17.2	80.1	73.1	69
1985	9	15	.0	2446323.5	6 5.911 +18 19.39	6 7.987 +18 19.19	.48 4.14	1.04	3.30	8.2	17.2	80.2	72.8	82
1985	9	16	.0	2446324.5	6 9.221 +16 56.62	6 11.276 +16 56.26	.48 4.55	1.04	3.63	8.2	17.2	80.4	72.5	96
1985	9	17	.0	2446325.5	6 12.433 +15 34.56	6 14.468 +15 34.04	.48 4.95	1.04	3.95	8.3	17.2	80.6	72.2	110
1985	9	18	.0	2446326.5	6 15.551 +14 13.30	6 17.565 +14 12.62	.49 5.34	1.04	4.27	8.3	17.2	80.8	71.8	123
1985	9	19	.0	2446327.5	6 18.576 +12 52.91	6 20.571 +12 52.08	.49 5.71	1.05	4.59	8.3	17.2	81.1	71.4	136
1985	9	20	.0	2446328.5	6 21.513 +11 33.48	6 23.489 +11 32.51	.49 6.08	1.05	4.91	8.3	17.2	81.3	71.1	148
1985	9	21	.0	2446329.5	6 24.365 +10 15.07	6 26.322 +10 13.96	.50 6.42	1.05	5.22	8.4	17.2	81.5	70.7	157
1985	9	22	.0	2446330.5	6 27.133 + 8 57.74	6 29.072 + 8 56.49	.50 6.76	1.06	5.53	8.4	17.2	81.8	70.3	161
1985	9	23	.0	2446331.5	6 29.820 + 7 41.54	6 31.742 + 7 40.16	.50 7.08	1.06	5.83	8.4	17.2	82.1	69.8	157
1985	9	24	.0	2446332.5	6 32.429 + 6 26.51	6 34.334 + 6 25.01	.51 7.38	1.06	6.13	8.5	17.2	82.3	69.4	148
1985	9	25	.0	2446333.5	6 34.961 + 5 12.69	6 36.849 + 5 11.07	.51 7.67	1.07	6.42	8.5	17.3	82.6	68.9	138

EPHEMERIS (WITH PERTURBATIONS) FOR P/GIACOBINI-ZINNER

YR	MN	DY	HR	J.D.	R.A. 1950.0	DEC.	R.A. APPN	DEC.	DELTA	DELDOT	R	RDOT	TMAG	NMAG	THETA	BETA	MOON
1985	9	30	.0	2446338.5	6 46.544	- 0 37.46	6 48.354	- 0 39.64	.54	8.88	1.09	7.82	8.7	17.3	84.1	66.5	85
1985	10	5	.0	2446343.5	6 56.454	- 5 55.38	6 58.194	- 5 58.03	.56	9.74	1.11	9.09	8.9	17.4	85.9	63.9	42
1985	10	10	.0	2446348.5	7 4.808	-10 41.94	7 6.485	-10 44.98	.59	10.30	1.14	10.23	9.1	17.5	87.5	61.2	47
1985	10	15	.0	2446353.5	7 11.668	-14 59.21	7 13.289	-15 2.58	.62	10.61	1.17	11.23	9.3	17.6	89.4	58.5	98
1985	10	20	.0	2446358.5	7 17.073	-18 49.57	7 18.642	-18 53.20	.65	10.75	1.20	12.11	9.6	17.7	91.3	55.8	133
1985	10	25	.0	2446363.5	7 21.055	-22 15.35	7 22.578	-22 19.16	.68	10.76	1.24	12.86	9.8	17.7	93.3	53.2	112
1985	10	30	.0	2446368.5	7 23.635	-25 18.68	7 25.114	-25 22.61	.72	10.68	1.28	13.50	10.0	17.8	95.4	50.7	76
1985	11	4	.0	2446373.5	7 24.816	-28 1.26	7 26.255	-28 5.25	.75	10.55	1.32	14.04	10.3	17.9	97.6	48.3	55
1985	11	9	.0	2446378.5	7 24.599	-30 24.19	7 26.000	-30 28.17	.78	10.42	1.36	14.48	10.5	18.0	99.8	45.9	72
1985	11	19	.0	2446388.5	7 20.084	-34 12.51	7 21.419	-34 16.30	.84	10.30	1.44	15.15	10.9	18.2	104.4	41.5	116
1985	11	29	.0	2446398.5	7 10.764	-36 43.67	7 12.048	-36 47.04	.90	10.49	1.53	15.56	11.4	18.3	109.0	37.5	68
1985	12	9	.0	2446408.5	6 57.943	-37 56.51	6 59.196	-37 59.29	.96	11.11	1.62	15.80	11.8	18.5	113.4	33.8	95
1985	12	19	.0	2446418.5	6 43.530	-37 51.12	6 44.782	-37 53.24	1.03	12.26	1.72	15.89	12.2	18.6	117.2	30.7	97
1985	12	29	.0	2446428.5	6 29.752	-36 34.16	6 31.028	-36 35.64	1.10	13.88	1.81	15.89	12.6	18.8	120.2	28.1	65
1986	1	8	.0	2446438.5	6 18.353	-34 19.16	6 19.672	-34 20.10	1.19	15.92	1.90	15.81	12.9	19.0	121.8	26.1	116
1986	1	18	.0	2446448.5	6 10.369	-31 22.94	6 11.745	-31 23.52	1.29	18.26	1.99	15.68	13.3	19.3	122.0	24.8	76
1986	1	28	.0	2446458.5	6 6.128	-28 3.72	6 7.562	-28 4.12	1.40	20.72	2.08	15.51	13.7	19.5	120.6	24.0	74
1986	2	7	.0	2446468.5	6 5.389	-24 36.99	6 6.881	-24 37.37	1.52	23.20	2.17	15.32	14.1	19.8	117.9	23.7	124
1986	2	17	.0	2446478.5	6 7.733	-21 14.28	6 9.279	-21 14.80	1.67	25.54	2.26	15.10	14.5	20.1	114.1	23.6	55
1986	2	27	.0	2446488.5	6 12.653	-18 3.90	6 14.246	-18 4.68	1.82	27.64	2.34	14.87	14.8	20.4	109.5	23.5	94
1986	3	9	.0	2446498.5	6 19.638	-15 10.49	6 21.273	-15 11.64	1.98	29.46	2.43	14.63	15.2	20.6	104.3	23.3	115
1986	3	19	.0	2446508.5	6 28.283	-12 36.43	6 29.955	-12 38.02	2.16	30.93	2.51	14.39	15.5	20.9	98.8	23.1	41



AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue 10

April 1985

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

HALLEY PHOTOS BY FRENCH AMATEURS

Reproduced in Figure 1 is a pair of photographs taken by Patrick Martinez and Eric Laffont on 19 February 1985. The exposures were each one hour and began at 19:26 UT (Figure 1a) and 21:35 UT (Figure 1b). The images had to be printed on Kodalith three times to obtain sufficient contrast. The exposures were made with the 60 cm f/3.5 reflector at Pic du Midi on Kodak 2415, emulsion hypersensitized in forming gas. The telescope followed the comet's motion, streaking the stars. Martinez and Laffont also obtained an image on 18 February and probably on the 20th, 21st, and 22nd.

AMERICAN WORKSHOP ON COMETARY ASTRONOMY

The IHW and the International Comet Quarterly are jointly sponsoring this gathering of amateur and professional astronomers interested in comets, to be held on June 17 and 18, 1985 at the University of Arizona in Tucson. Scheduled speakers on Monday include Stephen Larson, Susan Wyckoff, David Levy, Charles Morris, Joseph Marcus, Stephen O'Meara, Alan Hale, and Stephen Edberg. A panel discussion on Halley's Comet and comet observing is scheduled on Tuesday morning. Events for the joint convention of the WAA-AL-ALPO and tours of surrounding observatories follow for the rest of the week. For registration information send a self addressed stamped envelope (SASE) to Comet Workshop, Jet Propulsion Laboratory M/S T1166W, 4800 Oak Grove Drive, Pasadena, CA 91109, USA.

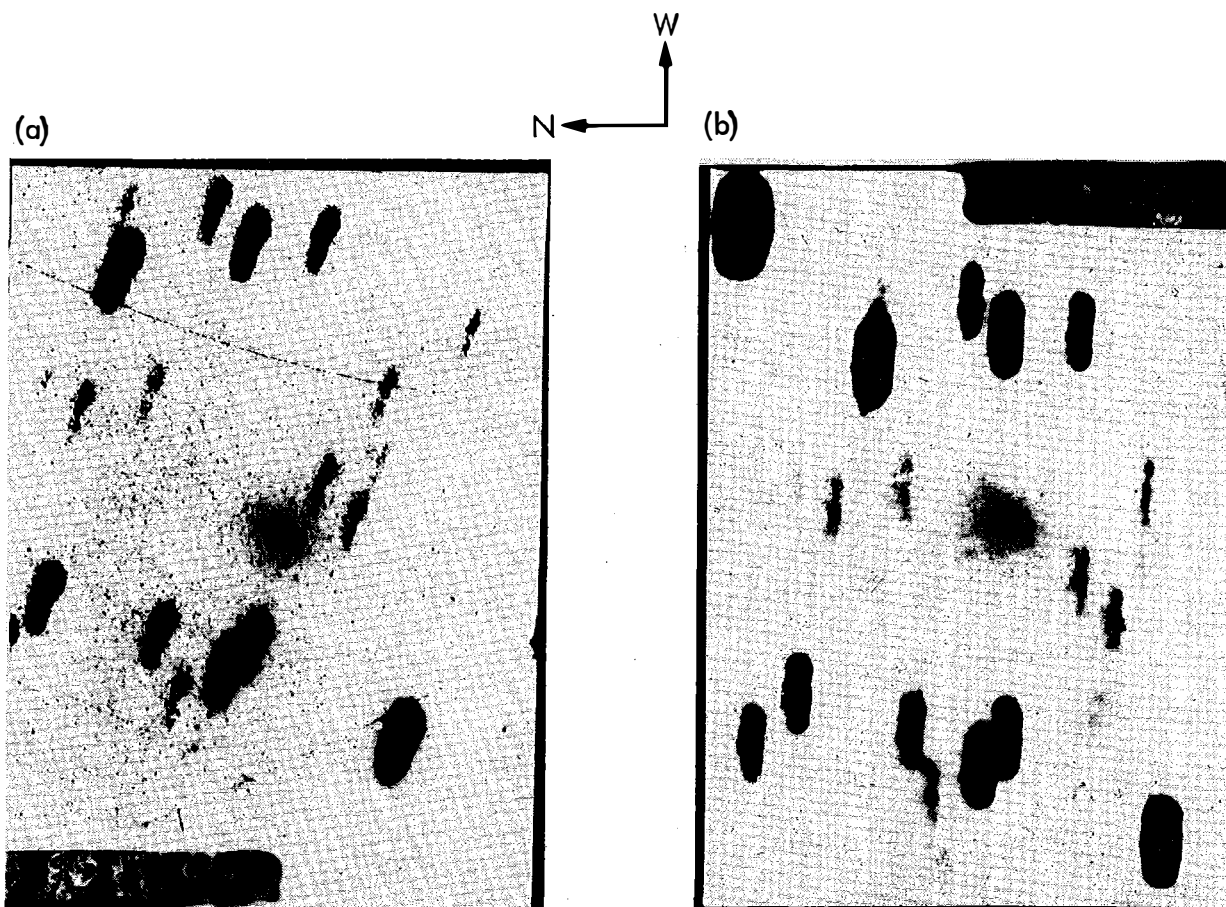


Figure 1

COMET HALLEY AND IHW UPDATES

The most recent available magnitudes for Halley show it to be at $V = 19.17$ and $B = 20.08$ based on CCD images by T. Boroson at Kitt Peak on February 25. Meanwhile, Reticon spectra taken with the 4.5 m MMT on Feb. 17 show some weak emission, with CN at 3875 Å identifiable. Magnitudes of $V = 18.9$, $B = 19.6$ in a 5 arc second aperture were reported.

The visual observation of Halley by S. O'Meara reported in the last issue is receiving greater general acceptance now that more details of his procedure are known. Readers are invited to study his account of the work in the April 1985 Sky and Telescope. Meanwhile, the photo of Halley taken by T. Seki and appearing in the January 1985 Sky and Telescope and the January 1985 International Comet Quarterly has generated a large amount of discussion among astronomers. It turns out that Seki retouched and rephotographed the original so that the (retouched) image could be printed (ICQ, 7, No. 2, April 1985, p. 47).

Misprints in three equations in the Amateur Manual have recently been uncovered. Alex Storrs points out that equations (6) and (7) on page 7-4 should read:

$$\xi'' = \frac{x''}{F} + ax'' + by'' + c \quad (6)$$

$$\eta'' = \frac{y''}{F} + a'x'' + b'y'' + c' \quad (7)$$

The Manual author found that d and n had been transposed in equation (1) on page 8-2. It should read

$$\lambda = \frac{d}{n} \frac{L}{\sqrt{L^2 + F^2}}$$

Spain now has a national correspondent: Angel Gomez Roldan
Agrupacion Astronomica de Madrid
Apartado no. 46269
Madrid, SPAIN

An adaptation of the Amateur Manual called Manual De Observacion Del Cometa Halley may be ordered from Sr. Roldan.

The adaptation of Part II of the IHW Amateur Observers' Manual in Spanish is available for \$5.00 (by check or UNESCO coupons, made out to Asociacion Venezolana de Astronomia, AVA) from LIADA, Apartado 700, Merida 5101-A, Venezuela. An adaptation of Part I is in preparation.

Data contributors are reminded that observations must be submitted on the standard report forms found in the IHW Amateur Observers' Manual, available from the U.S. Government Printing Office, Enslo Publishers, and Sky Publishing Corp. Detailed instructions are given in it on filling out the report forms, and the Observer Index supplied with the manual must be returned by would-be contributors to register as observers with the IHW. Data submitted on forms other than standard will be handled last, if time is available. The Recorders and National Correspondents, listed in the acknowledgement returned to observers on receipt of an Observer Index form, are prepared to receive data from observers, and the data should not be sent to the Lead Center. This makes the book-keeping and data indexing much easier. Thank you for your cooperation.

GIACOBINI-ZINNER UPDATES

G-Z was visually recovered by C. Morris and S. Edberg with the 61 cm (24") Cassegrain at Table Mountain Observatory on April 13, 1985. The magnitude was 15.5, coma diameter 15 arcseconds, and DC = 1-2. The comet was observed to move during the observing period of 9:30 to 11:45 UT.

Meanwhile, spectra show dust continuum and strong CN emission in the ultraviolet, with hints of OH (also in the UV) and C2 and [OI] in the visual spectrum. Direct images in poor seeing showed a 10 arcsecond coma and a 20-30 arcsecond tail.

A midcourse trajectory correction is planned in May for the ICE spacecraft, due to fly through G-Z's tail on 11 September 1985.

PREDICTIONS OF THE NAKED EYE BRIGHTNESS AND TAIL LENGTH FOR COMET HALLEY

As Comet Halley approaches the Sun for the current generations to view it, much is being speculated on its eventual naked eye brightness and tail length. The general consensus is that Comet Halley will be best viewed from the southern hemisphere with the southern United States, Europe, and Asia a poor second and northern United States and northern Europe and Asia very unfavorable. This has led some persons to take the position that while Comet Halley is interesting from a historical standpoint there will probably be in

the next few years a brighter, more favorably placed random comet similar to Comet Bennett or Comet West, so why make a big effort to see Comet Halley.

To help myself make the decision whether to view Comet Halley inexpensively from a dark site relatively near my home in northern Illinois, moderately expensively from the southern United States, or very expensively from the southern hemisphere, and to pick the optimum dates for any long trips, I have predicted the naked eye appearance of Comet Halley when viewed from a dark site at various latitudes during the postperihelion period.

The naked eye appearance of Comet Halley will greatly depend on the local circumstances of the observer. To predict the naked eye appearance, corrections must be applied to the forecast total apparent magnitude and tail length to correct for atmospheric absorption at the altitudes of the head and tail, and for background sky brightness due to the moon when present. The basis for my predictions are forecasts of the total apparent magnitude and tail length derived from information in the article "Brighter Prospects for Halley's Comet" by J. E. Bortle and C. S. Morris in the January 1984 issue of Sky and Telescope.

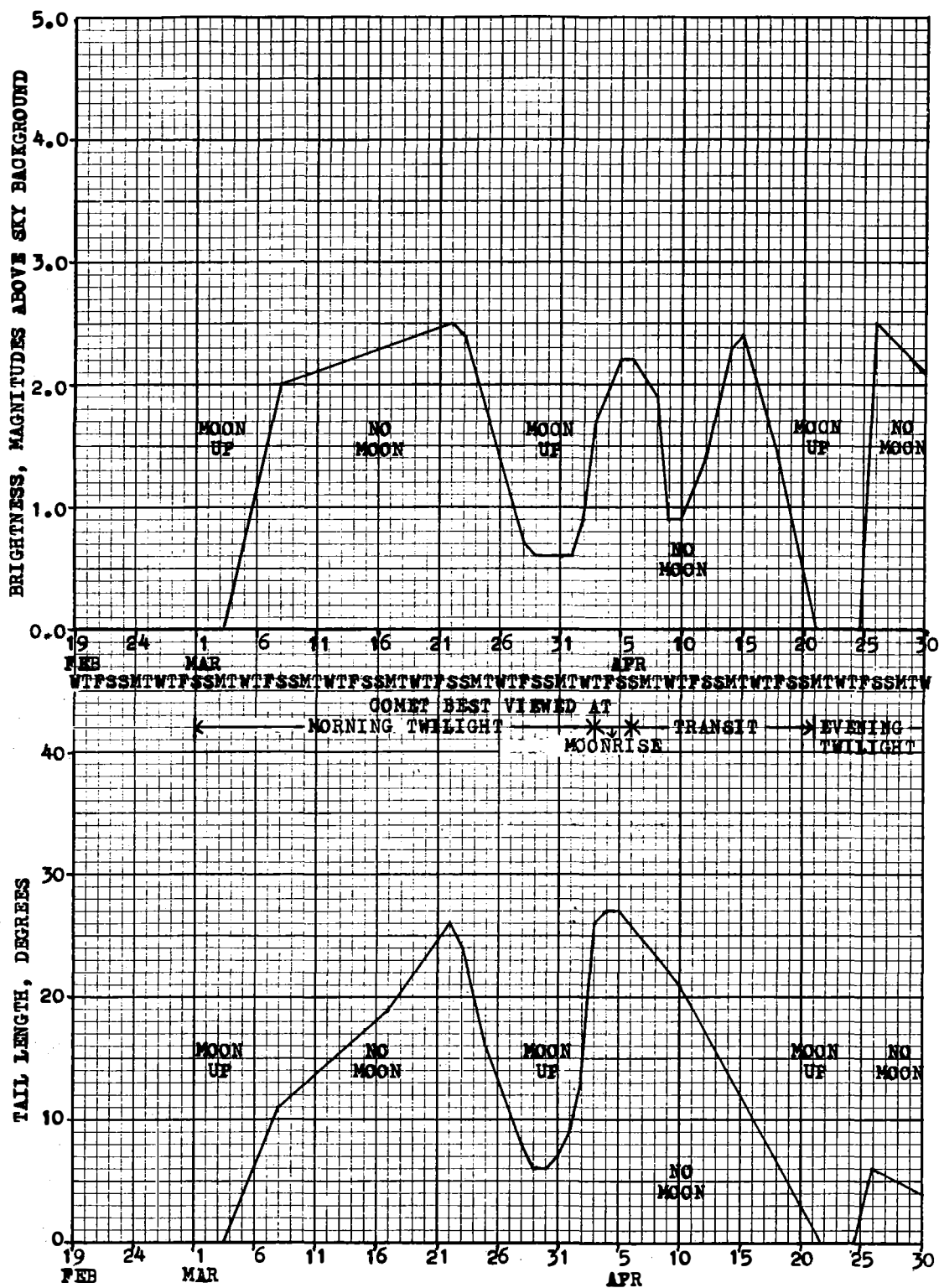
The results of my predictions are shown in Figures 1, 2, and 3 which present the changing naked eye appearance of Comet Halley during the post-perihelion period from mid-February to the end of April 1986 as viewed from a dark site at 42°N, 30°N, and 25°S respectively. Each figure consists of two plots which give the predicted brightness, in magnitudes above the sky background, and tail length, in degrees, on each day of the postperihelion period.

The predictions are for the best viewing period on each date. On the bulk of the dates, this occurs at the beginning of morning twilight. Towards the end of the period, it occurs at the end of evening twilight. Between these, there is an extensive period when Comet Halley can be best seen when it transits the meridian. On a few dates, the best view occurs at moonrise or moonset.

One of the most significant features of the plots is the three large dips in the relative brightness and tail length centered on about March 1, March 30, and April 23. These result from the increased sky brightness caused by the Moon. The additional dip centered on April 9 and 10 in the 42°N plot of relative brightness is due to Comet Halley reaching its extreme southerly declination at which time its head transits the meridian only about half a degree above the southern horizon at 42°N. The corresponding dip in the tail length is mitigated by the tail being nearly vertical to the horizon as the comet approaches opposition on April 14-15.

Figure 4 shows the effect of increased sky brightness due to light pollution, expressed in the form of reduced naked eye zenith limiting magnitude, on the appearance of Comet Halley on the two no-moon weekends when Comet Halley will be best. The strong latitude effect seen in Figure 4 is due to the comet appearing much lower in the sky from points farther north. The brightness of the sky due to light pollution is much more severe when the comet is at lower altitudes because of the longer sight line passing closer to the light pollution sources.

John D. Phelps, Jr.



JOHN D. PHELPS, JR., 1984

Figure 1. Predicted Naked Eye Comet Halley Brightness and Tail Length from a Dark Site at 42° North

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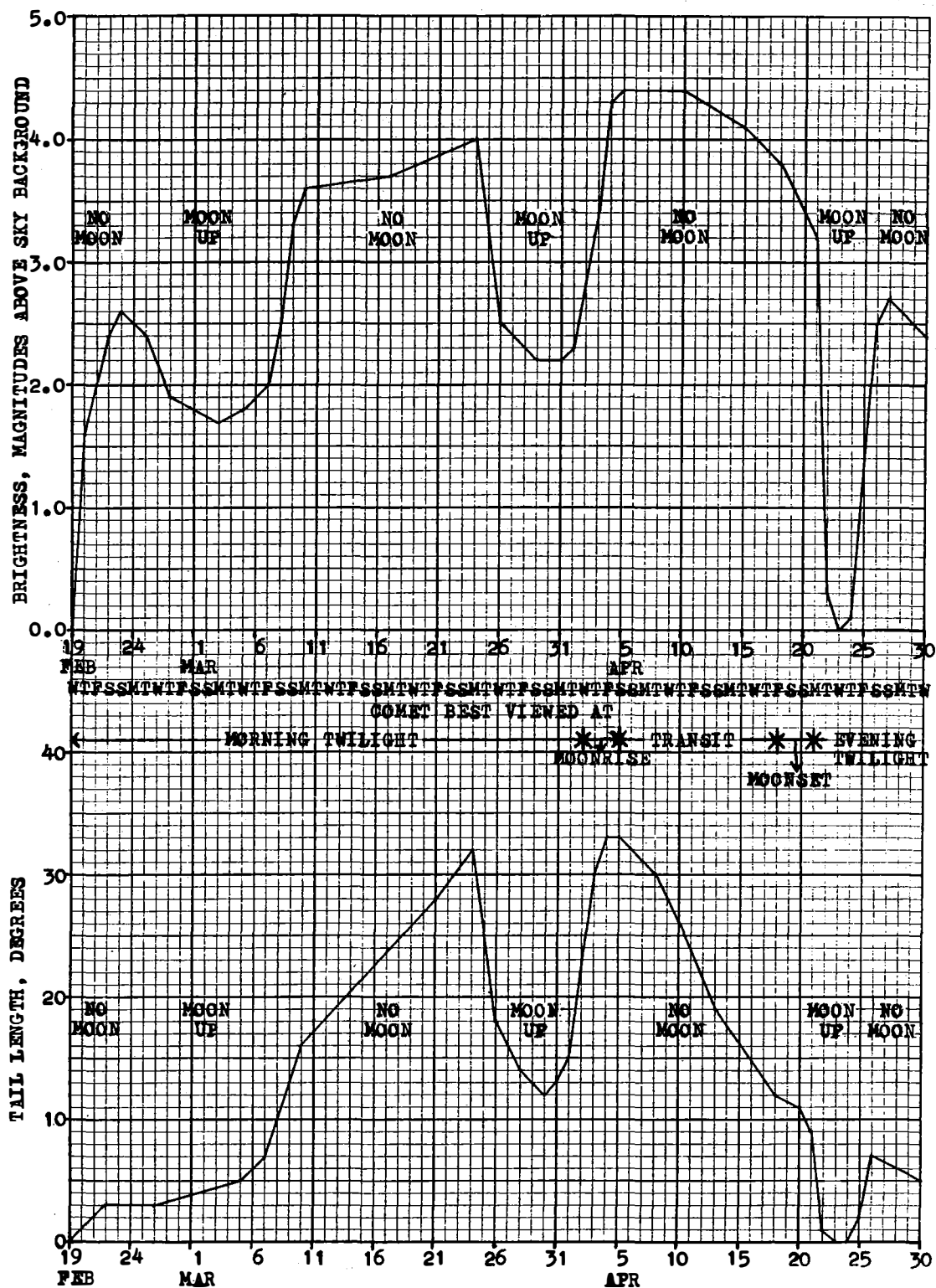
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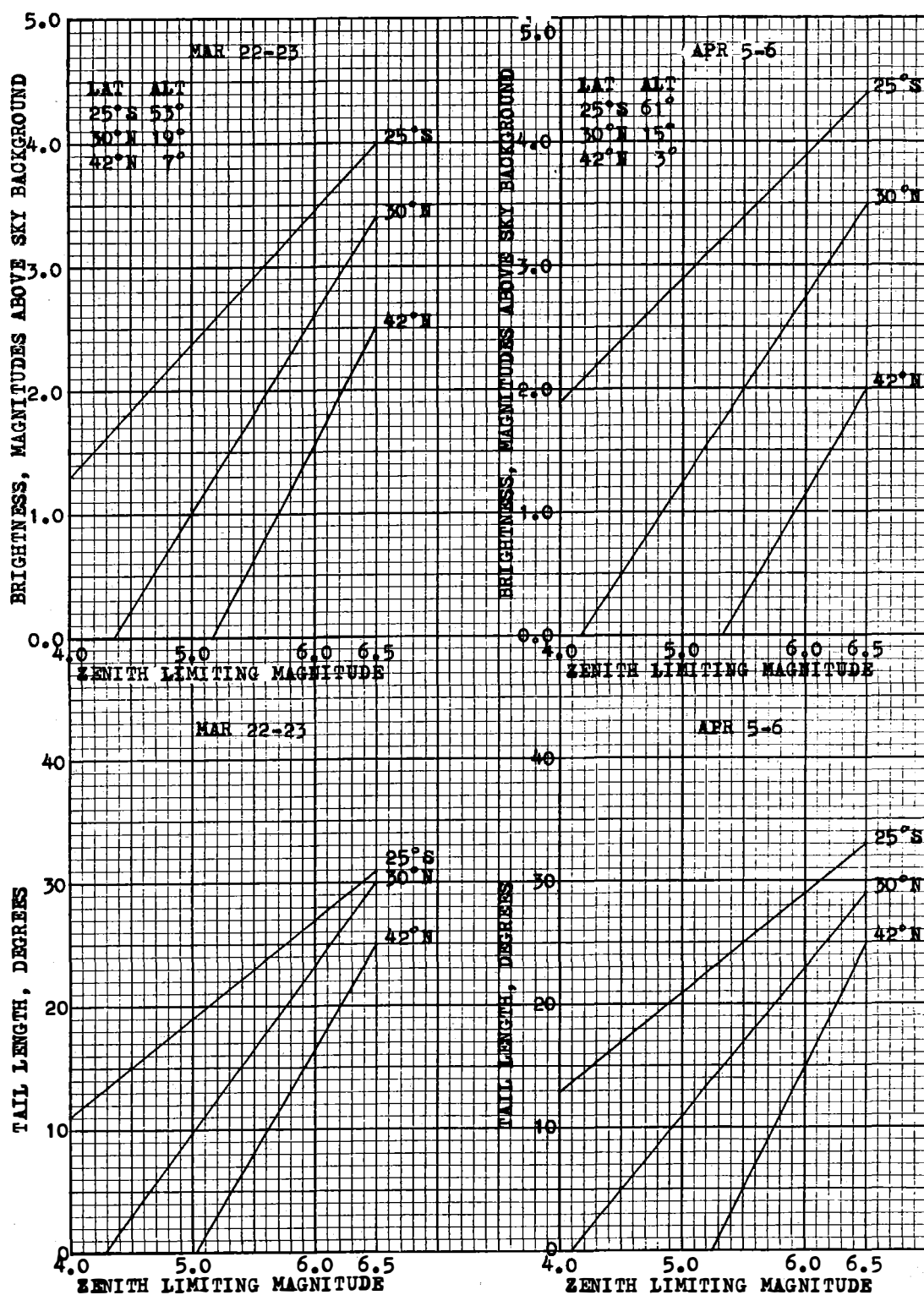
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John D. Phelps, Jr.



JOHN D. PHELPS, JR., 1984

Figure 3. Predicted Naked Eye Comet Halley Brightness and Tail Length from a Dark Site at 25° South



JOHN D. PHELPS, JR., 1984

Figure 4. Comet Halley Brightness and Tail Length on Best Weekends as a Function of Observing Site Zenith Limiting Magnitude and Latitude

EPHEMERIS (WITH PERTURBATIONS) FOR P/6IACOBINI-ZINNER (continued from Bulletin 9)

YR	MN	DY	HR	J.D.	R.A. 1950.0 DEC.	R.A. APPN DEC.	DELTA DELDOT	R	RDOT	TMAG	NMAG	THETA	BETA	MOON
1985	9	30	.0	2446338.5	6 46.544 - 0 37.46	6 48.354 - 0 39.64	.54 8.88	1.09	7.82	8.7	17.3	84.1	66.5	85
1985	10	5	.0	2446343.5	6 56.454 - 5 55.38	6 58.194 - 5 58.03	.56 9.74	1.11	9.09	8.9	17.4	85.8	63.9	42
1985	10	10	.0	2446348.5	7 4.808 -10 41.94	7 6.485 -10 44.98	.59 10.30	1.14	10.23	9.1	17.5	87.5	61.2	47
1985	10	15	.0	2446353.5	7 11.668 -14 59.21	7 13.289 -15 2.58	.62 10.61	1.17	11.23	9.3	17.6	89.4	58.5	98
1985	10	20	.0	2446358.5	7 17.073 -18 49.57	7 18.642 -18 53.20	.65 10.75	1.20	12.11	9.6	17.7	91.3	55.8	133
1985	10	25	.0	2446363.5	7 21.055 -22 15.35	7 22.578 -22 19.16	.68 10.76	1.24	12.86	9.8	17.7	93.3	53.2	112
1985	10	30	.0	2446368.5	7 23.635 -25 18.68	7 25.114 -25 22.61	.72 10.68	1.28	13.50	10.0	17.8	95.4	50.7	76
1985	11	4	.0	2446373.5	7 24.816 -28 1.26	7 26.255 -28 5.25	.75 10.55	1.32	14.04	10.3	17.9	97.6	48.3	55
1985	11	9	.0	2446378.5	7 24.599 -30 24.19	7 26.000 -30 28.17	.78 10.42	1.36	14.48	10.5	18.0	99.8	45.9	72
1985	11	19	.0	2446388.5	7 20.084 -34 12.51	7 21.419 -34 16.30	.84 10.30	1.44	15.15	10.9	18.2	104.4	41.5	116
1985	11	29	.0	2446398.5	7 10.764 -36 43.67	7 12.048 -36 47.04	.90 10.49	1.53	15.56	11.4	18.3	109.0	37.5	68
1985	12	9	.0	2446408.5	6 57.943 -37 56.51	6 59.196 -37 59.29	.96 11.11	1.62	15.80	11.8	18.5	113.4	33.8	95
1985	12	19	.0	2446418.5	6 43.530 -37 51.12	6 44.782 -37 53.24	1.03 12.26	1.72	15.89	12.2	18.6	117.2	30.7	97
1985	12	29	.0	2446428.5	6 29.752 -36 34.16	6 31.028 -36 35.64	1.10 13.88	1.81	15.89	12.6	18.8	120.2	28.1	65
1986	1	8	.0	2446438.5	6 18.353 -34 19.16	6 19.672 -34 20.10	1.19 15.92	1.90	15.81	12.9	19.0	121.8	26.1	116
1986	1	18	.0	2446448.5	6 10.369 -31 22.94	6 11.745 -31 23.52	1.29 18.26	1.99	15.68	13.3	19.3	122.0	24.8	76
1986	1	28	.0	2446458.5	6 6.128 -28 3.72	6 7.562 -28 4.12	1.40 20.72	2.08	15.51	13.7	19.5	120.6	24.0	74
1986	2	7	.0	2446468.5	6 5.389 -24 36.99	6 6.881 -24 37.37	1.52 23.20	2.17	15.32	14.1	19.8	117.9	23.7	124
1986	2	17	.0	2446478.5	6 7.733 -21 14.28	6 9.279 -21 14.80	1.67 25.54	2.26	15.10	14.5	20.1	114.1	23.6	55
1986	2	27	.0	2446488.5	6 12.653 -18 3.90	6 14.246 -18 4.68	1.82 27.64	2.34	14.87	14.8	20.4	109.5	23.5	94
1986	3	9	.0	2446498.5	6 19.638 -15 10.49	6 21.273 -15 11.64	1.98 29.46	2.43	14.63	15.2	20.6	104.3	23.3	115
1986	3	19	.0	2446508.5	6 28.283 -12 36.43	6 29.955 -12 38.02	2.16 30.93	2.51	14.39	15.5	20.9	98.8	23.1	41

COMMENTS ON THE EFFORTS TO PHOTOGRAPH
COMET HALLEY BY AMATEUR ASTRONOMERS

Numerous photographs and claims of photographs of Comet Halley have crossed my desk during the past observing season. It has been interesting and enlightening to study the photos and try to determine if the comet was picked up. In only two submissions was there an image that could be called fairly convincing, with portions of the French success illustrated earlier in this issue. In the other case an image was in the right place but there was no confirming image: is it Comet Halley or Comet KODAK?

Oftentimes a photo submitted had a suspect indicated by the observer, which turned out to be far enough from the path that a check in one of Vehrenberg's atlases would have confirmed it as false. A cluster of stars and a variable were suggested to be Halley. One otherwise careful and competent observer accidentally missed the target area by a small amount.

In spite of this list of problems, all these observers should be congratulated for pushing their equipment and skills to the limit. But I think many of them didn't realize the size of the task they were undertaking, nor the fact that the result might be inconclusive. When a suspect was indicated on a photo I first confirmed the position on a Palomar Sky Survey print. If it was a false alarm I searched the area where the comet should have been to see if it could be found. The search was intensive and required care. It could not be done by casually blinking or comparing: I had to look for an enhancement in grain that was in the right place and not a random

print. If it was a false alarm I searched the area where the comet should have been to see if it could be found. The search was intensive and required care. It could not be done by casually blinking or comparing: I had to look for an enhancement in grain that was in the right place and not a random clumping. To confirm a suspect, a second photo of the same or better quality is usually necessary but was usually not available.

The lesson to be learned is that skill and technique, while very important, are only as powerful as the observer's data reduction - in this case, his Halley search - is. I commend all the observers for trying and I encourage all observers to expend as much energy analyzing their observations as they do making them.

Stephen J. Edberg
International Halley Watch

The IHW Observers Bulletin is prepared by the staff of the IHW at JPL, and published by The Planetary Society as a free service to the international astronomical community. With this issue you have received the special appeal that was sent to our members to support an even broader distribution of public information about Halley's Comet. To fund the Society's educational and scientific programs we need your support. Please read the enclosed letter and use the form to help however you can.

IHW Amateur Observer's Bulletin
Planetary Society

110 S. Euclid
Pasadena, CA 91109



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Issue No. 9

February 1985

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IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Leader, Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

COMET HALLEY UPDATE

Infrared astronomers using both the U.K. Infrared Telescope and the NASA Infrared Telescope Facility on Mauna Kea have recently detected Comet Halley. Thus the professional infrared network has joined the near-nucleus, photometry, and spectroscopy networks in acquiring Halley data.

A number of reports of photographic observations of Halley have been reported first- or second-hand by amateurs in Japan (T. Seki), France (J. C. Merlin), the U.S. (D. Healy), and the U.K. (A. Young). T. Seki in Japan made the first amateur recovery, in September. No other observations have been confirmed. Meanwhile, as this update was being written, S. O'Meara reported the first visual observations of Comet Halley. He found it at mag. 19.6 with a 24" (0.6 m) telescope at Mauna Kea and CCD observations with the 88" (2.2 m) at Mauna Kea verified the position. There is considerable skepticism over this observation, but if it is correct this is the faintest visual observation of a comet ever made. Following Halley visually as it brightens will prove most interesting.

GENERAL IHW AND AMATEUR NETWORK NEWS

At present 36 states in the U.S. are represented by 168 registered observers and 36 other countries are represented by 144 observers. Registered observers and anyone planning to join the IHW are reminded to submit their observations on the standard report forms. Other reporting methods are almost unusable because of the time required to transfer the information to the IHW computer-translatable form.

A formal effort to coordinate a Watch on Comet Giacobini-Zinner (G-Z) during the encounter period of the International Cometary Explorer (ICE) spacecraft is being made, using IHW networks already in place. Amateurs are invited to participate in this activity, centered on September 11, 1985, ICE's encounter day. In addition, meteor observers should be alert for any unusual Draconid (Giacobinid) activity on October 8.5, 1985 UT. While unlikely, a meteor storm like those in 1933 and 1946 is possible. More information on G-Z and the G-Z Watch appears elsewhere in this issue.

December and January saw the launch of three spacecraft on Halley missions. On December 15 and 21 the Soviet Union successfully launched its Vega 1 and 2 spacecraft, which will each drop off a lander and an atmospheric balloon at Venus before their Halley encounters. The Japanese MS-T5 spacecraft was successfully launched on January 7 to test the launch vehicle and study the solar wind environment near Halley.

A German-language adaptation of the IHW Amateur Manual, Komet Halley Beobachtungshilfen, is now available for 8 DM from the Wilhelm-Foerster-Sternwarte, Munsterdamm 90, D-1000 Berlin 41, Federal Republic of Germany.

Observers in Denmark may now submit observations to the following Recorders:

Visual Observations

Lars Spatzek
Ulsbilsager 19
DK-2791 Dragor
Denmark

Photography

Henrik Johannesen
Gurrevej 392
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In the United Kingdom the following Recorders have been named:

Astrometry & IHW Correspondent

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United Kingdom

Photoelectric Observations

Charles Munday
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Rowney's Farm
Wakes Colne
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Essex, CO6 2AS
United Kingdom

Italian Correspondent and Visual/PEP Recorder Antonio Milani has a new address :

viale Cavallotti, 61
35100 Padova
Italy

Observers planning a trip to the southern hemisphere in April 1986 may wish to contact Estacao Astronomica Municipal de Campinas, Programa Brasileiro de Observacao do Cometa Halley-PBOCH, Av. Anchieta 200, 6°, 13100 Campinas-SP-Brasil for information regarding use of the facilities there. A brochure is available in German and English.

THIRD AMERICAN WORKSHOP ON COMETARY ASTRONOMY

This workshop, designed to promote interaction between amateur and professional astronomers interested in comets, is scheduled for Monday, June 17, 1985 at the University of Arizona in Tucson. The schedule is still being prepared but participants can be assured of an interesting and educational experience. For further details when they become available send a Self Addressed Stamped Envelope (SASE) to Comet Workshop - IHW, Jet Propulsion Laboratory, M/S T1166 CW, 4800 Oak Grove Drive, Pasadena, CA 91109, USA. The workshop immediately precedes the joint convention of the Western Amateur Astronomers and Astronomical League in Tucson (June 18-22) and the annual meeting of the Astronomical Society of the Pacific in Flagstaff, Arizona (June 23-27).

GIACOBINI-ZINNER COMPARISON STAR FIELDS

Visual observers of Comet Giacobini-Zinner should use the following AAVSO comparison star fields:

230759	V Cas	period of suitability:	July 1985
021558	S Per		July 31 - Aug. 26
060547	SS Aur		Aug. 24 - Sep. 10
061115	CZ Ori		Sep. 8 - Sep. 24
061702	V Mon		Sep. 22 - Oct. 16
072820B	Z Pup		Oct. 14 - Oct. 31

A pair of charts should be used during the periods which overlap.

In general, b or d charts should be used. These charts can be ordered for 25¢ each from AAVSO, 187 Concord Ave., Cambridge, MA 02138, USA. Be sure to give the number and the variable star designation. Order early to allow for delays.

HALLEY AND VARIABLE STAR FIELDS

The Chart Committee of the AAVSO has prepared a set of its existing charts which show Comet Halley's positions and paths, based on the plots given in the IHW Amateur Manual.

These charts may be of interest since they show detailed positions of the comet as observable from the northern hemisphere, both before and after perihelion, at times when the comet is predicted to pass relatively close to comparison stars whose magnitudes have been measured. The charts in the set include 012216 ST Psc b, 031919 SV Ari b, 035620 AK Tau b, 043322 VY Tau b, d, 053920 Y Tau c, 101806 X Sex b, d.

Interested observers should send \$2 to cover reproduction and postage to the undersigned at 10 Canterbury Lane, Wilton, Connecticut 06897, USA.

Clinton B. Ford
AAVSO Secretary

COMET GIACOBINI-ZINNER

This comet was first discovered by M. Giacobini in 1900 and rediscovered by E. Zinner in 1913. Because the period of this comet's orbit is about 6.5 years, good apparitions occur every 13 years; the last well observed apparition was in 1972. G-Z was recovered last April at a distance of 4.6 AU from the Sun. Its path during this year carries it along the galactic equator, moving from the summer Milky Way through Cassiopeia and into the winter Milky Way. It passes less than 3 degrees from Comet Halley in mid-September. During this close approach G-Z will be about magnitude 8 while Halley will be about magnitude 12.

With the ICE encounter scheduled for September 11, observers are encouraged to especially concentrate on G-Z over the period Sept. 1-20. The Moon is a nuisance for a portion of this period. Observers are especially encouraged to observe over September 9-13. Perihelion passage occurs on September 5.

Observations could begin soon. An ephemeris is included in this issue. The column headings are explained in the Amateur Manual and Halley Handbook.

A TRIAL RUN WITHOUT A COMET

To practice the visual observation methods recommended in the IHW Amateur Observers' Manual is not conditioned on some comet's apparition. Although it is desirable to practice with comets, there are many stellar and non-stellar bodies that can be used instead of comets. This permits us to practice for a longer time. Let us see some examples.

To find Halley's Comet visually at the magnitude limit of our telescope will require knowing very well the stellar field of the comet trajectory; mainly we should know the position where the comet will be at our telescope's magnitude limit. However, the perception of a tiny, weak spot may be difficult if we do not have practice. Some galaxies, such as NGC 5194, NGC 6822, and NGC 1097, or the globular clusters NGC 5634 and NGC 6287 may be useful to try finding. Also, the planetary nebulae NGC 3587, NGC 6891, and NGC 6803 may present good targets similar to comets. Some asteroids, such as (9) Metis, (12) Victoria, (20) Massalia, and (29) Amphitrite, are objects to find and to follow in their movement too.

Visual photometry methods can also be tried with globular clusters. M13, M3, Omega Centauri and other bright clusters can be used to test the Bobrovnikoff and Morris methods. The Sidgwick method can be practiced with NGC 5824, NGC 6101, NGC 6229, and NGC 6316.

The same clusters mentioned above are ideal objects to practice the measures of angular diameter and degree of condensation. There are many double stars systems to practice measuring the position angle. Some emission nebulae like the Orion Nebula, Trifid Nebula, and Lagoon Nebula are good targets to practice one's drawing skills. In this way, every dark night can be a trial night for a comet, even without a comet.

Antonio Sanchez Ibarra
Mexican National Correspondent

EPHEMERIS. (WITH PERTURBATIONS) FOR P/GIACOBINI-ZINNER

YR	MN	DY	HR	J.D.	R.A. 1950.0 DEC.	R.A. APPN DEC.	DELTA DELDOT	R	RDOT	T MAG	N MAG	THETA	BETA	MOON
1985	3	15	.0	2446139.5	18 35.523 + 4 8.24	18 37.251 + 4 9.82	2.38 -32.19	2.34	-14.88	14.8	21.0	75.7	24.3	31
1985	3	25	.0	2446149.5	18 51.870 + 6 29.50	18 53.571 + 6 31.89	2.19 -31.48	2.25	-15.11	14.5	20.7	80.4	25.9	113
1985	4	4	.0	2446159.5	19 8.273 + 9 13.69	19 9.943 + 9 16.88	2.01 -30.40	2.16	-15.33	14.1	20.5	84.7	27.4	110
1985	4	14	.0	2446169.5	19 24.783 +12 22.08	19 26.417 +12 26.06	1.84 -29.04	2.08	-15.52	13.7	20.3	88.6	28.9	43
1985	4	24	.0	2446179.5	19 41.454 +15 55.70	19 43.050 +16 .47	1.68 -27.41	1.99	-15.69	13.3	20.0	91.9	30.4	121
1985	5	4	.0	2446189.5	19 58.413 +19 54.61	19 59.968 +20 .14	1.53 -25.56	1.89	-15.82	12.9	19.8	94.5	32.0	93
1985	5	14	.0	2446199.5	20 15.905 +24 18.27	20 17.416 +24 24.57	1.38 -23.61	1.80	-15.89	12.4	19.5	96.4	33.9	56
1985	5	24	.0	2446209.5	20 34.262 +29 4.80	20 35.729 +29 11.87	1.25 -21.60	1.71	-15.89	12.0	19.2	97.5	35.9	121
1985	6	3	.0	2446219.5	20 54.078 +34 10.19	20 55.504 +34 18.04	1.13 -19.66	1.62	-15.79	11.5	19.0	97.7	38.4	85
1985	6	13	.0	2446229.5	21 16.342 +39 29.04	21 17.734 +39 37.69	1.03 -17.88	1.53	-15.55	11.0	18.7	97.0	41.3	63
1985	6	23	.0	2446239.5	21 42.588 +44 52.86	21 43.966 +45 2.35	.93 -16.33	1.44	-15.12	10.5	18.5	95.5	44.6	116
1985	7	3	.0	2446249.5	22 15.443 +50 8.48	22 16.851 +50 18.84	.84 -15.03	1.35	-14.44	10.0	18.2	93.4	48.5	86
1985	7	13	.0	2446259.5	22 59.057 +54 55.08	23 .586 +55 6.24	.75 -13.95	1.27	-13.44	9.4	18.0	90.8	52.9	60
1985	7	18	.0	2446264.5	23 26.582 +56 56.06	23 28.231 +57 7.52	.71 -13.44	1.24	-12.79	9.3	17.9	89.4	55.3	85
1985	7	23	.0	2446269.5	23 58.803 +58 32.21	0 .620 +58 43.80	.68 -12.90	1.20	-12.03	9.1	17.8	88.0	57.8	119
1985	7	28	.0	2446274.5	0 35.984 +59 33.08	0 38.017 +59 44.53	.64 -12.30	1.17	-11.14	8.9	17.7	86.5	60.3	124
1985	8	2	.0	2446279.5	1 17.576 +59 46.31	1 19.847 +59 57.25	.60 -11.59	1.14	-10.12	8.8	17.6	85.1	62.9	89
1985	8	7	.0	2446284.5	2 1.895 +58 59.35	2 4.378 +59 9.34	.57 -10.71	1.11	-8.97	8.6	17.5	83.7	65.4	51
1985	8	12	.0	2446289.5	2 46.356 +57 2.41	2 48.979 +57 11.07	.54 -9.62	1.08	-7.69	8.4	17.4	82.4	67.9	42
1985	8	17	.0	2446294.5	3 28.340 +53 51.22	3 31.006 +53 58.33	.52 -8.24	1.06	-6.27	8.3	17.3	81.2	70.1	84
1985	8	22	.0	2446299.5	4 6.077 +49 28.17	4 8.700 +49 33.70	.50 -6.53	1.05	-4.75	8.2	17.2	80.2	72.0	141
1985	8	27	.0	2446304.5	4 38.927 +44 1.87	4 41.454 +44 5.89	.48 -4.52	1.04	-3.13	8.1	17.2	79.5	73.4	140
1985	8	28	.0	2446305.5	4 44.918 +42 50.15	4 47.423 +42 53.89	.48 -4.09	1.03	-2.80	8.1	17.2	79.4	73.6	129
1985	8	29	.0	2446306.5	4 50.724 +41 36.57	4 53.205 +41 40.03	.47 -3.65	1.03	-2.47	8.1	17.2	79.3	73.8	118
1985	8	30	.0	2446307.5	4 56.349 +40 21.26	4 58.806 +40 24.45	.47 -3.20	1.03	-2.13	8.0	17.2	79.3	74.0	107
1985	8	31	.0	2446308.5	5 1.799 +39 4.35	5 4.231 +39 7.29	.47 -2.74	1.03	-1.79	8.0	17.2	79.2	74.1	95
1985	9	1	.0	2446309.5	5 7.078 +37 46.00	5 9.485 +37 48.68	.47 -2.28	1.03	-1.45	8.0	17.1	79.2	74.2	84
1985	9	2	.0	2446310.5	5 12.191 +36 26.35	5 14.573 +36 28.78	.47 -1.81	1.03	-1.11	8.0	17.1	79.1	74.3	73
1985	9	3	.0	2446311.5	5 17.144 +35 5.54	5 19.501 +35 7.73	.47 -1.34	1.03	-.77	8.0	17.1	79.1	74.3	61
1985	9	4	.0	2446312.5	5 21.943 +33 43.73	5 24.274 +33 45.69	.47 -.87	1.03	-.43	8.0	17.1	79.1	74.4	50
1985	9	5	.0	2446313.5	5 26.591 +32 21.07	5 28.898 +32 22.80	.47 -.40	1.03	-.09	8.0	17.1	79.2	74.4	39
1985	9	6	.0	2446314.5	5 31.095 +30 57.70	5 33.377 +30 59.21	.47 .08	1.03	.26	8.1	17.1	79.2	74.3	28
1985	9	7	.0	2446315.5	5 35.460 +29 33.79	5 37.718 +29 35.08	.47 .55	1.03	.60	8.1	17.1	79.3	74.3	17
1985	9	8	.0	2446316.5	5 39.690 +28 9.46	5 41.924 +28 10.54	.47 1.02	1.03	.94	8.1	17.1	79.3	74.2	5
1985	9	9	.0	2446317.5	5 43.790 +26 44.88	5 46.000 +26 45.76	.47 1.49	1.03	1.28	8.1	17.1	79.4	74.1	5
1985	9	10	.0	2446318.5	5 47.765 +25 20.17	5 49.952 +25 20.85	.47 1.95	1.03	1.62	8.1	17.1	79.5	73.9	17
1985	9	11	.0	2446319.5	5 51.620 +23 55.48	5 53.783 +23 55.97	.47 2.40	1.03	1.96	8.2	17.1	79.6	73.7	29
1985	9	12	.0	2446320.5	5 55.357 +22 30.93	5 57.499 +22 31.24	.47 2.85	1.03	2.30	8.2	17.1	79.8	73.5	42
1985	9	13	.0	2446321.5	5 58.983 +21 6.66	6 1.102 +21 6.79	.47 3.29	1.03	2.64	8.2	17.1	79.9	73.3	55
1985	9	14	.0	2446322.5	6 2.499 +19 42.77	6 4.596 +19 42.74	.48 3.72	1.04	2.97	8.2	17.2	80.1	73.1	69
1985	9	15	.0	2446323.5	6 5.911 +18 19.39	6 7.987 +18 19.19	.48 4.14	1.04	3.30	8.2	17.2	80.2	72.8	82
1985	9	16	.0	2446324.5	6 9.221 +16 56.62	6 11.276 +16 56.26	.48 4.55	1.04	3.63	8.2	17.2	80.4	72.5	96
1985	9	17	.0	2446325.5	6 12.433 +15 34.56	6 14.468 +15 34.04	.48 4.95	1.04	3.95	8.3	17.2	80.6	72.2	110
1985	9	18	.0	2446326.5	6 15.551 +14 13.30	6 17.565 +14 12.62	.49 5.34	1.04	4.27	8.3	17.2	80.8	71.8	123
1985	9	19	.0	2446327.5	6 18.576 +12 52.91	6 20.571 +12 52.08	.49 5.71	1.05	4.59	8.3	17.2	81.1	71.4	136
1985	9	20	.0	2446328.5	6 21.513 +11 33.48	6 23.489 +11 32.51	.49 6.08	1.05	4.91	8.3	17.2	81.3	71.1	148
1985	9	21	.0	2446329.5	6 24.365 +10 15.07	6 26.322 +10 13.96	.50 6.42	1.05	5.22	8.4	17.2	81.5	70.7	157
1985	9	22	.0	2446330.5	6 27.133 + 8 57.74	6 29.072 + 8 56.49	.50 6.76	1.06	5.53	8.4	17.2	81.8	70.3	161
1985	9	23	.0	2446331.5	6 29.820 + 7 41.54	6 31.742 + 7 40.16	.50 7.08	1.06	5.83	8.4	17.2	82.1	69.8	157
1985	9	24	.0	2446332.5	6 32.429 + 6 26.51	6 34.334 + 6 25.01	.51 7.38	1.06	6.13	8.5	17.2	82.3	69.4	148
1985	9	25	.0	2446333.5	6 34.961 + 5 12.69	6 36.849 + 5 11.07	.51 7.67	1.07	6.42	8.5	17.3	82.6	68.9	138

Donald K. Yeomans
IHW Astrometry DS

SOME HALLEY HISTORY: A NEWSPAPER REPORT FROM 1910

NAILS HIMSELF TO CROSS California Sheepman Goes Insane Over Halley's Comet
Washington Post, May 10, 1910: 3.

San Bernardino, Cal., May 9. -While brooding over possible ill effects of the comet's visit, Paul Hammerton, a sheepman and prospector, became insane and crucified himself, according to mining men, who arrived here with him yesterday. Hammerton was found where he had nailed his feet and one hand to a rude cross, which he had erected.

Although he was suffering intense agony, Hammerton pleaded with his rescuers to let him remain on his cross.

Since the visit of Comet A. 1910, Hammerton has been much alarmed, and when he learned that the earth was scheduled to pass through the tail of Halley's comet his mind gave way. He believes that the end of the world is at hand.

Ruth Freitag
Library of Congress

The Planetary Society publishes and mails the "IHW Amateur Observer's Bulletin" in cooperation with NASA and the Jet Propulsion Laboratory as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extraterrestrial life. Membership is \$20 per year (US) or \$25 abroad. Foreign currency payments may be made. Contributions are tax-deductible in the United States. Membership includes subscription to the Society's colorful magazine, The Planetary Report.

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AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue 8

December 1984

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

COMET HALLEY UPDATE

Halley's Comet was picked up after summer's solar conjunction late in September. Within days of each other, professional astronomers using the Kitt Peak 4 m telescope and a CCD detector, and T. Seki (of Comet Ikeya-Seki fame) in Japan using a 0.6 m (24 inch) telescope and 103a-0 emulsion recorded the comet. The comet continues its puzzling brightness fluctuations and has surprised astronomers by showing a 6 arc second (approximately 26,000 km) diameter coma. The coma was expected to form during this observing season but has appeared earlier than expected. There is no consensus on the mechanism that allows the coma to form beyond 6 AU from the Sun but an exothermic change of phase in amorphous ice is a possibility.

ARTIFICIAL COMET

The Active Magnetospheric Particle Tracer Experiment (AMPTE) satellite's barium release in the solar wind outside the Earth's bow shock is scheduled for UT Dec. 25, 1984 at 1216 [0416 PST]. The release will be made at 18.45 Earth radii over longitude 82°.91 West and latitude 9°.41 South. From the southwestern US the 3rd magnitude cloud should be seen at about 13^h 10^m, -11° expanding rapidly during the first minute to 0°.3 diameter and then slowing, while the solar wind draws out a tail. Another release opportunity occurs 2 days later but the circumstances are much poorer. The SW US is favored for this experiment, which will go ahead even if ground observers are clouded out. The NASA research plane Galileo II and a plane sponsored by the Max

Planck Institute in Germany will both be airborne to study the release. The December 1984 issue of Science 84 gives further discussion of this experiment and somewhat different positions and time for the release.

ANNOUNCEMENTS

Comet Halley Returns, A Teacher's Guide 1985-86 by R. D. Chapman and R. L. Bondurant has recently become available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402, USA. Contact the Superintendent for the price of this NASA publication, EP-197.

A new national meteor correspondent has joined the IHW in Hungary and the correspondents in Denmark and Australia have new addresses:

Gabor Sule	Per Aldrich	Jeff Wood
Budapest	F.E.M.A.	N.A.P.O. Meteor Section
Attila u. 23 V./31	Naesbyholmvej 6 st.th.	42 Jacaranda Drive
H 1013	DK-2700 Bronshoj	Ballajara, W.A. 6066
HUNGARY	DENMARK	AUSTRALIA

The German Democratic Republic has now selected Recorders:

National Chief Recorder and Visual Observation Recorder: Karsten Kirsch 6900 Jena Otto-Schwarz-Str. 27	Photoelectric and Visual Magnitude Recorder: Dietmar Bohme 4851 Nessa 11 PSF 93
Photography Recorder: Klaus Dieter Kalauch 7802 Annahutte Klettwitz Str. 6	Meteor Recorder: Jurgen Rendtel Gontardstr. 11 1500 Potsdam

The Swiss Astronomical Society has now appointed a national correspondent:

Andreas Tarnutzer
Zentralsekretariat SAG
Hirtenhofstrasse 9
CH-6005 Luzern
SWITZERLAND

The German-language HAC-Circular (Halley Comet Circular) is being published every 4 weeks at present and then every 2 weeks starting in June 1985. A ten issue subscription is 30-DM. Contact Sienel Ludwig, Muhlbergstr. 7, 8878 Kissendorf, Federal Republic of Germany or Dietmar Bohme (address above).

A Spanish translation of Part II of the IHW Amateur Observers' Manual has been received at the Pasadena Lead Center. Ordering information will be published as soon as it becomes available.

Fernando Antonio Pires Vieira of the Planetarium of Rio de Janeiro, Avenida Padre Leonel Franca, 240 Gavea, Rio de Janeiro, RJ CEP.: 22 451, Brazil has offered to assist observers planning to choose a viewing site in Brazil. Contact him for further information.

Most time announcements available over the telephone are inaccurate. For accurate telephone time in the United States call (900) 410-8463 to hear the standard WWV shortwave radio time broadcast.

The October 1984 issue of Sky and Telescope magazine contains an article discussing weather prospects for observing Halley's Comet in the southern hemisphere in early April 1986. Madagascar and certain regions of all three continents which lie in the south temperate zone are expected to have 6 out of 7 clear mornings for observing. Desert sites are preferred over maritime areas. See the article for more details.

FINDING COMET HALLEY BY PROJECTION BLINKING

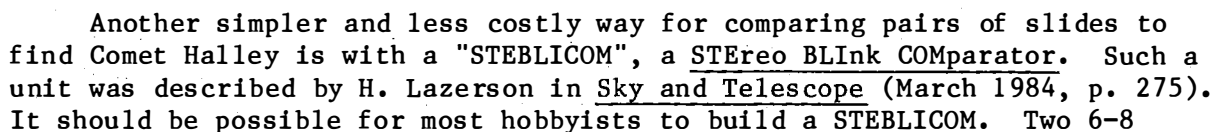
There is a method which enables us to find Halley's Comet at the earliest possible date, a system which allows starting our quest tonight or on any clear (moonless) night from now on. The way to achieve earliest results is to begin photographing the areas in which we know, even now, that the historic comet will be found on any given night from here on forward.

The invaluable second edition of the Comet Halley Handbook, an Observer's Guide (available from the U.S. Government Printing Office and other booksellers), presents an accurate Ephemeris for Comet Halley at One-Day Intervals from August 1984 to May 1987. Start by selecting target areas to photograph during the most favorable times of the coming months (centered on the dates of the new moons). Seek out a location from which to take your photographs, as far away from city lights as possible. Select the equipment you plan to use throughout your search and the type of film which you plan to employ henceforth. In order for all photographs to be as identical as possible for later comparison, site selection, film emulsions, exposure times, seeing conditions, etc. should be recorded in a log for subsequent replication.

All that is needed to re-discover Comet Halley for yourself is a pair of negatives or a pair of color slides. Whether you work with an eight-inch Schmidt camera using gas-hypered 2415 Technical Pan film or a homebuilt 14-inch Newtonian with some new color film pushed from 1600 to 3200 ISO, you can soon establish the potential reach of your equipment by calibrating it with the help of the charts provided in Sky and Telescope (January 1984, p. 28). This will help find your telescope's magnitude limit. Together with the projected but approximate magnitudes in the Halley Handbook, you can now estimate the approximate date when your search may be crowned with success, and when to photograph your second "data" picture.

Why do we need a pair of photographs? Let us say we shoot the region centered on R.A. $6^h 03^m$, Dec $+19^\circ 07'$ at any time between tonight and Aug. 16, 1985. We will then hold a "reference" record of the precise area where Comet Halley will be on the New-Moon night of the third weekend in August 1985. If our tests concerning magnitude have shown that we can record images to 14th magnitude, then any identical photograph taken on, or near Aug. 16, 1985 will not only contain the myriad stars of the Milky Way in Orion, but also the first glimmer of our elusive solar system wanderer. We know almost exactly where to look in our Aug. photograph for the image of 1982i, known as "Periodic Comet Halley," but to establish exactly, beyond the shadow of a doubt, the identity of our comet, we need to check our August picture against our reference slide taken previously, perhaps as early as

By alternately projecting the pair of slides through a pair of slide-projectors, using an occulting shutter which presents first the reference slide and then the data slide to viewers in rapid succession, the comet will blink on and off, thus making its position known immediately. Such a device needs only a 120 RPM motor and a simple rack to stack projectors on top of each other as shown. In Sky and Telescope (September 1977, p. 246-9) and in Astronomy (May 1978, p. 34-7) there are explanatory PROBLICOM articles. The book STARWATCH (Putnam Publishing) by Ben Mayer gives diagrams reproduced here by permission.



power magnifiers held by a yoke about 65mm apart (on center) can serve in place of the binocular viewer. Such blinking devices are also commercially available and are advertised in astronomy magazines.

Eventually, in October 1985, the comet will come within reach of 135mm telelenses mounted on equatorial drives (or piggyback on "driven" telescopes). At magnitude 5.8 in early January 1986 anyone with a 35mm SLR camera should be able to find Comet Halley via a pair of slides shot 24 hours apart with unguided 15-20 second exposures taken from reasonably dark sites removed from city light pollution. Standard 50mm lenses with "speeds" of f/1.4-f/2.0 combined with the fast new color emulsions should make the 1985/86 appearance of Halley's famous comet the best recorded cometary event in astronomical history.

Ben Mayer

HALLEY PHOTOGRAPHY CONTEST

The Problicom Sky Survey announces the opening of a telescopic astrophotography contest to reward the earliest Problicom pair of photos (as outlined above) showing Halley's Comet. Only nonprofessional astronomers or amateur photographers may enter. The cash prize totals \$100.00. For particulars send a self-addressed, stamped envelope (or international mail coupons) to Problicom Sky Survey + Nova Patrol, 1940 Cotner Ave., Los Angeles, CA 90025, USA. The closing date for submissions is June 1, 1985.

OPEN LETTER

I think it is important to remind participants in the IHW to practice their observing techniques any time a fairly bright comet is visible. By fairly bright I refer to a comet brighter than magnitude 10. Although the official practice comet has come and gone, other comets will supply valuable experience to apply to observing Comet Halley.

Recently, there have been a couple of fairly bright comets. The brightest of these was Comet Austin (1984i). I had the chance to observe and photograph this comet in early September. It proved to be a great learning experience, almost as valuable as Comet Crommelin. At magnitude 6.4 the coma was bright enough and large enough to practice several guiding techniques on. Also, the tail and the anti-tail proved to be a challenge to observe and photograph. Comets like this are ideal to practice on.

In closing I would like to point out the fact that Austin was about 2 magnitudes brighter than it was expected to be. This is a good incentive to observe the comets listed in many astronomical publications to practice magnitude estimates and compare results.

I sure hope Halley surprises us in that it also is 2 magnitudes brighter than expected.

Mark J. Coco

ANOTHER NEWSPAPER REPORT FROM 1910

COMET MARKS ON CALVES Each of Quadruplets Wears a Star, and Dairy Maid Blames Sky Wanderer. Washington Post, May 15, 1910: 1.

Special to the Washington Post.

Pitcher, N.Y., May 14.-Friday the 13th was not such an unlucky day on the farm of Amos Rhoades. This morning one of his prize Dorsetshire cows gave birth to four well-formed calves.

Two of them have star-shaped markings on their foreheads, which, the dairy-maid says, are due to Halley's comet.

Ruth Freitag
Library of Congress

The Planetary Society publishes and mails the "IHW Amateur Observer's Bulletin" in co-operation with NASA and the Jet Propulsion Laboratory as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extraterrestrial life. Membership is open to all at \$20 per year (US) or \$25 abroad. Foreign currency payments may be made. Contributions are tax-deductible in the United States. Membership includes subscription to the Society's colorful magazine, The Planetary Report. In Issue 7, a membership form that was supposed to have been inserted inside the Bulletin was, by error, bound in as a page of the Bulletin. We regret the confusion.

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SEEING HALLEY'S COMET: A GUIDE FOR OBSERVERS IN THE NORTHERN HEMISPHERE

Halley's Comet, famous for its regular once-in-a-lifetime appearances, will be swinging through the inner solar system and be visible to casual observers in the winter and spring of 1985-86. Since the comet's last appearance was in 1910, its coming appearance will be the first when modern instruments will be used for observations. These instruments include everything from spacecraft fly-bys and observations from Earth orbit through binoculars and cameras available from department stores to the naked eyes of interested observers around the world.

Comets look like "hairy stars" as they move almost imperceptibly across the sky during the night and they can be visible for weeks or months at a time. They are not shooting stars — meteors — seen momentarily several times a night when dust particles burn up in Earth's atmosphere. Comets are believed to be huge snowballs of frozen gases mixed with dust moving in elongated orbits around the sun. As they approach the sun the frozen gases of the nucleus return to gaseous form and expand outward carrying dust with them to form the coma and head of the comet. The effects of sunlight and the solar wind blow the coma material away from the head to form dust and ion tails, distinguishable by their structure and coloring on photographs.

WHERE TO LOOK FOR THE COMET

Because of the orbital motions of the Earth and comet around the sun, this appearance of Halley's Comet will be much less spectacular than the one in 1910 or, in fact, any in the past 2000 years.

To see Halley's Comet well it will be important to observe it from an area with little pollution, haze, or dust in the air and away from city lights and moonlight. This will allow the faint, gossamer glow of the comet, like thin, moonlit clouds, to be easily seen in the sky.

The Earth's southern hemisphere is the favored viewing area for this appearance of the comet. Observers in mid-northern latitudes will see a modest display.

Figure 1 traces the path of Halley's Comet on the celestial sphere during July 1984 to November 1986. Note the comet's retrograde loops and its transition from a primarily northern hemisphere object in late 1985 to a southern hemisphere one in early 1986.

Halley's Comet will be visible in small telescopes during the autumn of 1985. In December the comet will be visible in binoculars about halfway between the horizon and zenith in the southwest at the end of evening twilight (about 1-1/2 hours after sunset). By early January 1986 the comet should be visible to the naked eye. Observers will see that it brightens rapidly and develops a tail as it approaches the sun during January. While this is occurring, it is also seen lower in the sky and more towards due west each night at the end of twilight.

Figure 2 shows the comet's position at the end of evening astronomical twilight during January. In Figures 2-4, approximate total visual magnitudes, with a smaller number implying a brighter comet, are given in parentheses following dates. Also, viewing with binoculars and ideal observing conditions are assumed.

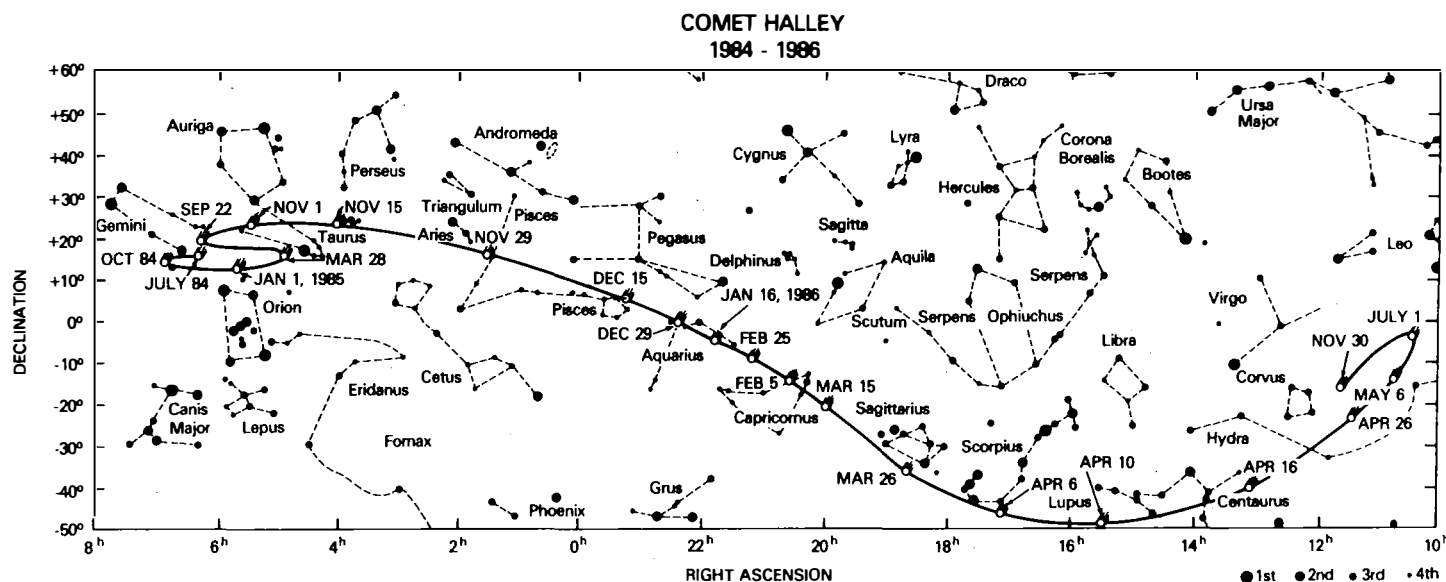


Figure 1. Comet Halley's Path on the Celestial Sphere.

By the end of January the comet is lost in the solar glare. A month later Halley has reappeared in the *morning* sky slightly south of due east and low on the horizon before the onset of morning twilight (1-1/2 hours before sunrise). The comet's tail is better developed than in January. As March progresses Halley's Comet moves higher in the sky and more towards the south, slowly brightening through the end of the month as it approaches Earth. Figure 3 plots the comet's position at the beginning of morning astronomical twilight for this period.

In late March and early April the comet is closest to Earth. Seen low in the southeast and moving further towards the south daily, the comet is now brightest and shows its greatest tail extent for this appearance. In north temperature latitudes the low al-

titude of the comet will prevent the full extent of the tail from being seen because of severe absorption of light by the Earth's atmosphere. During the second week of April the comet essentially disappears for mid-northern observers because of its extreme southern position in the sky. Figure 4 gives the comet's position at the end of evening astronomical twilight during April.

During the last half of April the comet is in the southeast after *evening* twilight, rising higher in the sky daily. The tail is decreasing in length and Halley's Comet is now approaching the limit of naked eye visibility. By May binoculars will be required to see the comet as it returns to the deep freeze of the outer solar system. It can be followed in binoculars or a small telescope for several more months.

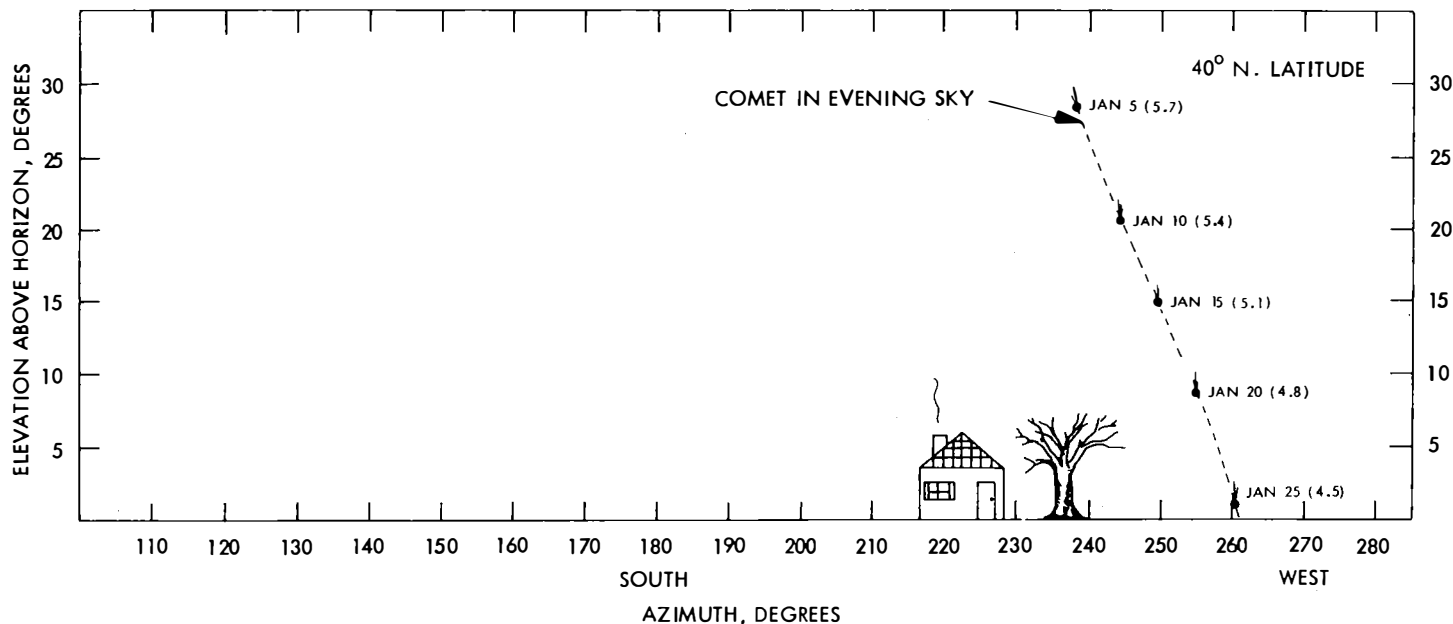


Figure 2. Comet Halley's Position During January.

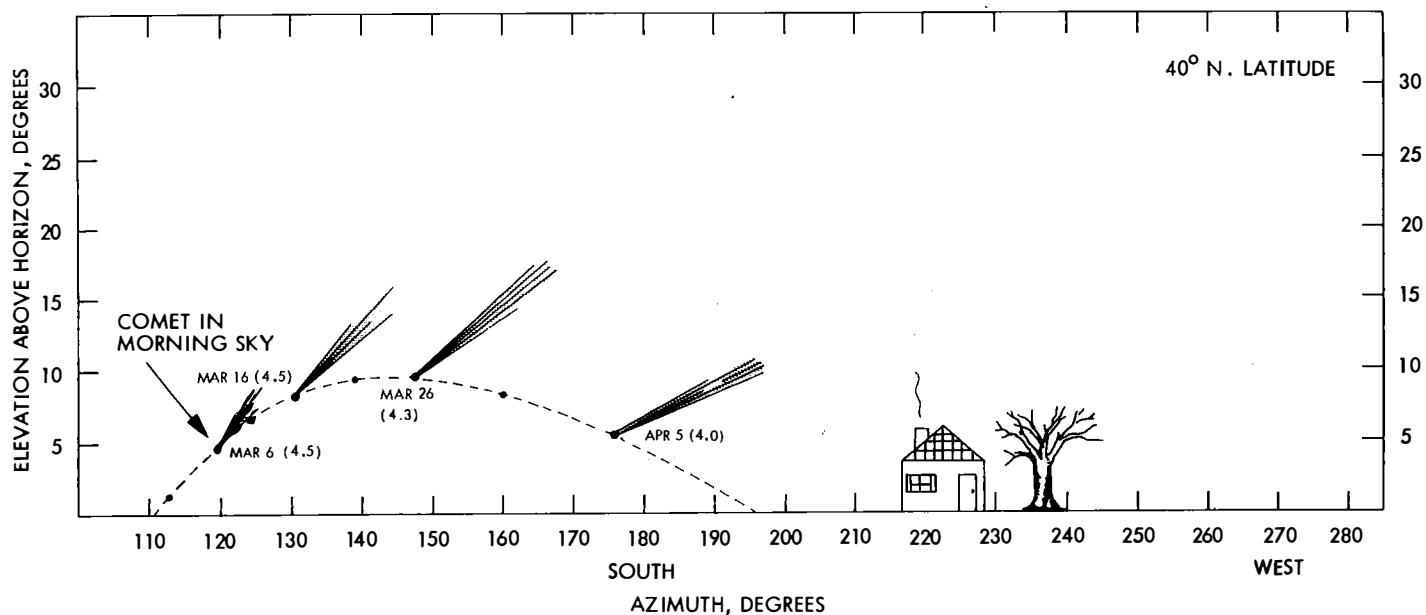


Figure 3. Comet Halley's Position During March and Early April.

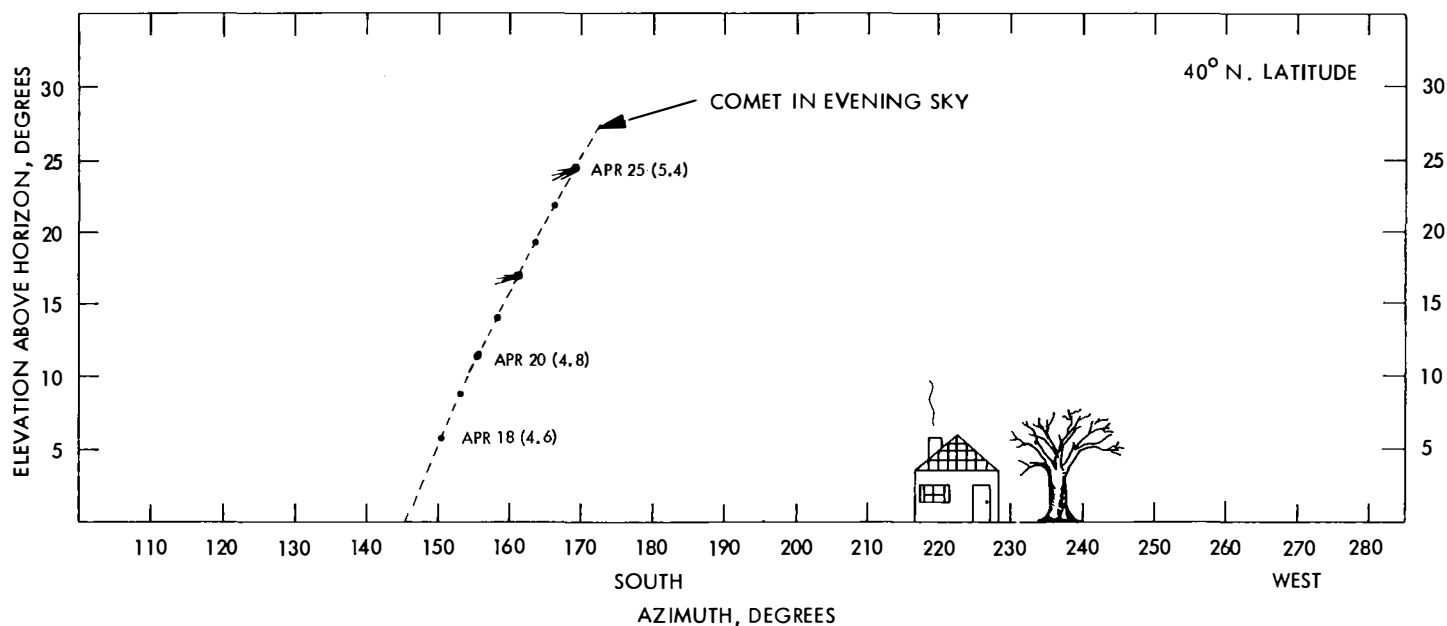


Figure 4. Comet Halley's Position During April.

HOW TO OBSERVE THE COMET

For visually observing the comet, binoculars and small telescopes or the naked eye will provide fine views of the comet, especially when used away from city lights and pollution. It is important to allow the eyes at least 10 to 20 minutes to adapt to darkness. Going from brightly lit indoors to dark outdoors and immediately looking for the comet will make it difficult to locate much less to see well. Among the many sizes and types of binoculars available, 7 x 35 and especially 7 x 50 binoculars will provide the best views. Compared to the naked eye, the greater light gathering power of binoculars will bring out the full extent of the comet but the field of view is limited by the magnification. It may be necessary to sweep the binocular field of view over the comet to see its full extent. The slow motion of the head against background stars will be apparent in a few hours time.

Well dark-adapted naked eyes will allow an observer to take in the whole comet in one look. Its motion from night to night across the sky will be easily distinguishable.

Comet photography is easily accomplished with any camera whose shutter can be locked open (most adjustable cameras have a "B" shutter setting for this purpose). Even some automatic cameras that make long duration exposures will work. Simply place the camera on a sturdy, rigid tripod. Use a cable release to open the shutter with a minimum of vibration. Exposures of 10 seconds to 10 minutes or more will show the comet on fast color and black and white films. On the film the Earth's rotation will

cause noticeable trailing of the comet and background star images with longer exposures.

Lenses with focal lengths of 28 mm to 200 mm will work well to show the comet, depending on the desired field of view. The lens should be used at the lowest f/ number possible, the lower the better.

ADDITIONAL INFORMATION

Local planetariums and astronomy clubs can supply more information on comets and astronomical photography. Other sources include:

Astronomy magazine; Astromedia Corp., P.O. Box 92788, Milwaukee, WI 53202, USA

Astrophotography Basics; Eastman Kodak Co., Department 841, Rochester, NY 14650, USA

The Comet Is Coming by Nigel Calder; The Viking Press, 625 Madison Avenue, New York, NY 10022, USA

Comets, readings from *Scientific American* edited by John C. Brandt; W. H. Freeman and Company, 660 Market Street, San Francisco, CA 94104, USA

Sky and Telescope magazine; Sky Publishing Corporation, 49 Bay State Road, Cambridge, MA 02238, USA

NOTES



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

JPL 400-189 5/83

International Halley Watch
Jet Propulsion Laboratory
California Institute of Technology
M.S. T-1166NH
4800 Oak Grove Drive
Pasadena, California 91109



AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue No. 7

October 1984

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

EDITORIAL

I wish to thank the national correspondents in 16 countries who submitted reports on their trial run efforts. Except for photos submitted by Raju Patel (India) and Jack Marling, Dennis di Cicco, and Mark Coco (USA), all observations so far reported were visual.

One problem that has become apparent from the initial return of P/Crommelin comet reports and η Aquarid meteor reports is that observers are not using the standard IHW report forms found in the Amateur Manual. THE IHW MUST INSIST THAT OBSERVERS USE THE STANDARD REPORT FORMS. There is simply not enough manpower available to transfer data from nonstandard reports to the standard form for entry into the archives. Also, for the data to be useful, EACH OBSERVER MUST RETURN THE OBSERVER INDEX FORM AT THE FRONT OF THE AMATEUR MANUAL. This Index form supplies necessary data on the observing site and equipment. The IHW Amateur Manual is available from the Superintendent of Documents, U. S. Government Printing Office, Dept. 33, Washington, D. C. 20402, USA (stock numbers 033-000-00888-1 and 033-000-00889-9, \$9.00 total) and from Enslow Publishers, Bloy St. and Ramsey Ave., Box 777, Hillside, NJ 07205, USA and Sky Publishing Corp., 49 Bay State Road, Cambridge, MA 02238, USA (both publishers, \$9.95 [+ \$1.00 for postage outside the USA]). Please note that the author receives no royalties.

Stephen J. Edberg

UPDATES AND NEWS

At present almost 200 observers in 24 countries have registered with the Amateur Observation Network. In the USA, Illinois, California, and Pennsylvania have the greatest number of registrants, while among other countries Mexico, Canada, Italy, and England lead in numbers of registered observers. This Bulletin serves approximately 3000 readers.

Venezuelan national correspondent Jesus H. Otero A. of Sociedad Venezolana de Aficionados a la Astronomia has a new address: Apartado 68320, Altamira 1062-A, Caracas, Venezuela.

The May/June 1984 issue of the Astronomical Society of the Pacific's journal Mercury has an article summarizing information on the spacecraft scheduled to visit comets in the near future. Readers may find it interesting.

METEOR NOTES

The Halley-related meteors of the Orionid shower will be making their appearance this month. Observers are encouraged to monitor the shower from October 15-31 if possible, and certainly over the Halley Meteor Days October 20-24. With new moon occurring on October 24, dark nights without lunar glare can be expected over much of the observing period.

Visual and radio observers should use the new report form published in Bulletin 5. Meteor photographers should use the new report form included in this issue. The changes on it follow the changes described on the comet photography and spectroscopy forms in Bulletin 6. Specifically, an Instrument No. column has been added to refer to the Camera Lens specifications list at the top of the form. The use of a grating or prism with a camera should be indicated there. Lastly, the Aperture of the grating or prism is now requested further down in the top section. The remainder of the form is unchanged with respect to requested information.

Observers in Denmark, the German Democratic Republic, and Hungary may now submit their meteor observations to their respective national correspondents:

Per Aldrich	Jurgen Rendtel	Janos Papp
Agervej 8	Gontardstrasse 11	Hungarian Meteor Observers
DK-4700 Naestved	1500 Postdam	Budapest
Denmark	German Democratic	Katica u.11.
	Republic	H-1191, Hungary

NOTES FROM THE U.S. METEOR RECORDERS

In Bulletin 5, E. P. Majden suggested that those observers trying spectroscopic observations of the Orionids and/or the Eta Aquarids use a sturdy stationary mount instead of a driven one as proposed in the observing manual. We have done some research on the subject and we concur. So, if you plan to make spectroscopic observations, do use a stationary mount. It is further recommended, in fact almost mandatory, to be sure the spectra of the stars in the field are aligned 90 degrees to the diurnal trails of these stars. Your meteor spectra will then generally be at an angle to the star trails.

The observations received of the Eta Aquarid shower indicate that no

METEOR PHOTOGRAPHY INFORMATION REPORT FORM

UT Date Range _____ Observer _____

1. Camera Lens: Focal Length _____ f/_____ Used with grating _____ prism _____

2. Camera Lens: Focal Length _____ f/_____ Used with grating _____ prism _____

3. Camera Lens: Focal Length _____ f/_____ Used with grating _____ prism _____

Film Name _____ ISO (ASA/DIN) _____

Developed in _____ at _____ °C / _____ °F for _____ minutes

Grating _____ gr/mm Blaze Order _____ Aperture _____

Prism apex angle _____ ° Glass Type _____ Aperture _____

Rotating Shutter Chop Frequency _____ . Other Chopper Info.: _____

Exposures

Negative Number	Meteor or Star Designation	UT Date	UT Start	Instrument No.	Duration	Faintest Star	Site

Triangulation: Second Observer _____ Second Site _____

Paired Negative Numbers _____

(A separate report form should be completed for the second site.)

Notes:

Submit contact prints or duplicate slides with your name and address on them to the Meteor Recorder.

trouble was incurred using the revised visual meteor report form, or in a few cases the original form. We hope that all observers now have the revised form (published in Bulletin 5 and distributed in the information packet sent to all registered IHW amateur observers) and will use it. Please remember to begin your observations on the quarter hour, half hour, or hour.

Finally, in the "Faintest Star" column there is no need to identify the actual star. All that is required is the magnitude of the "Faintest Star" in your observing area.

M. J. (Mike) Morrow
Meteor Recorder

Ruthi Moore
Assistant Meteor Recorder

PHOTOGRAPHING THE TRIAL RUN COMET

The 1984 apparition of Comet Crommelin has come and gone. And, although the comet did not live up to projections in regards to its brightness, Crommelin did live up to my expectations as a "practice comet" for the 1985/86 apparition of Halley's Comet. In making a photographic contribution to the International Halley Watch I was able to learn a few things that I will apply to any and all attempts at photographing Comet Halley and other comets.

First of all, choosing a site from which to photograph a comet is most important. As with deep sky photography, the location must be far from light-polluted city skies. However, if the comet to be photographed is near the horizon (where comets frequently are), that area must be free from sky glow caused by artificial lights. I did not take this into consideration when photographing Comet Crommelin. I simply chose the darkest sky location I could think of. Unfortunately, there was a tremendous amount of sky glow to the west - the same area where Crommelin was located. At magnitude 9.5 the comet was hard to pick up photographically. The bright sky background washed out most of my photos and the contrast of even my best photographs was very low.

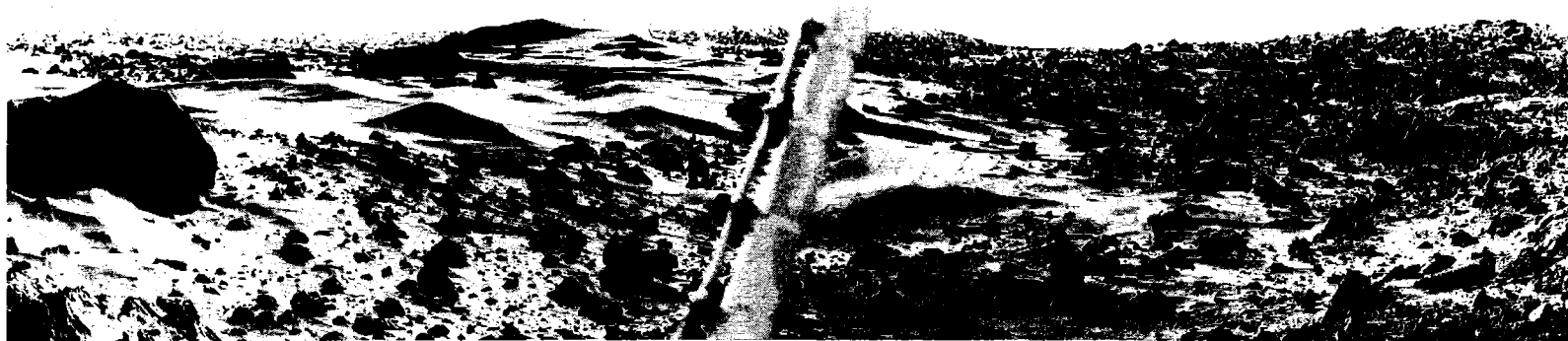
One must choose a site best-suited for the comet's position in the sky. If the comet is in the western or evening sky, make sure that any sky glow is off to the east (i.e., in the opposite direction of the comet). Halley's Comet will be low in the east in the morning sky when it is brightest so a location east of a large city is better at that time. This places the light-polluted skies in the opposite direction of the comet.

Much fainter than the sky glow caused by city lights, but still a problem for comet photographers, is the zodiacal light. The zodiacal light is a general sky glow caused by sunlight scattered off interplanetary dust. Zodiacal light is brightest near the horizon and along the ecliptic. The zodiacal light will not vary in brightness from different locations. It makes no difference where your observing site is: if a comet is in that portion of the sky the zodiacal light can be a problem.

Film selection is critical. If the zodiacal light appears unusually bright, black & white film, like Kodak technical pan 2415, should be used. In fact, this is the film recommended for photographers participating in the Halley Watch program. Any bright sky background can be compensated for in the darkroom where the photos are printed. Color films are not as easy to work with in correcting for discoloration of the sky background. Filtering

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EARLY MORNING ON A MARTIAN DESERT—VIKING 1

AND SEE THE WORLDS

IN THE LAST TWO DECADES the human species has undertaken an unparalleled series of voyages of exploration and discovery. For the first time in history we have studied our neighboring worlds close-up and in detail. We have examined the enigmatic pyramids and ancient river valleys of Mars; the broiling, asphyxiating hellhole called Venus; the active volcanos on Io; the clouds of organic matter on Titan; the exquisite system of 10,000 Saturnian rings. Our generation is privileged to be the first to make these discoveries and to calibrate our own tiny and lovely little world.

WE HAVE DISCOVERED forty new worlds that are plausible objectives for future missions. The United States, the Soviet Union, the European Space Agency and Japan are planning missions that are likely to include landers, a balloon observatory and a radar orbiter at Venus; encounters with Halley's Comet; and an orbiter around Jupiter to examine its moons and radiation belts and to drop, for the first time, a probe into its atmosphere. Such ventures will be remembered by our descendants thousands of years from now when most other aspects of our epoch will be obscure and forgotten.

THE PLANETARY SOCIETY is the largest space interest group in the world and the fastest-growing membership organization in America in the last decade. Its membership has grown to more than 125,000 people from all walks of life, from every state and every continent. Members receive a bi-monthly color publication, The Planetary Report, filled with timely pictures and articles. The Society holds lectures for members and major exhibits such as Planetfest '81, the largest privately-sponsored event in the history of solar system exploration. Members can purchase pictures, slides, and the latest books at special rates. The success of the Society has also permitted us to support a few relatively low-cost but critical scientific projects, including the construction of a quarter-million channel receiver and computer system to be attached to existing radio telescopes in the search for signals from advanced civilizations in space. Membership in The Planetary Society provides an opportunity to participate in the greatest adventure of our times—the exploration of the planets and the search for extraterrestrial life. Join The Planetary Society and see the worlds.

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D-003

a color emulsion not only affects the color of the sky background, it also affects the apparent size and brightness of the comet being photographed. Black & white films are not affected by this as much. I plan on taking several rolls of film out for every photographic session. If conditions permit, color film will be used. However, if the zodiacal light is bright, the black & white film will be used.

Lastly, the choice of a lens for photographing a comet is very important. I used a 5 1/2" Schmidt camera to photograph Comet Crommelin. The field of view with this lens is 4.5° x 6.5°. With such a large field, I thought this lens would be good for comet photography. However, Crommelin was very small and diffuse. The image on my 35mm frame was so small I could just recognize Crommelin. I now realize the best lens to use will depend on the level of cometary activity. If the comet is like Crommelin, small and diffuse, a long focal length lens is more desirable. (By long focal length I refer to a lens of focal length 1000mm or greater.) If the comet is like West (or what we expect Halley to be like), a wide field lens is better - something between 28mm and 200mm. Halley's Comet offers the opportunity to do both types of photography. While far away from the Sun, Halley will be small and faint. This is the time to use a long focal length lens. However, when Comet Halley is in the inner solar system, its tail may be as long as 30°. This is the best time for wide field photography.

With a little more practice I should be well-prepared for the 1985-86 apparition of Halley's Comet. With what I have learned from photographing Comet Crommelin, I look forward to many successful photographic sessions of Comet Halley.

Mark J. Coco

SOME HALLEY HISTORY: NEWSPAPER REPORTS FROM 1910

POLICE PHONE CITIZENS 'GET UP AND SEE COMET' Mayor of Woodbury, N.J., Issues Orders And Residents Are Promptly Called From Bed. New York American, May 8, 1910, Pt. 2: 1.

Woodbury, N.J., May 7. - So that any one who wishes to see Halley's comet need not stay up all night, Mayor Ladd has instructed the police to be on the lookout for the sky visitor; and to notify by telephone all those who want to be awakened. A dozen families were called up at 3 o'clock this morning, when the comet was visible. "Get up and see the comet," was the call.

HALLEY'S COMET BRINGS "END OF WORLD" PANIC New York American, Apr. 24, 1910, Foreign News: 4.

Vienna, April 23. - An amusing account of the way in which the inhabitants of a small Hungarian village prepared for the end of the world has reached Vienna. In a village in the Theiss Valley, the inhabitants have been expecting the end of the world for some weeks, believing that on the appearance of Halley's comet the whole globe will be smashed to atoms.

Some days ago a large fire broke out toward midnight in a neighboring village. The watchman seeing the skies lighted up, walked through the streets blowing his horn to rouse the inhabitants and shouting "The last day has come!" The people rushed halfclothed from their abodes to die in the open.

Men trembled, women screamed, and the children cried.

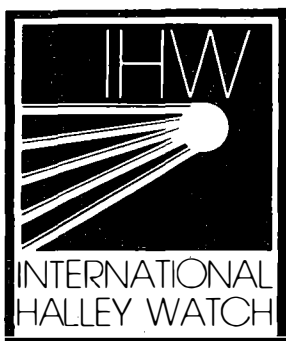
What followed was a curious satire on the actions and thoughts attributed to the dying by writers of poetry and fiction. The simple people considered first that all the provisions in the village should be consumed. A large fire was lighted in the square in front of the church, and there food and drink were brought out of the houses. Everyone joined in a hurried orgy, while hasty prayers were made between bites for the salvation of their souls.

Ruth Freitag
Library of Congress

The Planetary Society publishes this Bulletin in cooperation with NASA, the Jet Propulsion Laboratory, and the International Halley Watch, as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extra-terrestrial life. Membership is open to all at \$20 per year (U.S.) or \$25 abroad. Foreign currency payments may be made. Contributions are tax-deductible in the United States. Membership includes subscription to the Society's colorful magazine, The Planetary Report.

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THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

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IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

EDITORIAL

I wish to apologize to subscribers for the long mailing delays for the last two issues of the Bulletin. I realize the delay was an inconvenience to observers. Future issues are less likely to carry "time-value" material but they will still be prepared with sufficient lead time (about triple the original estimate) to arrive on time. Please bear with us as publication problems are ironed out.

Stephen J. Edberg

TRIAL RUN UPDATE

Whether due to the late arrival of the Bulletin, poor weather, or difficulty in finding Comet Crommelin, the results of amateur trial run efforts were disappointing. Observations have so far been received from amateurs in eight countries, with Australia sending in a plurality. Apparently only visual observations were made, as no other types have been submitted.

The professional trial run was successful, with more observers than expected participating. The real test, however, is data transfer from the observers to the Discipline Specialists to the Lead Centers. This process is just beginning.

Amateur astronomers planning on participating in the IHW must return the Observer Index form in the front of the Amateur Manual before submitting Halley observations.

IHW NATIONAL CORRESPONDENTS

Observers in the countries listed below should submit their observations to the named Correspondent. French-speaking Belgians should work with the Belgian correspondent listed below; Flemish-speaking Belgians should work with the Netherlands correspondent listed in Bulletin 4.

James Doyle
68, rue de la Neuville, Box 6
B-6000 Charleroi
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Halley Watch Committee Bolivia
Asociacion Boliviana de Astronomia
Casilla 7707
La Paz, BOLIVIA

Dr. M. C. Festou
Institut d'Astrophysique de Paris
98 bis Boulevard Arago
75014 Paris
FRANCE

Dr. J.-L. Heudier
C.E.R.G.A.
Caussols
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Fco. Javier Maudujano O.
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Sociedad Astronomica Orion, A.C.
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ul. Chopina 12/18
87-100 Torun
POLAND

Nibondh Saibejra, Director
Bangkok Planetarium/TAS
928 Sukhumvit Road
Bangkok 10110
THAILAND

In ITALY, Recorders have been selected:

National Correspondent and
Visual/Photoelectric Recorder:

Photography/Spectroscopy: Meteors:

Antonio Milani
Corso Milano 122
35100 PADOVA

Dr. Marco Fulle
Corso Buenos Aires 6
16043 CHIAVARI (GE)

Maurizio Eltri
UAI Meteor Section
via M. Bragadin 2
30126 VENEZIA LIDO

REVISED REPORT FORMS FOR COMET AND METEOR PHOTOGRAPHS AND SPECTROGRAMS

Shortcomings noticed in the use of the photograph report form in the IHW Amateur Manual have prompted the revisions discussed here and incorporated on the new forms.

In particular, photographers may use several instruments and camera lenses to record the comet on the same roll of film. Provision has been added to list the specifications of the instruments and lenses and designate which was used for each image in the Instrument No. column. In the Photo. Method column the spectroscopic method should be reported using the designation O for objective, N for nonobjective, or S for slitless. EFL, as before, should give the actual working focal length at which the image was recorded. The Aperture of the grating or prism used is now requested on the spectroscopic observation form. No other changes have been made. Report forms for both these areas should be sent together if direct photos and spectra are on the same contact print. Two contact prints are preferred if both types of observation are on the same roll of film. The changes on these forms should make their use easier.

Changes on the meteor photography form match those described above except that space is included to indicate if a grating or prism was used with the camera.

J. Sabia, S. J. Edberg

ASTROPHOTOGRAPHY BASICS

This article addresses the area of astrophotography referred to as the basics, not such items as film speed vs. exposure time that are subjects well covered in many articles written in Sky & Telescope and Astronomy magazines. A reference guide on the subject of astronomical photography and equipment has been prepared by Bill Smith (p.7). Mr. Smith, a member of the Astronomical Society of Harrisburg, published his guide in the newsletter of the Astronomical Society of Harrisburg's October and November 1980 issues. The guide separates the articles by category for both aforementioned magazines.

But the question I have in mind is this: are you prepared to go into the field and photograph? In a sense, are you packing every item you need? Sure, the camera, tripod, and equatorial mount are packed, but what about those little items? For instance, tools are necessary, an extra cable release, even batteries. In order to save time prepare a checklist of all items to be packed.

The second item that demands an observer's attention is comfort. The observer must dress according to weather conditions, especially for winter. Those few moments guiding on a star or comet can seem like hours when cold invades the body. Therefore, proper attire is called for. Flexibility and light weight should be a factor when looking for winter wear.

The first obstacle to overcome with portable equipment is the alignment of the telescope mount on the celestial pole. Read the articles listed in Mr. Smith's reference dealing with polar alignment. Then practice a few of those procedures. Polar alignment is no easy, quick task. It requires continual exercising to obtain faster set-up time and accurate positioning.

To those just beginning in the field the best firsthand source of information is the local astronomy group. There is always a good chance someone has already practiced astrophotography. Most people are willing to give advice or suggest a good reference book on the subject.

PHOTOGRAPHIC INFORMATION REPORT FORM

UT Date Range _____ Observer _____

1. Instrument Focal Length _____ f/ _____ Aperture _____

2. Instrument Focal Length _____ f/ _____ Aperture _____

3. Instrument Focal Length _____ f/ _____ Aperture _____

4. Camera Lens: Focal Length _____ f/ _____

5. Camera Lens: Focal Length _____ f/ _____

6. Camera Lens: Focal Length _____ f/ _____

Film Name _____ ISO (ASA/DIN) _____

Hypersensitized in _____ at _____ °C
°F for _____ hours.

Emulsion cooled to _____ °C
°F.

Developed in _____ at _____ °C
°F for _____ minutes.

Guiding: Computed _____ Micrometer _____ On Condensation _____

Tangent X-hairs _____ X-hairs on Coma _____

Exposures

Negative Number	UT Date	UT Start	Instru- ment No.	Photo. Method	EFL	Filter	Duration	Faintest Star	Site

Submit notes on reverse if necessary. Submit contact prints or duplicate slides with your name and address on them with this report form.

SPECTROSCOPIC OBSERVATION REPORT FORM

UT Date Range _____ Observer _____

1. Telescope: Type _____ Aperture _____ Focal Length _____

2. Telescope: Type _____ Aperture _____ Focal Length _____

3. Camera Lens: Focal Length _____ f/ _____

4. Camera Lens: Focal Length _____ f/ _____

Film Name _____ ISO (ASA/DIN) _____

Hypersensitized in _____ at _____ °C / °F for _____ hours.

Emulsion cooled to _____ °C / °F

Developed in _____ at _____ °C / °F for _____ minutes.

Guiding: Computed _____ Micrometer _____ On Condensation _____

Tangent X-hairs _____ X-hairs on Coma _____

Grating: _____ gr/mm Blaze Order _____ Aperture _____
Projection Distance _____ mm

Prism: Apex Angle _____ ° Glass Type _____ Aperture _____

Exposures

Negative Number	Comet or Star Designation	UT Date	UT Start	Instrument No.	Spectro. Method*	EFL	Duration	Faintest Star	Site

*Objective = O, Nonobjective = N, Slitless = S

Notes (continue on reverse if necessary):

Submit contact prints or duplicate slides with your name and address on them with this report form.

METEOR PHOTOGRAPHY INFORMATION REPORT FORM

UT Date Range _____ Observer _____

1. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

2. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

3. Camera Lens: Focal Length _____ f/_____ Used with grating _____ Prism _____

Film Name _____ ISO (ASA/DIN) _____

Developed in _____ at _____^{°C}/_{°F} for _____ minutes

Grating _____ gr/mm Blaze Order _____ Aperture _____

Prism apex angle _____ ° Glass Type _____ Aperture _____

Rotating Shutter Chop Frequency _____ . Other Chopper Info.: _____

Exposures

Negative Number	Meteor or Star Designation	UT Date	UT Start	Instrument No.	Duration	Faintest Star	Site

Triangulation: Second Observer _____ Second Site _____

Paired Negative Numbers _____

(A separate report form should be completed for the second site.)

Notes:

Submit contact prints or duplicate slides with your name and address on them to the Meteor Recorder.

SKY & TELESCOPE

The basics, required reading for all:

Month	Year	Pg.	Title
2	79	197	Astrophotography: Planning Pays Off
4	80	348	Starlight and Patience
4	77	314	On the Road to Better Astrophotos I
5	77	399	On the Road to Better Astrophotos II
6	77	484	On the Road to Better Astrophotos III
7	75	61	An Evaluation of 8 Films for Astrophotography (correction 8/75 pg 79)
5	80	433	An Evaluation of Films for Astrophotography
2	76	135	Polar Alignment of Portable Equatorial Telescopes
9	79	280	Some Notes on Polar Alignment
1	78	78	The Precise Adjustment of an Equatorial Mounting
2	78	173	Further Notes on Adjusting a Telescope
5	68	319	Optical Alignment by a Squaring-On Eyepiece
2	73	127	Photographing Planetary Surfaces (exposure info)
9	76	220	High Resolution Planetary Photography

Advanced articles to fine tune your techniques:

6	70	394	Polar Alignment via Polar Axis Hole
11	73	329	Photographic Polar Alignment of an Equatorial Telescope
5	78	439	Correcting Periodic Errors in a Clock Drive
6	72	358	Hints on Photographing the (Solar) Eclipse
5	73	322	Some Hints for Photographers of Total Solar Eclipses
5	77	362	Photo Hints for Mercury
1	77	24	New Trends in Celestial Photography
4	74	221	Planetary Camera System
3	73	189	Deep Sky Photography With Cooled Emulsions
7	70	56	Hints on Planetary Photography for Amateurs I (filters)
8	70	116	Hints on Planetary Photography for Amateurs II
11	73	337	Photographing the Infrared Airglow
6	73	396	Color Infrared Photography of Some Astronomical Objects (useful for daytime shooting, e.g., Venus)
3	79	231	Nebula Filters
2	72	123	Two Adapters for Projection Photography
7	77	63	A Camera Mount For Projection Photography (Simple)
4	75	263	A Simple Camera Mounting for Short Exposures (with a tripod...Easy)
2	70	134	Combining Camera Lenses for Solar Photography
2	70	124	Hints on Eclipse Instrumentation for Photography
5	79	395	A Simple Technique for Recording the Sun's Spectra
1	77	63	Camera Mount for Projection Photography
12	76	472	Polar Alignment via Polar Axis Bore

Darkroom Techniques:

8	79	184	Enhancing Astronomical Photographs (by Slide Copying)
8	79	186	Enhancing Astrophotos
7	70	61	Increasing Picture Contrast
7	78	92	Enhancement of Old Negatives
4	74	274	A Film for Obtaining Isophotic Contours
9	72	201	Print Masking
5	78	401	Which Films Are Worth Hydrogenating
11	70	322	Hypersensitizing Films for Astrophotography (Easy, and it works)
4	79	355	Astrophotog With Unsharp Masking (Correction 5/79 pg 445)
2	80	170	A New Way to Photograph the Sun (Tricolor Printing)
8	74	120	Color Portraits of Deep Sky Objects (Tricolor Printing)
11	74	333	More About Indirect Color Astrophotog (Tricolor Printing)

ASTRONOMY

The basics, required reading for all:

Month	Year	Pg.	Title
4	76	34	Astrophotography In Spite of Myself
2	75	43	The Night Tourist
9	79	37	This is Astrophotography (Shows what the amateur can do)
9	78	48	Getting More out of Your Astrophotography
2	76	32	Astrophotography: A Woman's View
5	75	59	Astrophotographic Routes (all camera combinations explained)
8	73	27	Optics for Astrophotography (describes the problems to be conquered)
12	75	42	Tune Up Your Telescope (collimation)
5	76	46	Choosing B & W Films
3	74	52	Photography With Small Telescopes (Problems and Exceptions)
9	77	48	Polar Alignment for Astrophotography
11	74	35	Sky Photography Without a Telescope
6	78	42	Astrophotography With Camera Only
11	73	36	It's Simple to Photograph Constellations
8	74	31	Catch A Falling Star
2	76	37	Photograph a Comet (Camera & Tripod)
6	79	50	How to Photograph a Spaceship (Satellites)
6	76	34	Photograph the Milky Way
10	79	52	How to Get Steady Pictures
7	78	48	Exposure in Astrophotography
10	78	32	Astrophotography with a Small Telescope
1	75	60	Piggyback Astrophotography
2	78	34	Photograph The Moon
7	77	26	Astrophotography With Telephoto Lenses
9	77	46	Astrophotography With Newtonian Reflectors

Advanced articles for experimentalists and the hooked:

9	73	34	Film: A Grainy Dilemma For Sky-Shooters (match the film to the object)
12	76	52	Is Faster Better? (color slide film evaluation)
6	79	45	Ektachrome 400 Evaluation
7	75	50	Equipment for Guided Astrophotography
11	80	62	Equipment for Guiding Your Astrophotos
10	76	50	City Astrophotography
8	76	40	Red Light Sky Photography
2	75	47	Red Window to the Sky
11	79	43	High Resolution Photography
1	80	46	Wide Field Sky Photography
3	80	39	Photographing the Sun

Month	Year	Pg.	Title
2	74	20	Moon and Sun Photography-Easy & Satisfying
1	78	36	Photographing the Sun in H-Alpha Light
11	78	44	Film the Solar Eclipse (exposure and hints)
9	74	51	Tell the Planets to Say "Cheese"
4	78	42	Capture a Galaxy on Film
7	80	38	Stalking the Gaseous Nebulae
4	76	43	Occultation Photography
2	80	39	Photography Stellar Spectra
3	79	51	Nebula Filters (Remove Unwanted City Lights)
8	79	46	More About Nebula Filters

Darkroom techniques: Do it yourself for fun, satisfaction and better results.


9	80	46	A Darkroom for Astrophotography
6	76	42	Setting Up an Astrodarkroom
9	76	46	Developing B & W Astrofilms
11	80	69	Processing Your Astronegatives
12	76	46	Printing Your Astrophotographs I (basic Printmaking)
1	77	42	Printing Your Astrophotographs II (Printmaking tricks)
4	77	46	Printing Your Astrophotographs III (Nebulae)
12	77	34	Printing Your Astrophotographs IV (Integration printing, high contrast copying)
10	73	35	Integration Printing: Aid to Long Exposure Photographs
12	73	19	Highlight Masking: A Method of Detail Enhancement
10	80	50	Getting the Most Out of Your Deep Sky Negatives
11	77	54	Improving Your Lunar Photographs
4	80	54	Using S0-115 Film (high contrast, high resolution)
12	78	42	The Wet Side of Color Astrophotography (printing)
2	79	34	Improve Your Slides Through Rephotography
5	74	25	Slide Copying Improves Color Photos
3	78	42	Isophote Mapping

For the well seasoned photographer, why not consider presenting a program on astrophotography at a meeting? A great many errors on the part of the beginner can be avoided. Perhaps the most important feature of the program would deal with Polar Alignment. An entire evening could be devoted on the subject. Darkroom operations should not be overlooked either.

As a last word, consider the importance of frequent photography. Much can be said for first hand experience: for one, it will lead to better quality photographs.

John D. Sabia, Photography (East) Recorder

AMATEUR MANUAL UPDATES



J. W. S. Marshall of Quebec and Pornchai P.-Tanakun of Thailand point out that the proportions for the metric crossbow in the Amateur Manual are wrong. The simplest way to make them work is to shorten the meter stick to a length of 36 cm.

A Japanese translation of the Amateur Manual is now available. Contact Seibundo Shinkosha Publishing Co., Ltd., No. 5 Nishikicho 1 Chome, Kanda, Chizoda-Ku, Tokyo, JAPAN.

The Planetary Society publishes this Bulletin in cooperation with NASA, the Jet Propulsion Laboratory, and the International Halley Watch, as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extraterrestrial life. Membership is open to all at \$20 per year (U.S.) or \$25 abroad. Foreign currency payments may be made. Contributions are tax-deductible in the United States. Membership includes subscription to the Society's colorful magazine, The Planetary Report.

IHW Amateur Observer's Bulletin
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AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue No. 5

April 1984

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

EDITORIAL

This fifth Bulletin is dedicated to meteor observations. The moon will hardly interfere with observations of the η Aquarids and Orionids this year so meteor observers should plan on beginning their contributions to the Halley archives in May. Remember to send your observations to the Recorder or his assistant or, for some observers outside the U. S. and Canada, to their national meteor correspondent listed in this issue. A new meteor report form is included in this issue and should be used in place of the visual meteor report form in the Amateur Manual.

I wish to send a special greeting to the many readers of the Spanish translation of this Bulletin prepared by Sociedad Astronomia Orion, A.C.

Stephen J. Edberg

UPDATE ON THE TRIAL RUN

While professional observations commenced last August, Comet Crommelin was picked up first by a French amateur, J.-C. Merlin on December 29, 1983. M. Verdenet, also in France, saw it a few days later at about twelfth magnitude, but it was not reported by U. S. observers until January 21. Brightening slowly and nonlinearly, it peaked at about magnitude 8 near perihelion on February 20. It has since faded and grown more diffuse and may be difficult for many observers during the trial run, March 25-31. Light pollution and the zodiacal light can make observation of this comet difficult. Hopefully most observers had the opportunity to see this comet and practice their observing technique on it.

REPORTS ON HALLEY'S COMET

Professional astronomers have been actively observing Halley during the current observing season (which ends soon). Last October a spectrum of the comet was obtained with the 4 m telescope at Kitt Peak National Observatory. The spectrum was weak and noisy and shows nothing except reflected sunlight. Over the past few months large numbers of astrometric images have been obtained by the 1.5 m European Southern Observatory telescope at La Silla, Chile with a CCD camera. These are being used for further refinement of Halley's orbit. Lastly, a possible occultation of a star by Halley's nucleus on January 7, 1984 has been reported by Chinese astronomers.

A REVISED OBSERVATION FORM FOR METEOR OBSERVERS

The major changes are the addition of more hours of observation, more cloud cover entries, and a more specific "Facing Direction" entry. We encourage wider observation dates: 27 April to 11 May for the η Aquarids and 15 October to 31 October for the Orionids. This is in keeping with the fourteen day activity period as concluded by Hajduk, et al, in 1983. This allows for observations of the Halleyid "subshower," which comes to maximum on approximately 8 May. The most important dates (2 - 6 May and 20 - 24 October) can be stressed for those who must select a limited number of observing nights.

On the revised report form, under Group Observation check no or yes depending on whether or not you were working with other observers. If yes, give the number of observers in the group in the space provided (#) and list their names in the Notes section. Cloud Cover is now to be written in as the percentage of sky covered, with space provided for an estimate at the beginning and end of each hour. Changes in percentage or cloud type during an observation period should be reported with the UT of the change. It may be necessary to use several lines for a single hour's observations if there are many cloud cover changes during that hour. Under Facing Direction circle one or more of the letters to indicate the direction faced while observing. Z refers to the zenith. Number of Meteors - Shower refers to only η Aquarid or Orionid meteors, not to sporadic or other meteors related to the minor showers active during May and October. Sporadic and minor shower meteors (from the μ Virginids, α Scorpiids, α Bootids, and ϕ Bootids during April-May and from the Southern and Northern Piscids, Southern and Northern Taurids, Annual Andromedids, ϵ Geminids, Leo Minorids, and Pegasids during August-November) should all be counted in the Non-shower column.

Many people will be observing for only a few hours a night. Please use a different form for each night's observing, regardless of the number of spaces used. Be sure to fill out all information on the top of each form. If the observing site changes by more than a few miles, this information must be included on the sheet, along with the coordinates of the new location.

When more than one person is observing at the same location, each individual must submit his own observation record. There is a space for the number of observers at the same site, and room to list the names, but

the forms should reflect the work of an individual, not the group. Group efforts can be very advantageous and are encouraged. The entire sky can be monitored with six people. When working in a group, Facing Direction becomes even more important in recording observations.

Due to the relatively brief observing time of the η Aquarids by people in the mid and high northern and southern latitudes, some observers may try to increase their observing time by doing radio observations after daylight. If you do make radio observations of meteors please report your observations on this report form. Give some information about your equipment and method of operation in the Notes section. Dark Adaptation Time, Group Observation, Faintest Star, and Cloud Cover obviously need not be filled in. Viewing Area of Sky and Facing Direction should be used to identify the pointing of your antenna. All identified meteors should be counted since Shower and Non-shower meteors are expected to be indistinguishable.

All observation periods should begin on the hour, quarter hour or half hour, using Universal Time and Date only. Time should be allowed for proper dark adaptation, taking into account your activities and light sources prior to beginning observations.

Because the information from these forms will be archived by computer, it is extremely important that only the standard form be used for your observations. Any data submitted on other observing forms will be given last consideration. Transposing data from other forms to the IHW report form is acceptable and should not be difficult.

Completed observations from the U. S. and Canada should be sent to:

Michael J. Morrow
Meteor Recorder
Hale Hoku Observatory
91-1033 Hanakahi St.
Ewa Beach, HI 96706

OR

Ruthi Moore
Assistant Meteor Recorder
1347 Uila St.
Honolulu, HI 96818

Observers in other countries should submit their observation reports to the IHW Correspondents listed elsewhere in this issue.

M. J. Morrow, R. Moore

METEOR OBSERVATION RECOMMENDATIONS

Experienced meteor observer M. J. J. Buhagiar of Western Australia suggests that observers should also concentrate on the period May 6-10 (besides the May 2-6 stretch) in order to better monitor the period when the Earth crosses the plane of Comet Halley's orbit.

Meteor spectroscopist E. P. Majden of British Columbia has found that meteor spectra should be obtained with cameras on sturdy, non-tracking mounts, contrary to the advice given in the Amateur Manual. He also points out that motors driving chopping shutters should be isolated from cameras to prevent vibration.

Shower Observed _____

VISUAL/RADIO METEOR OBSERVATION REPORT FORM

UT Date _____ Observer _____

Dark Adaptation Time _____ Site _____

Count Method: Written _____ Counter _____ Tape Recorder _____

Group Observation? No _____ Yes _____ # _____ List names of observers in Notes (below).

Viewing Area of Sky: Unrestricted _____ Limited to _____° x _____°

UT		Faintest Star	Cloud Cover - %*	Facing Direction	Number of Meteors	
Start	End				Shower	Non-shower
	//////			N		
//////				E Z W		
//////				S		
	//////			N		
//////				E Z W		
//////				S		
	//////			N		
//////				E Z W		
//////				S		
	//////			N		
//////				E Z W		
//////				S		
	//////			N		
//////				E Z W		
//////				S		
	//////			N		
//////				E Z W		
//////				S		

*Indicate changes in percent of sky covered between Start and End times in the Notes section.

Notes (continue on reverse if necessary):

IHW INTERNATIONAL METEOR CORRESPONDENTS

Jeff Wood
N. A. P. O. Meteor Section
126 Moulden Ave.
Yokine, W. A. 6060
AUSTRALIA

Robert Mackenzie
British Meteor Society
26, Adrian St.,
Dover, Kent
CT17 9AT
ENGLAND

George Spaulding
British Astr. Assoc.
Meteor Section, 2 Hyde Road
Denchworth, Wantage,
Oxon OX12 ODR
ENGLAND

Fintan Sheerin
Irish Meteor Society
24 Goatstown Rd.
Dundrum, Dublin 14
IRELAND

Yasuo Yabu
Nippon Meteor Society
878 Maruyama-cho
Omihachiman-shi
Shiga 523,
JAPAN

Godfrey Baldacchino
SACMES
315, Zabbar Rd.
Fgura, MALTA

Gilberto Klar Renner
UBA Meteor Section
Rua-Ramiro Barcelos, 1820 Ap. 801
CEP: 90000, Porto Alegre - RS
BRAZIL

Ken Morse
RASNZ Meteor Section
P. O. Box 2241
Wellington
NEW ZEALAND

M. Eltri and E. Stomeo
UAI - Sezione Meteore
2, Via M. Bragadin
30126 Venezia Lido
ITALY

Meteor observers in countries not listed above should send their observations directly to the U.S./Canada Recorder or his assistant (addresses are given in the previous article).

COMPUTERIZED AMATEUR BULLETIN

Besides the mailed, hard copy version, the Amateur Bulletin can now be accessed on a computer bulletin board. The system can be reached by dialing (616) 342-4062. It is available 24 hours a day, 7 days a week. Callers should set their modems to 300 Baud, full duplex operation, using 8 data bits, one stop bit, and no parity. Only one caller can access the system at a time.

A number of text files on the system can be typed out to the caller's terminal. There are also a few simple astronomy-related programs that can be run at any time, or downloaded on specified days. New callers are requested to run HELP, and take notes on system operation before attempting to use the programs.

Eric Schreur

PHOTOELECTRIC PHOTOMETRY NOTES

Photoelectric observers wishing to make useful observations of a comet should not use UBV filters because of their wide passbands. The availability of a comet gas/dust filter pair for PEP has recently been announced by Lumicon, 2111 Research Drive, Suite 5, Livermore, CA 94550. These are designed to meet IAU/IHW requirements. Observers should contact Lumicon for further details.

A whole chapter on photoelectric photometry by IHW photometry discipline specialist M. A'Hearn will be found in Solar System Photometry Handbook, edited by R. Genet (Richmond: Willmann-Bell), 1983. This is the most complete discussion of cometary photometry technique known to the IHW Lead Center. The book may be found in bookstores or ordered directly from the publisher for \$17.95 (Willman-Bell, Inc., P. O. Box 3125, Richmond, VA 23235, USA).

The Planetary Society publishes this Bulletin in cooperation with NASA, the Jet Propulsion Laboratory, and the International Halley Watch, as a service to the worldwide amateur astronomy community helping in the scientific analysis of the Halley apparition. The Society is a non-profit public membership organization encouraging exploration of the solar system and the search for extraterrestrial life. Membership is open to all at \$15 per year (U.S.) or \$20 abroad. Foreign currency payments may be made. Contributions are tax-deductible in the United States.

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AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue No. 4

January 1984

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

EDITORIAL

This fourth Bulletin is the first to be mailed out by the Planetary Society. Thanks are due the Planetary Society for relieving the Halley Watch of the financial burden involved in publishing and distributing the Bulletin. See the Address Updates section for other information.

I would like to remind readers that the Bulletin is published irregularly. I realize that this leads to concerns like "Did I miss the latest issue?" Please be assured that the Bulletin is sent to the complete mailing list when it is published, but issues may be spaced by six months or more.

Since the second issue I have received a number of contributions, including historical notes from Ruth Freitag, a paper on estimating sky brightness from Joseph Marcus, a proposal discussing Halley observations from the polar regions by Randy Patrick, and numerous announcements of various types. My thanks go out to all who have made submissions. Unfortunately space in the Bulletin has been limited so far and I have had to use the room available for time-critical or maximum-interest articles and announcements.

Plans have changed regarding the publication of the Comet Watcher's Guide, a lower-level version of the amateur manual. The IHW will not be publishing this document and no publisher is being sought at present. The IHW amateur manual will fill the CWG role for the present.

Real-Time Monitor Network leaders John Bortle and Charles Morris have published a study and prediction of Comet Halley's light curve for 1986. Their article in the January 1984 Sky and Telescope predicts that Halley will be one to two magnitudes brighter post perihelion than earlier predictions. See the magazine for details.

Stephen J. Edberg

TRIAL RUN ON P/CROMMELIN

Professional astronomers will be actively studying this comet during February and March when it makes its first return since 1956. Amateurs are also encouraged to participate; see Bulletin No. 3 for details on submitting observations.

Elsewhere in this issue an ephemeris for IHW trial run comet P/Crommelin will be found. Charts from the AAVSO Variable Star Atlas (\$49.95 from the AAVSO, Sky Publishing, and other booksellers) are very good for preparing Crommelin finder charts and will help with locating comparison star fields.

Visual magnitude estimates of Comet Crommelin should be based on the following AAVSO variable star charts: V Peg (215605b,d), R Peg (230110b,d), R Pis (012502b) o Cet (0214-03b), U Cet (0228-13b), and T Lep (0500-22b,d), using the star field with the most similar altitude as the comet when making the observation. This set of charts may be ordered from the AAVSO for \$4.00 (first class to the U. S., Canada, and Mexico) or \$6.00 (air mail to all other countries). Use the attached form or a xerox of it to expedite your order. It should be sent to: Crommelin Charts, AAVSO, 187 Concord Ave., Cambridge, MA 02138, USA.

P/CROMMELIN COMPARISON STAR CHART ORDER FORM

Please send me AAVSO/Crommelin comparison star charts. I enclose

No. of Sets		Total	
_____ x \$4.00	= \$	_____	(U. S., Mexico, Canada)
_____ x \$6.00	= \$	_____	(all other countries)

Name _____

Address _____

Return this form to Crommelin Charts, AAVSO, 187 Concord Ave., Cambridge, MA 02138, USA.

Observers in countries not listed below or in the last issue of the Bulletin are requested to send their observations to James A. Morgan, 1818 Grandview Dr., Beloit, WI 53511, USA.

The list of national organizations responding to inquiries has lengthened:

Nelson A. S. Travnik
Observatorio do Capricornia
Av. Auchieta 200, 6°
13 100 Campinas - SP
BRAZIL

Rudiger Knigge
Dr.-Remeis-Sternwart
Sternwartstrasse 7
D-8600 Bamberg
FEDERAL REPUBLIC OF GERMANY

Francisco Villate Matiz
Presidente, ASASAC
Cra. 15, No. 69-89
Bogota, COLOMBIA

Dr. Noah Brosch
Wise Observatory
Tel Aviv University
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This list is expected to be further lengthened as other organizations respond to letters sent by the JPL Lead Center.

ADDRESS UPDATES

U. S. Southwest Visual Recorder Alan Hale has changed addresses since publication of the last Bulletin. Please correct his address to read: 2738 Montrose Ave., No. 14, Montrose CA 91020. Also, U. S. Southeast Visual Recorder Tom Williams has a new address: 3621 Wakeforest, Houston, TX 77098

Australian organizer David Seargent's new address is P. O. Box 204, The Entrance, NSW 2261, Australia.

Bulletin contributions and comments may continue being sent to S. J. Edberg, Jet Propulsion Laboratory, California Institute of Technology, 800 Oak Grove Drive T1166 B4, Pasadena, CA 91109, USA.

Requests for Bulletin subscriptions and address changes should be sent to the Planetary Society, 110 S. Euclid, Pasadena, CA 91101, USA.

EPHEMERIS (WITH PERTURBATIONS) FOR P/CRUMMELIN

YR	MN	DAY	HR	J.D.	R.A. 1950.0	DEC.	R.A. APPN	DEC.	DELTA	DELDOT	R	ROOT	TMAG	NMAG	THETA	BETA	MOON
1984	1	1	.0	2445700.5	21 33.906	+ 6 12.94	21 35.566	+ 6 21.99	1.49	-14.78	1.17	-22.49	.0	18.4	51.5	41.1	75
1984	1	3	.0	2445702.5	21 39.613	+ 6 8.25	21 41.275	+ 6 17.46	1.48	-15.23	1.15	-22.32	.0	18.4	50.8	41.7	54
1984	1	5	.0	2445704.5	21 45.501	+ 6 3.70	21 47.166	+ 6 13.07	1.46	-15.67	1.12	-22.13	.0	18.3	50.1	42.3	35
1984	1	7	.0	2445706.5	21 51.574	+ 5 59.23	21 53.242	+ 6 8.76	1.44	-16.10	1.09	-21.90	.0	18.3	49.4	43.0	23
1984	1	9	.0	2445708.5	21 57.838	+ 5 54.75	21 59.508	+ 6 4.43	1.42	-16.52	1.07	-21.64	.0	18.2	48.7	43.7	27
1984	1	11	.0	2445710.5	22 4.297	+ 5 50.18	22 5.969	+ 6 .02	1.40	-16.92	1.04	-21.33	.0	18.2	48.1	44.4	44
1984	1	13	.0	2445712.5	22 10.956	+ 5 45.42	22 12.631	+ 5 55.41	1.38	-17.31	1.02	-20.98	.0	18.1	47.5	45.2	64
1984	1	15	.0	2445714.5	22 17.820	+ 5 40.35	22 19.498	+ 5 50.49	1.36	-17.68	1.00	-20.58	.0	18.0	46.9	45.1	87
1984	1	17	.0	2445716.5	22 24.894	+ 5 34.86	22 26.575	+ 5 45.14	1.34	-18.02	.97	-20.12	12.7	18.0	46.3	47.0	112
1984	1	19	.0	2445718.5	22 32.163	+ 5 28.81	22 33.868	+ 5 39.23	1.32	-18.35	.95	-19.60	12.3	17.9	45.8	48.0	137
1984	1	21	.0	2445720.5	22 39.693	+ 5 22.06	22 41.381	+ 5 32.60	1.30	-18.64	.93	-19.02	11.9	17.9	45.3	49.0	159
1984	1	23	.0	2445722.5	22 47.428	+ 5 14.45	22 49.119	+ 5 25.11	1.28	-18.90	.91	-18.36	11.5	17.8	44.9	50.1	155
1984	1	25	.0	2445724.5	22 55.392	+ 5 5.82	22 57.086	+ 5 16.59	1.26	-19.14	.89	-17.63	11.1	17.8	44.5	51.2	134
1984	1	27	.0	2445726.5	23 3.589	+ 4 55.39	23 5.286	+ 5 6.85	1.23	-19.34	.87	-16.81	10.7	17.7	44.1	52.4	111
1984	1	29	.0	2445728.5	23 12.021	+ 4 44.77	23 13.721	+ 4 55.74	1.21	-19.51	.85	-15.90	10.3	17.7	43.8	53.7	88
1984	1	31	.0	2445730.5	23 20.690	+ 4 31.98	23 22.353	+ 4 43.03	1.19	-19.63	.83	-14.91	9.9	17.6	43.5	55.0	66
1984	2	2	.0	2445732.5	23 29.595	+ 4 17.40	23 31.302	+ 4 28.52	1.17	-19.71	.81	-13.81	9.5	17.5	43.3	56.4	44
1984	2	4	.0	2445734.5	23 38.735	+ 4 .83	23 40.446	+ 4 11.99	1.14	-19.74	.80	-12.62	9.2	17.5	43.1	57.8	23
1984	2	6	.0	2445736.5	23 48.109	+ 3 42.07	23 49.822	+ 3 53.26	1.12	-19.71	.78	-11.33	8.9	17.5	43.0	59.3	9
1984	2	8	.0	2445738.5	23 57.711	+ 3 20.91	23 59.426	+ 3 32.11	1.10	-19.62	.77	-9.94	8.6	17.5	43.0	60.7	23
1984	2	10	.0	2445740.5	0 7.537	+ 2 57.17	0 9.254	+ 3 8.36	1.08	-19.46	.76	-8.47	8.3	17.4	43.0	62.3	44
1984	2	12	.0	2445742.5	0 17.580	+ 2 30.69	0 19.299	+ 2 41.86	1.05	-19.23	.75	-6.91	8.1	17.4	43.0	63.8	68
1984	2	14	.0	2445744.5	0 27.833	+ 2 1.34	0 29.554	+ 2 12.45	1.03	-18.92	.74	-5.29	7.9	17.4	43.2	65.3	94
1984	2	16	.0	2445746.5	0 38.288	+ 1 29.03	0 40.010	+ 1 40.05	1.01	-18.52	.74	-3.60	7.7	17.4	43.4	66.7	121
1984	2	18	.0	2445748.5	0 48.938	+ 0 53.70	0 50.659	+ 1 4.64	.99	-18.05	.74	-1.88	7.6	17.4	43.7	68.1	149
1984	2	20	.0	2445750.5	0 59.775	+ 0 15.37	1 1.495	+ 0 26.18	.97	-17.48	.73	-.14	7.6	17.3	44.1	69.4	177
1984	2	22	.0	2445752.5	1 10.793	+ 0 25.70	1 12.510	+ 0 15.25	.95	-16.84	.74	1.60	7.5	17.3	44.6	70.7	155
1984	2	24	.0	2445754.5	1 21.984	+ 1 9.99	1 23.699	+ 0 59.52	.93	-16.11	.74	3.33	7.5	17.3	45.1	71.8	130
1984	2	26	.0	2445756.5	1 33.345	+ 1 56.72	1 35.056	+ 1 46.46	.91	-15.31	.74	5.02	7.6	17.3	45.8	72.7	107
1984	2	28	.0	2445758.5	1 44.871	+ 2 45.86	1 46.576	+ 2 35.65	.89	-14.44	.75	6.65	7.7	17.3	46.5	73.5	86
1984	3	1	.0	2445760.5	1 56.557	+ 3 37.14	1 58.256	+ 3 27.39	.88	-13.49	.76	8.22	7.8	17.3	47.4	74.2	65
1984	3	3	.0	2445762.5	2 8.402	+ 4 30.23	2 10.093	+ 4 20.79	.86	-12.49	.77	9.71	8.0	17.3	48.4	74.6	44
1984	3	5	.0	2445764.5	2 20.403	+ 5 24.78	2 22.085	+ 5 15.65	.85	-11.42	.78	11.11	8.2	17.4	49.4	74.9	26
1984	3	7	.0	2445766.5	2 32.557	+ 6 20.38	2 34.228	+ 6 11.63	.84	-10.31	.79	12.41	8.5	17.4	50.6	74.9	17
1984	3	9	.0	2445768.5	2 44.860	+ 7 16.63	2 46.520	+ 7 8.27	.83	-9.14	.81	13.62	8.7	17.4	51.9	74.8	28
1984	3	11	.0	2445770.5	2 57.308	+ 8 13.09	2 58.956	+ 8 5.15	.82	-7.94	.83	14.73	9.0	17.4	53.2	74.5	48
1984	3	13	.0	2445772.5	3 9.892	+ 9 9.32	3 11.528	+ 9 1.83	.81	-6.69	.84	15.75	9.3	17.4	54.7	74.0	71
1984	3	15	.0	2445774.5	3 22.605	+ 10 4.86	3 24.227	+ 9 57.85	.80	-5.41	.86	16.67	9.7	17.4	56.2	73.4	95
1984	3	17	.0	2445776.5	3 35.434	+ 10 59.28	3 37.042	+ 10 52.77	.79	-4.11	.88	17.50	10.0	17.4	57.8	72.6	119
1984	3	19	.0	2445778.5	3 48.363	+ 11 52.14	3 49.956	+ 11 46.16	.79	-2.78	.90	18.25	10.4	17.4	59.4	71.7	139
1984	3	21	.0	2445780.5	4 1.375	+ 12 43.04	4 2.954	+ 12 37.61	.79	-1.43	.92	18.92	10.7	17.4	61.1	70.7	148
1984	3	23	.0	2445782.5	4 14.448	+ 13 31.59	4 16.013	+ 13 26.73	.79	-.07	.95	19.51	11.1	17.4	62.8	69.5	141
1984	3	25	.0	2445784.5	4 27.558	+ 14 17.48	4 29.109	+ 14 13.21	.79	1.30	.97	20.04	11.5	17.5	64.5	68.3	127
1984	3	27	.0	2445786.5	4 40.676	+ 15 .42	4 42.214	+ 14 56.76	.79	2.66	.99	20.51	11.9	17.5	66.3	67.0	111
1984	3	29	.0	2445788.5	4 53.772	+ 15 40.21	4 55.295	+ 15 37.17	.79	4.03	1.02	20.92	12.3	17.5	68.0	65.6	95
1984	3	31	.0	2445790.5	5 6.815	+ 16 16.68	5 8.330	+ 16 14.26	.80	5.39	1.04	21.28	12.6	17.5	69.7	64.2	79
1984	4	1	.0	2445792.5	5 19.772	+ 16 49.74	5 21.277	+ 16 47.95	.81	6.74	1.07	21.59	.0	17.6	71.4	62.8	65
1984	4	3	.0	2445794.5	5 32.609	+ 17 19.34	5 34.105	+ 17 18.19	.81	8.08	1.09	21.86	.0	17.6	73.1	61.3	52
1984	4	5	.0	2445796.5	5 45.295	+ 17 45.51	5 46.784	+ 17 44.97	.82	9.39	1.12	22.09	.0	17.5	74.7	59.9	44
1984	4	7	.0	2445798.5	5 57.798	+ 18 8.30	5 59.281	+ 18 8.38	.84	10.69	1.14	22.29	.0	17.7	76.2	58.4	43

EPHEMERIS (WITH PERTURBATIONS) FOR P/CROMMELIN

YR	MN	DY	HR	J.D.	R.A. 1950.0 DEC.	R.A. APPN DEC.	DELTA	DELDOT	R	ROOT	TMAG	NMAG	THETA	BETA	MOON
1984	4	10	.0	2445800.5	6 10.090 -18 27.84	6 11.570 -18 28.53	.85	11.96	1.17	22.46	.0	17.7	77.7	57.0	51
1984	4	12	.0	2445802.5	6 22.146 -18 44.28	6 23.623 -18 45.56	.86	13.20	1.19	22.61	.0	17.7	79.1	55.6	66
1984	4	14	.0	2445804.5	6 33.943 -18 57.79	6 35.419 -18 59.65	.88	14.42	1.22	22.72	.0	17.8	80.5	54.2	83
1984	4	16	.0	2445806.5	6 45.464 -19 8.57	6 46.939 -19 11.00	.90	15.50	1.25	22.82	.0	17.8	81.7	52.8	102
1984	4	18	.0	2445808.5	6 56.693 -19 16.84	6 58.170 -19 19.81	.92	16.76	1.27	22.90	.0	17.9	82.9	51.5	118
1984	4	20	.0	2445810.5	7 7.622 -19 22.83	7 9.101 -19 26.32	.94	17.88	1.30	22.96	.0	17.9	83.9	50.3	130
1984	4	22	.0	2445812.5	7 18.243 -19 26.78	7 19.726 -19 30.77	.96	18.97	1.33	23.00	.0	18.0	84.9	49.1	134
1984	4	24	.0	2445814.5	7 28.554 -19 28.91	7 30.041 -19 33.38	.98	20.02	1.35	23.03	.0	18.0	85.8	47.9	132
1984	4	26	.0	2445816.5	7 38.553 -19 29.48	7 40.045 -19 34.40	1.00	21.03	1.38	23.05	.0	18.1	86.6	46.8	123
1984	4	28	.0	2445818.5	7 48.243 -19 28.70	7 49.740 -19 34.05	1.03	22.01	1.41	23.06	.0	18.2	87.3	45.7	110

EXPLANATION OF SYMBOLS

J.D.= JULIAN DATE

R.A. 1950.0 DEC. = GEOCENTRIC RIGHT ASCENSION AND DECLINATION REFERRED TO THE MEAN EQUATOR AND EQUINOX OF 1950.0 - LIGHT TIME CORRECTIONS HAVE BEEN APPLIED

R.A. APPN DEC. = APPARENT GEOCENTRIC RIGHT ASCENSION AND DECLINATION - LIGHT TIME, ANNUAL ABERRATION, NUTATION CORRECTIONS HAVE BEEN APPLIED AND R.A. AND DEC. HAVE BEEN PRECESSED TO THE EPHEMERIS DATE

DELTA= GEOCENTRIC DISTANCE OF OBJECT IN A.U.

DELDOT = GEOCENTRIC VELOCITY OF OBJECT IN KM/SEC

R= HELIOCENTRIC DISTANCE OF OBJECT IN A.U.

ROOT = HELIOCENTRIC VELOCITY OF OBJECT IN KM/SEC

TMAG= TOTAL MAGNITUDE = $12.5 + 5.00 \cdot \text{DLOG}_{10}(\text{DELTA}) + 36.40 \cdot \text{DLOG}_{10}(\text{R})$

NMAG= NUCLEAR MAGNITUDE = $16.0 + 5.00 \cdot \text{DLOG}_{10}(\text{DELTA}) + 5.00 \cdot \text{DLOG}_{10}(\text{R}) + .03 \cdot \text{BETA}$

NOTE: IN CASES WHERE TMAG AND/OR NMAG ARE NOT COMPUTED, THE CORRESPONDING COLUMN(S) ARE FILLED WITH ZEROS (0.0).

THETA = SUN-EARTH-OBJECT ANGLE IN DEGREES

BETA = SUN-OBJECT-EARTH ANGLE IN DEGREES

MOON = COMET-EARTH-MOON ANGLE IN DEGREES

OUTPUT TIMES IN ABOVE EPHEMERIS ARE IN E.T.

THE FOLLOWING OSCULATING ORBITAL ELEMENTS ARE CONSISTENT WITH THE ABOVE EPHEMERIS

EPOCH	2445760.50000	1984	3	1.00000
PERIHELION PASSAGE	2445750.66255	1984	2	20.16255
PERIHELION DISTANCE IN AU	.7345337			
ECCENTRICITY	.9191770			
ARG. OF PERIHELION	195.85131			
LONG. OF ASCENDING NODE	250.19244			
INCLINATION	29.10305			

IN THE ABOVE ORBITAL ELEMENTS, THE ANGLES ARE IN DEGREES AND REFERRED TO THE ECLIPTIC AND EQUINOX OF 1950.0
THE EPOCH AND PERIHELION PASSAGE TIMES ARE IN EPHEMERIS TIME

ORBIT AND EPHEMERIS COMPUTATIONS BY

DR. D.K. YEOMANS
JET PROPULSION LAB.
PASADENA, CALIF. 91109

Comet Crommelin is active only for a few weeks on either side of perihelion. The crude total magnitude estimates are based upon this comet's brightness behavior in 1956. This ephemeris is based upon an orbit that used 37 observations over the period Sept. 30, 1956 until Oct. 27, 1983. A similar ephemeris by Dr. B.G. Marsden appears on I.A.U. circular 3886.

DARK SKIES FOR COMET HALLEY (DSCH)

Fred Schaaf, columnist for Astronomy magazine, has been promoting the concept of shutting off sources of artificial illumination on selected nights during the Halley apparition (see the June, 1982 issue of Science 82, p. 16). This will make it easier for residents of light polluted areas to see Halley, and even the stars, perhaps for the first time. Now is the time to start working on the technical and political problems involved in achieving this goal.

DSCH is being supported by the Astronomical League, which will publish the DSCH Newsletter in their own quarterly, the Reflector. Subscription rates are \$4.00 USA and \$5.00 foreign and should be sent to Don Archer, P. O. Box 12821, Tucson, AZ 85732, USA. Information on club or individual league membership (which includes a subscription to the Reflector) may also be obtained from Don Archer.

IHW Amateur Observer's Bulletin
Planetary Society
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AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue No. 3

November 1983

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

THE IHW AMATEUR OBSERVERS' MANUAL

At long last and after several printing delays the amateur observer's manual is now available. The full title is The International Halley Watch Amateur Observers' Manual for Scientific Comet Studies by Stephen J. Edberg. It is available from three publishers, and may eventually be distributed by booksellers in North America and Europe in addition. This book is required reading for all amateur astronomers planning on submitting observations to the IHW.

The version available from the Superintendent of Documents, U.S. Government Printing Office, Dept. 33, Washington, D.C. 20402, USA, (202) 783-3238 has been printed in two saddlestitched parts (i.e., each part is center-stapled like a magazine). Part I, Methods is primarily descriptive how-to-do-it material, stock number 033-000-00888-1, \$4.50. Part II, Ephemeris and Star Charts includes a daily ephemeris, star charts showing the comet's path over a six month period, and lists of standard and calibration stars, stock number 033-000-00889-9, \$4.50. IHW contributors should purchase both parts. The payment may be by check or money order made payable to the Superintendent of Documents, or by charging to Visa or MasterCard accounts (include account number and expiration date). Include the stock number and title and allow at least four weeks for delivery by non-priority mail or United Parcel Service. Telephone orders or first class or air mail service may be arranged at

(202) 783-3238, and the two mailing classes may also be arranged by mail in advance of the order.

Group orders of 100 or more copies or book dealers (including clubs ordering on letterhead; no minimum quantity) may take a 25% discount.

Foreign orders must be in English and remitted in US dollars by check drawn on a US or Canadian bank, UNESCO coupon, International Postal Money Order made out to Superintendent of Documents, or by MasterCard or Visa. A 25% surcharge is made on foreign orders and surface mail is used. Contact the Superintendent prior to ordering if air mail service is desired.

Enslow Publishers, Bloy Street and Ramsey Avenue, Box 777, Hillside, NJ 07205, USA, and Sky Publishing Corp., 49 Bay State Road, Cambridge, MA 02238, USA are offering the same book perfect-bound (glued back) with both parts combined in a single volume. Their printing also contains the Halley observing conditions illustrations from D. Yeomans' Comet Halley Handbook. The price is \$9.95 postage paid. Foreign orders must be in US funds drawn on a US bank or by international money order, and 10% for postage should be added.

The availability of translations of the manual in French, Russian, Polish, Japanese, Spanish, Bengali, and Italian will be announced as each becomes available.

IHW contributors in currency-controlled countries should send a letter to Stephen J. Edberg, Jet Propulsion Laboratory, 4800 Oak Grove Drive, T1166 B3, Pasadena, CA 91109, USA detailing their observing plans, available instruments, and geographic coordinates of their observing sites. Arrangements will be made to send manuals to these observers.

IHW AMATEUR OBSERVER'S BULLETIN SUBSCRIPTIONS

The Planetary Society, 110 S. Euclid Ave., Pasadena, CA 91101, USA has kindly offered to handle publication and distribution of future Bulletin issues, at no charge for the present. Address corrections and new subscription requests should be sent to them from now on.

The Planetary Society is organized to promote planetary exploration and the search for extraterrestrial life. Membership in the society costs \$15.00 per year and includes a subscription to the bimonthly Planetary Report. Membership outside the US is being organized at the present time.

SPANISH TRANSLATION OF THE BULLETIN

The Sociedad Astronomia Orion, A.C., Apdo. Postal No. 384, 84000 Nogales, Sonora, Mexico is offering free subscriptions to the Spanish translation of this Bulletin. Readers desiring a subscription should contact this organization directly.

TRIAL RUN COMET

Periodic Comet Crommelin has been designated 1983n after its recovery last August. Lubos Kohoutek (of Comet Kohoutek fame) found it on plates taken with the 80 cm Schmidt camera at Calar Alto, Spain. It was also picked up at Kitt Peak by Susan Wyckoff and Peter Wehinger using a 90 cm telescope and CCD detector.

This comet, which may reach 6th magnitude in early March 1984, is the IHW trial run comet. The trial run is formally scheduled for the last week of March but amateurs are encouraged to begin observing the comet as soon as they can pick it up, perhaps in January. P/Crommelin has been poorly observed at its earlier apparitions so magnitude predictions are particularly uncertain. The next issue of the Bulletin will carry ephemeris information.

HOW TO CONTRIBUTE DATA TO THE IHW AMATEUR OBSERVATION NETWORK

Readers planning to contribute observations should obtain a copy of the amateur manual as soon as possible and return the Observer Index form at the front of the book. This registers you as an observer. The IHW wants amateurs to contribute during the upcoming trial run on Comet Crommelin. Meteor observers should start observing the η Aquarids and Orionids next May and October, respectively. They are encouraged to observe other meteor showers, in addition.

Observations must be reported on duplicates of the report forms in the amateur manual. Note that photographic and spectroscopic observation reports should be submitted with duplicate slides or contact prints. In the US and Canada observation reports should be submitted to the volunteer Recorders listed below. They will serve as accumulation points for data and can answer questions about procedure and technique. (Please send a self-addressed, stamped envelope [SASE] or International Postal Coupons to keep their costs down). They will collect observations and then submit them to the IHW Lead Center.

At the IHW Lead Center the visual and meteor observations (no meteors for the trial run) will be entered into the archives. The professional discipline specialists will submit requests for amateur data that they need to complete their data sets before their sets are entered into the archives.

Canadian and American observers should send their observations to the recorder assigned to the region they live in. The U.S. + Canada has been halved with the Mississippi River. Minnesota, Manitoba, and the Northwest Territories are considered west of the Mississippi and Wisconsin and Ontario are considered east. Photographic and spectroscopic observers should send their observations to:

West:

John Sanford
2215 Martha Ave.
Orange, CA 92667

East:

John Sabia
1112 Fairview Rd.
Clarks Summit, PA 18411

HALLEY'S COMET CHRISTMAS STAMP

Joe Laufer, publisher of the private "Halley's Comet Watch Newsletter" is starting a campaign to have the U. S. Postal Service issue a 1985 Christmas stamp reproducing the painting Adoration of the Magi by Giotto, which depicts Comet Halley's 1301 apparition (see Scientific American, May 1979, pg. 160 for an article and photographs). Contact him at Box 188, Vincentown, NJ 08088 to learn how to approach the U.S.P.S. in support of this idea.

This publication was prepared by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

JPL 410-6-3 11/83

International Halley Watch
Jet Propulsion Laboratory
California Institute of Technology
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Pasadena, California 91109
USA

The U.S. + Canada has been further halved with Washington, Oregon, Idaho, Montana, Wyoming, the Dakotas, Nebraska, Minnesota, Iowa, and the provinces north of them in the Northwest Region. The states south of these and west of the Mississippi are in the Southwest Region. The Northeast Region includes Virginia and Kentucky and the states and provinces north of them. The Southeast includes the remaining states. Visual observations should go to:

Northwest:

Chris E. Spratt
1431 St. Patrick St.
Victoria, BC V8S 4Y5
Canada

Northeast:

Warren Morrison
955 Ford St.
Peterborough, Ontario K9J 5V5
Canada

Southwest:

Alan Hale
2775 Mesa Verde Dr. East
Apt. M108
Costa Mesa, CA 92626

Southeast:

Tom Williams
270 Revere
Apt. 281
Houston, TX 77098

There is only one recorder each for photoelectric photometry, astrometry, and for meteors:

PEP:

Robert Fried
Braeside Observatory
P. O. Box 906
Flagstaff, AZ 86002

Astrometry:

Stephen Edberg
Jet Propulsion Lab.
T1166A
4800 Oak Grove Dr.
Pasadena, CA 91109

Meteors:

Mike Morrow
Hale Hoku Observatory
91-1033 Hanakahi St.
Ewa Beach, HI 96706

British observers and members of the British Astronomical Association should contact M. J. Hendrie, Director of the BAA Comet Section, 33 Lexden Rd., West Bergholt, Colchester, Essex C06 3BX, Britain regarding data submission.

In Australia the contact is David Seargent, 156 Entrance Rd., The Entrance, NSW 2261, Australia.

A.C. Gilmore, Mt. John University Observatory, P.O. Box 20, Lake Tekapo, South Canterbury, New Zealand is the contact for observers in New Zealand.

In Colombia, Kevin Marshall, A.C.A.F.A., Calle 56, No. 47-23, Apto. 601, Medellin, Colombia will coordinate data collection.

Prof. Jorge Balseiro Savio, Director of the Institute de Ciencia e Investigacion, Brasil 328, Mercedes, Uruguay is coordinating amateurs there.

In some other Spanish and Portuguese speaking countries Dr. Ignacio Ferrin of the Liga Ibero-Americana de Astronomia (LIADA), Apartado 700, Merida 5101-A, Venezuela will serve to collect observations.

Observers in countries not listed in this issue or the next issue of the Bulletin are requested to send their observations to James A. Morgan, 1818 Grandview Dr., Beloit, WI 53511, USA.

MORE ON COMET INFORMATION SOURCES

IAU Circulars, published by the Central Bureau for Astronomical Telegrams, Smithsonian Astrophysical Observatory, 60 Garden St., Cambridge, MA 02138, USA carry discovery and follow-up information on many types of transient astronomical phenomena, including comets, close-approaching asteroids, novae and supernovae, and other events. A special subscription price for subscribers willing to keep track of their own non-invoiced accounts is 50 issues for \$18.00 (or 100 issues for \$36.00). These are issued at irregular intervals, sometimes in bunches.

Minor Planet Circulars issued by the Minor Planet Center at the Smithsonian Astrophysical Observatory contain position reports and orbital elements on comets and minor planets and announce newly assigned names to minor planets. Cost of a special, non-invoiced subscription is \$88.00 per year, payable to the Minor Planet Center. This is a very technical publication.

Tonight's Asteroids, published by J.U. Gunter, 1411 N. Mangum, Durham, NC 27701, USA carries finder charts and commentary on currently visible asteroids and occasionally comets. To subscribe, U.S. residents should send a supply of business size (11 cm x 25 cm) self-addressed, first class stamped envelopes to the address above. Canadian and Mexican observers should send \$2.00 and other foreign subscribers should send \$8.50 to Dr. Gunter for ten issues.

The BAA Handbook carries comet ephemerides for returning comets as well as a variety of other astronomical data for the year. The 1983 edition cost £ 5.00. It is available from the British Astronomical Association, Burlington House, Piccadilly, London W1V ONL, England.

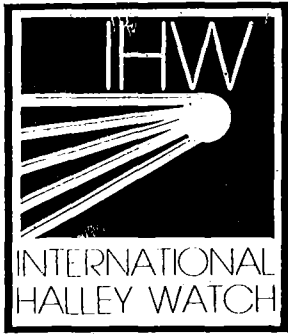
The Catalog of Cometary Orbits by B.G. Marsden is available from the Smithsonian Astrophysical Observatory, in a 22 cm x 28 cm staple-bound version or from Enslow Publishers, Bloy Street and Ramsey Avenue, Box 777, Hillside, NJ 07205, USA in a 16 cm x 23 cm perfect-bound version. This catalog lists the orbital elements of over 700 comets seen at over 1100 apparitions through May 1982 and costs \$10.00 from either source.

THE 1983 AMERICAN WORKSHOP ON COMETARY ASTRONOMY

This workshop was held last October 1. Amateur and professional astronomers, numbering over 130, listened to discussions of cometary photometry by Ray Newburn, cometary nuclei by Zdenek Sekanina, spacecraft missions to comets by Paul Weissman, predicted comets for 1984 and 1985 by Alan Hale, cometary photography by John Sanford, the new Polaroid 35 mm materials by Dan Tidwell, comet Swan band filters by Jack Marling, and visual observing techniques by John Bortle and Charles Morris.

The evening observing session was clouded out, a casualty of Southern California's unusual weather this year. Instead, an open discussion was held and observing techniques were practiced indoors using slides projected on a screen.

The workshop was a success and another workshop is planned for June 1985 in Tucson, Arizona.



AMATEUR OBSERVER'S BULLETIN

THE INTERNATIONAL HALLEY WATCH AMATEUR OBSERVER'S BULLETIN

Issue No. 2

May 1983

IHW Leader, Western Hemisphere: Ray L. Newburn

IHW Leader, Eastern Hemisphere: Jurgen Rahe

IHW Deputy Leader: Murray Geller

IHW Coordinator for Amateur

Observations and Bulletin Editor: Stephen J. Edberg

EDITORIAL

This is the second IHW Amateur Observer's Bulletin. Since the first issue the readership has tripled due to the overwhelming response to my article in Astronomy, last March.

This issue updates various Halley Watch activities. I encourage authors to submit contributions to the Bulletin for possible use. The Bulletin's purpose is communication, not just from the Lead Center to readers but also from readers to readers.

Stephen J. Edberg
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California Institute of Technology
4800 Oak Grove Drive, MS T-1166/B2
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THE IHW AMATEUR OBSERVERS' MANUAL

I had hoped to announce the availability of the manual in this issue of the Bulletin. Preprints of the manual (essentially a "dress rehearsal") were circulated at the IHW Steering Group and Discipline Specialist meeting at the end of March. Several requests for updates and changes were made and this has delayed publication by one to two months. In the meantime, negotiations for publication and sale by not just the U. S. Government Printing Office but other publishers and booksellers are going on. The next issue of the Bulletin will be mailed as soon as purchasing information is available.

S. E.

BULLETIN SUBSCRIPTIONS

A severely limited budget will force the IHW to limit publication of the Bulletin after the next issue or two. Because of federal government regulations the IHW cannot accept money to maintain subscriptions. Instead, we are negotiating with several organizations to handle subscriptions to the Bulletin, as a privilege of membership and/or as a separate enterprise at a nominal fee. It is possible that the Bulletin will also be available from the U. S. Government Printing Office. Current subscribers will be informed of the subscription possibilities in a future issue. Arrangements will be made to continue sending the Bulletin to subscribers in currency-controlled countries.

AMERICAN WORKSHOP ON COMETARY ASTRONOMY

The second workshop in the series started last year in Cambridge, Massachusetts will occur on October 1, 1983 at the Jet Propulsion Laboratory in Pasadena. Cosponsored by the International Halley Watch and the International Comet Quarterly, this workshop will bring together amateur and professional comet astronomers for a day of exchange on observing techniques and the latest developments in the field. In addition, tours of JPL and an evening observing session are scheduled. More information will be published in a subsequent issue of the Bulletin.

PRACTICE OBSERVATIONS AND THE TRIAL RUN

Comets, being rather unusual creatures in the cosmic zoo, require unusual methods for valid observations to be made. This is why it's important to obtain a copy of the amateur manual as soon as it becomes available and to begin practicing on other available comets. The International Comet Quarterly, c/o Dan Green, Smithsonian Observatory, 60 Garden Street, Cambridge, MA 02138, USA (US \$8.00/yr, in U. S. funds) and Comet News Service, McDonnell Planetarium, 5100 Clayton Road, St. Louis, MO 63110, USA (US \$4.00/yr) publish comet ephemerides so observers can study the periodic and other comets for which predictions are available. In addition, Comet Predictions for 1984 is available for the cost of reproduction and postage from Charles Townsend, 3521 San Juan Avenue, Oxnard, CA 93033, USA (US \$4.00 for the continental US and US \$5.00 elsewhere).

Listed in the prediction handbook, among many other comets, is the target of the trial run scheduled for February and March 1984. This is Comet Crommelin, whose 27-year period is intermediate between the well observed shorter period comets and Halley's Comet with its longer period, all of which belong to the short period class. More information on Crommelin and the trial run will be published in a future issue.

THE INTERNATIONAL UNION OF AMATEUR ASTRONOMERS

This organization, recently recognized formally by the International Astronomical Union, has endorsed the IHW and is promoting amateur network activities. In general, it is anxious to promote more amateur assistance to professional astronomers.

My visit to Belgium in February to meet with the IUAA council and attend their regional symposium was a pleasant, refreshing, and educational experience. Because of the size of the U. S., it's easy for us to forget that amateurs in other countries have the same interest, activities, and problems that we have. They are most anxious to share experiences with American amateurs and I heartily recommend that American amateurs travelling outside the U. S. visit local astronomy clubs during their trips. The International Directory of Amateur Astronomical Studies is available from A. Heck, c/o ESA Satellite Tracking Station, Apartado 54065, Madrid, Spain or Jean Manfroid, c/o Institute d' Astrophysique, avenue de Cointe 5, B-4200 Cointe-Ougree, Belgium for less than US \$20.00 and is a very useful listing of astronomical societies around the world.

S. E.

HALLEY METEOR DAYS AND IHW DAYS

Halley Meteor Days have been declared for May 2 - 6 and October 20 - 24 in conjunction with the η Aquarid and Orionid meteor showers, respectively, for the years 1983-1987. These two showers are related to Halley's Comet and observers are especially encouraged to make hourly counts and photographic observations during these periods. New methods of radio observation of meteors make useful observations possible even during years when the moon interferes with visual observations (as in 1983). Observers interested in pursuing radio studies should contact the American Meteor Society, Department of Physics and Astronomy, State University of New York at Geneseo, Geneseo, New York 14454, USA for more information.

IHW Days for coordinated observations of Halley's Comet by all the professional disciplines and amateurs are still being selected for the period 1984-87. This list will be published when it is finalized.

DATA HANDLING, ARCHIVING, AND THE AMATEUR OBSERVATION NETWORK

An article like this will probably appear several times over the next few years as IHW plans evolve to their final form. This is a discussion of the current plans and status of handling and archiving amateur data.

Amateur contributions will follow several steps from the observer to the archives. The route mapped below is for American observers, and probably for Canadians as well when the Royal Astronomical Society of Canada formally decides on how it wants to organize its participation. The national astronomical societies of other countries should decide on data handling procedures in the next few months and inform the IHW Lead Center in Pasadena. Observers in countries lacking nationwide organizations will be requested to work within the U. S./Canada system.

After comet and calibration observations are made (according to the methods in the IHW amateur manual) the data should be transferred to copies of the standard report form included in the manual. Also, duplicates or contact prints of any photographs should be prepared. On a weekly basis, the data should be collected and mailed to the designated Recorder (described below).

Recorders are being selected on the basis of their geographic location and previous comet observation experience. Current plans are for six to be selected to handle visual observations, two for photographic observations, and one each for photoelectric and meteor observations. Their names and addresses will be published by the end of the year, in time for the trial run.

The Recorders will assess the data submitted by observers and forward the high-quality, calibrated data to the Lead Center for further processing.

At the Lead Center, the data will be filed by date. It will be used in two ways. The professional discipline specialists can request particular types of observations to improve the completeness of their network's coverage of the comet during a single day or over several days.

The Lead Center data set will also be used for the archives. When the archives are compiled for publication, amateur data will be included in each day's record of the comet. Data not appropriate to a daily report format, like a visual light curve or meteor rates, will be published in a separate section of the archive.

This recorder system has been organized to control the flow of data to the Lead Center so that we are not overwhelmed at the height of interest in the comet. Observers who want to see their data in the archives must make the effort necessary to obtain high-quality, calibrated data that will be valuable to a researcher preparing for Halley's 2061 apparition!

This publication was prepared by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

JPL 410-6-2 6/83



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California



**Discipline
Specialist Teams**

Astrometry

D. K. Yeomans
R. M. West
R. S. Harrington
B. G. Marsden

**Infrared Spectroscopy
and Radiometry**

R. F. Knacke
T. Encarnaz

Large-Scale Phenomena

J. C. Brandt
M. B. Niedner, Jr.
J. Rahe

Near-Nucleus Studies

S. Larson
Z. Sekanina
J. Rahe

**Photometry and
Polarimetry**

M. A'Hearn
H. Campins
V. Vanysek

Radio Studies

W. M. Irvine
F. P. Schloerb
R. D. Brown
E. Gerard
P. D. Godfrey

**Spectroscopy and
Spectrophotometry**

S. Wyckoff
P. A. Wehinger
M. C. Festou

Dear Observer:

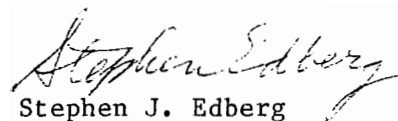
Thank you for returning the IHW amateur manual's Observer Index form. This registers you as a full participant in the IHW Amateur Observation Network.

If you are not already receiving the IHW Amateur Observer's Bulletin, contact the Planetary Society, P. O. Box 91687, Pasadena, CA 91109, USA for a free subscription. This periodical will be our primary means of communication on various topics of interest to you.

Reprinted here are several articles of importance to observers. Please study them carefully.

I'm looking forward to receiving your observations from your U.S./Canada Recorder or IHW National Correspondent.

Clear Skies,


Stephen J. Edberg

HOW TO CONTRIBUTE DATA TO THE IHW AMATEUR OBSERVATION NETWORK

Observations must be reported on duplicates of the report forms in the amateur manual. Note that photographic and spectroscopic observation reports should be submitted with duplicate slides or contact prints. In the US and Canada observation reports should be submitted to the volunteer Recorders listed below. They will serve as accumulation points for data and can answer questions about procedure and technique. (Please send a self-addressed, stamped envelope [SASE] or International Postal Coupons to keep their costs down). They will collect observations and then submit them to the IHW Lead Center.

At the IHW Lead Center the visual and meteor observations will be entered into the archives. The professional Discipline Specialists may submit requests for amateur data that they need to complete their data sets before their sets are entered into the archives. Alternatively, appropriate amateur data may all be submitted to the DSs for their examination.

Canadian and American observers should send their observations to the recorder assigned to the region they live in. The U.S. + Canada has been halved with the Mississippi River. Minnesota, Manitoba, and the Northwest Territories are considered west of the Mississippi and Wisconsin and Ontario are considered east. Photographic and spectroscopic observers should send their observations to:

West:

John Sanford
2215 Martha Ave.
Orange, CA 92667

East:

John Sabia
1112 Fairview Rd.
Clarks Summit, PA 18411

The U.S. + Canada has been further halved with Washington, Oregon, Idaho, Montana, Wyoming, the Dakotas, Nebraska, Minnesota, Iowa, and the provinces north of them in the Northwest Region. The states south of these and west of the Mississippi are in the Southwest Region. The Northeast Region includes Virginia and Kentucky and the states and provinces north of them. The Southeast includes the remaining states. Visual observations should go to:

Northwest:

Chris E. Spratt
1431 St. Patrick St.
Victoria, B.C. V8S 4Y5
Canada

Northeast:

Warren Morrison
955 Ford St.
Peterborough, Ontario K9J 5V5
Canada

Southwest:

Alan Hale
2738 Montrose Blvd., Apt. 14
Montrose, CA 91020

Southeast:

Tom Williams
3621 Wakeforest
Houston, TX 77098

There is only one recorder each for photoelectric photometry, astrometry, and for meteors:

PEP:

Robert Fried
Braeside Observatory
P. O. Box 906
Flagstaff, AZ 86002

Astrometry:

Stephen Edberg
Jet Propulsion Lab.
T1166A
4800 Oak Grove Dr.
Pasadena, CA 91109

Meteors:

Mike Morrow
Hale Hoku Observatory or
91-1033 Hanakahi St.
Ewa Beach, HI 96706

Ruthi Moore
Assistant Meteor Recorder
1347 Uila St.
Honolulu, HI 96818

Observers outside the U.S. and Canada should send their observations to their IHW National Correspondents or to International Recorder James A. Morgan, 1818 Grandview Dr., Beloit, WI 53511, USA. French-speaking Belgians should work with the Belgian correspondent; Dutch-speaking Belgians should work with the Netherlands correspondent.

David Seargent
P. O. Box 204
The Entrance, NSW 2261
AUSTRALIA

Mr. Francisco Villate Matiz
Presidente, ASASAC
Cra. 15, No. 69-89
Bogota, COLOMBIA

James Doyle
68, rue de la Neuville, Box 6
B-6000 Charleroi
BELGIUM

Dr. A. Ch. Levasseur-Regourd
Service d'Aeronomie
BP3-91370, Verrieres-le-Buisson
FRANCE

Halley Watch Committee Bolivia
Asociacion Boliviana de Astronomia
Casilla 7707
La Paz, BOLIVIA

Dr. M. C. Festou
Institut d'Astrophysique de Paris
98 bis Boulevard Arago
75014 Paris
FRANCE

A. Gonzalo Vargas B.
Astronomia Sigma Octante
Solar Department
Casilla 2299 - Cochabamba
BOLIVIA

Dr. J.-L. Heudier
C.E.R.G.A.
Caussols
06460 Saint-Vallier-de-Thiery
FRANCE

Nelson A. S. Travník, Director
Observatorio do Capricornio
Av. Auchieta 200, 6º.
13 100 Campinas-SP
BRAZIL

Mr. Rudiger Knigge
Dr. - Remeis - Sternwart
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D-8600 Bamberg
FEDERAL REPUBLIC OF GERMANY

Kevin P. Marshall
ACAFA
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Medellin, COLOMBIA

Kari Kaila
Ursa Astronomical Assoc.
Suvitie 11 A
SF-90800 Oulu 80
FINLAND

Janos Papp
Budapest
Katica a.11.
H-1191, HUNGARY

Ilan Manulis
P. O. Box 590
Kfar-Saba 44104
ISRAEL

Fco. Javier Mandujano O.
Sociedad Astronomica de Mexico A. C.
Apartado Postal M-9647
Admon. Correos #1
MEXICO 06000 D.F.

Antonio Sanchez
Sociedad Astronomica Orion, A. C.
Apdo. Postal No. 384
84000 Nogales
Sonora, MEXICO

Reinder J. Bouma
Dutch Comet Section
Bekemaheerd 77
9737 PR Groningen
THE NETHERLANDS

Alan C. Gilmore
Mt. John University Observatory
P. O. Box 20
Lake Tekapo, South Canterbury
NEW ZEALAND

Capt. Luis A. Velasquez
Asociacion Panamena de
Aficionados a la Astronomia
Apartado 6-7257 El Dorado
Panama R., PANAMA

Imelda B. Joson
1947 Gonzales St.
Pandacan, Manila
PHILIPPINES

Stefania Grudzinska, Marek Muciek
Institute of Astronomy
Nicolaus Copernicus University
ul. Chopina 12/18
87-100 Torun
POLAND

Andreas Tarnutzer
Hirtenhofstrasse 9
CH-6005 Luzern
SWITZERLAND

Nibondh Saibejra, Director
Bangkok Planetarium/TAS
928 Sukhumvit Road
Bangkok 10110
THAILAND

Prof. Jorge Balseiro Savio
Director,
Institute de Ciencia e
Investigacion
Brasil, 328
Mercedes, URUGUAY

Dr. Ignacio Ferrin
LIADA
Apartado 700
Merida, 5101-A
VENEZUELA

Jesus H. Otero A.
Sociedad Venezolana de Aficionados
a la Astronomia
Apartado, 78238
La Urbina 1074-A
Caracas, VENEZUELA

In Italy, the German Democratic Republic, Denmark, and in the United Kingdom
Recorders have been selected:

National Correspondent and Visual/PEP
Recorder

Antonio Milani
Coordinator, UAI Comet Section
viale Cavallotti, 61
35100 Padova
ITALY

Photography and Spectroscopy

Dr. Marco Fulle
Corso Buenos Aires 6
16043 Chiarari (GE)
ITALY

National Chief &
Visual Recorder

Karsten Kirsch
6900 Jena
Otto-Schwarz.-Str. 27
GERMAN DEMOCRATIC REPUBLIC

Photography

Klaus-Dieter-Kalauch
7802 Annahutte
Klettwitz Str. 6
GERMAN DEMOCRATIC REPUBLIC

PEP & Visual
Magnitude Recorder

Dietmar Böhme
4851 Nessa 11, PF93
GERMAN DEMOCRATIC REPUBLIC

Visual Recorder

Lars Spatzek
Ulspilsager 19
DK-2791 Dragor
DENMARK

Photographic Recorder

Henrik Johannesen
Gurrevej 392
DK-3490 Kvistgaard
DENMARK

Astrometry & IHW Correspondent

Michael J. Hendrie
Overbury
33 Lexden Road
West Bergholt
Colchester
Essex, CO6 3BX
UNITED KINGDOM

Visual Observations

Graham S. Keitch
2 South Meadows
Wroughton
Avon, BS18 7PF
UNITED KINGDOM

Photography & Spectrography

Harold B. Ridley
Eastfield Observatory
Eastfield Lane
East Chinnock
Yeovil
Somerset
BA22 9EP
UNITED KINGDOM

Photoelectric Photometry

Charles Munday
The Observatory
Rowney's Farm
Wakes Colne
Colchester
Essex, CO6 2AS
UNITED KINGDOM

Meteor observers should send their observations to their National Correspondent listed on the previous two pages or to the U.S/Canada Meteor Recorder if a national meteor organization is not listed below.

Jeff Wood
N.A.P.O. Meteor Section
42 Jacaranda Drive
Ballajura, W.A. 6066
AUSTRALIA

Janos Papp
Hungarian Meteor Observers
Budapest
Katica u.11.
H-1191, HUNGARY

G. Klar Renner
U. B. A.
Rua-Ramiro Barcelos, 1820 Ap. 801
CEP: 90000, Porto Alegre-RS
BRAZIL

Gabor Sule
Budapest
Attila u. 23 V./31
H 1013 HUNGARY

Per Aldrich
Naesbyholmvej 6 st.th.
DK-2700 Bronshoj
DENMARK

Fintan Sheerin
Irish Meteor Society
24 Goatstown Road
Dundrum, Dublin 14
IRELAND

Robert A. Mackenzie
British Meteor Society
26, Adrian St.,
Dover, Kent CT17 9AT
ENGLAND

M. Eltri and E. Stomeo Robert A.
UAI - Sezione Meteore
2, Via M. Bragadin
30126 Venezia Lido
ITALY

George Spaulding
British Astr. Assoc.
Meteor Section, 2 Hyde Road
Denchworth, Wantage,
Oxon OX12 ODR
ENGLAND

Yasuo Yabu
Nippon Meteor Society
878 Maruyama-cho
Omihachiman City
Shiga 523, JAPAN

Jurgen Rendtel
Gontardstrasse 11
1500 Potsdam
GERMAN DEMOCRATIC REPUBLIC

Godfrey Baldacchino
SACMES
315, Zabbar Rd.
Fgura, MALTA

Ken Morse
RASNZ Meteor Section
P. O. Box 2241
Wellington, NEW ZEALAND

REVISED REPORT FORMS FOR COMET PHOTOGRAPHS AND SPECTROGRAMS

Shortcomings noticed in the use of the photograph report form in the IHW Amateur Manual have prompted the revisions discussed here and incorporated on the new form.

In particular, photographers may use several instruments and camera lenses to record the comet on the same roll of film. Provision has been added to list the specifications of the instruments and lenses and designate which was used for each image in the Instrument No. column. In the Photo. Method column the photographic method (PF, NP, EP, A, or new camera lens designation CL) should be inserted. For the spectroscopy report form, in the Spectro. Method column the spectroscopic method should be reported using the designation O for objective, N for nonobjective, or S for slitless. EFL, as before, should give the actual working focal length at which the image was recorded. The Aperture of the grating or prism used is now requested on the spectroscopic observation form. No other changes have been made. Report forms for both these areas should be sent together if direct photos and spectra are on the same contact print. Two contact prints are preferred if both types of observation are on the same roll of film. The changes on these forms should make their use easier.

J. Sabia, S. J. Edberg

REVISED OBSERVATION FORMS FOR METEOR OBSERVERS

Both the meteor photography and visual report forms have been revised. Changes on the meteor photography form match those on the comet photography and spectroscopy forms as described earlier, except that space is included to indicate if a grating or prism was used with the camera. The changes on the visual report form are more extensive.

The major changes are the addition of more hours of observation, more cloud cover entries, and a more specific "Facing Direction" entry. We encourage wider observation dates: 27 April to 11 May for the η Aquarids and 15 October to 31 October for the Orionids. This is in keeping with the fourteen day activity period as concluded by Hajduk et al, in 1983. This allows for observations of the Halleyid "subshower," which comes to maximum on approximately 8 May. The most important dates (2 - 6 May and 20 - 24 October) can be stressed for those who must select a limited number of observing nights.

On the revised report form, under Group Observation check no or yes depending on whether or not you were working with other observers. If yes, give the number of observers in the group in the space provided (#) and list their names in the Notes section. Cloud Cover is now to be written in as the percentage of sky covered, with space provided for an estimate at the beginning and end of each hour. Changes in percentage or cloud type during an observation period should be reported with the UT of the changes in the Notes section. Under Facing Direction circle one or more of the letters to indicate the direction faced while observing. Z refers to the zenith. Number of Meteors - Shower refers to only η Aquarid or Orionid meteors, not to sporadic or other meteors related to the minor showers active during May and October. Sporadic and minor shower meteors (from the μ Virginids, α Scorpiids, α Bootids, and ϕ Bootids during April-May and from the Southern and Northern Piscids, Southern and Northern Taurids, Annual Andromedids, ϵ Geminids, Leo Minorids, and Pegasids

during August–November) should all be counted in the Non-shower column.

Many people will be observing for only a few hours a night. Please use a different form for each night's observing, regardless of the number of spaces used. Be sure to fill out all information on the top of each form. If the observing site changes by more than a few miles, this information must be included on the sheet, along with the coordinates of the new location.

When more than one person is observing at the same location, each individual must submit his own observation record. There is a space for the number of observers at the same site, and room to list the names, but the forms should reflect the work of an individual, not the group. Group efforts can be very advantageous and are encouraged. The entire sky can be monitored with six people. When working in a group, Facing Direction becomes even more important in recording observations.

Due to the relatively brief observing time of the η Aquarids by people in the mid and high northern and southern latitudes, some observers may try to increase their observing time by doing radio observations after daylight. If you do make radio observations of meteors please report your observations on this report form. Give some information about your equipment and method of operation in the Notes section. Dark Adaptation Time, Group Observation, Faintest Star, and Cloud Cover obviously need not be filled in. Viewing Area of Sky and Facing Direction should be used to identify the pointing of your antenna. All identified meteors should be counted since Shower and Non-shower meteors are expected to be indistinguishable.

All observation periods should begin on the hour, quarter hour, or half hour, using Universal Time and Date only. Time should be allowed for proper dark adaptation, taking into account your activities and light sources prior to beginning observations.

Because the information from these forms will be archived by computer, it is extremely important that only the standard form be used for your observations. Any data submitted on other observing forms will be given last consideration. Transposing data from other forms to the IHW report form is acceptable and should not be difficult.

M. J. Morrow, R. Moore

METEOR OBSERVATION RECOMMENDATIONS

Experienced meteor observer M. J. J. Buhagiar of Western Australia suggests that observers should also concentrate on the period May 6–10 (besides the May 2–6 stretch) in order to better monitor the period when the Earth crosses the plane of Comet Halley's orbit.

Meteor spectroscopist E. P. Majden of British Columbia has found that meteor spectra should be obtained with cameras on sturdy, non-tracking mounts, contrary to the advice given in the Amateur Manual. He also points out that motors driving chopping shutters should be isolated from cameras to prevent vibration problems.