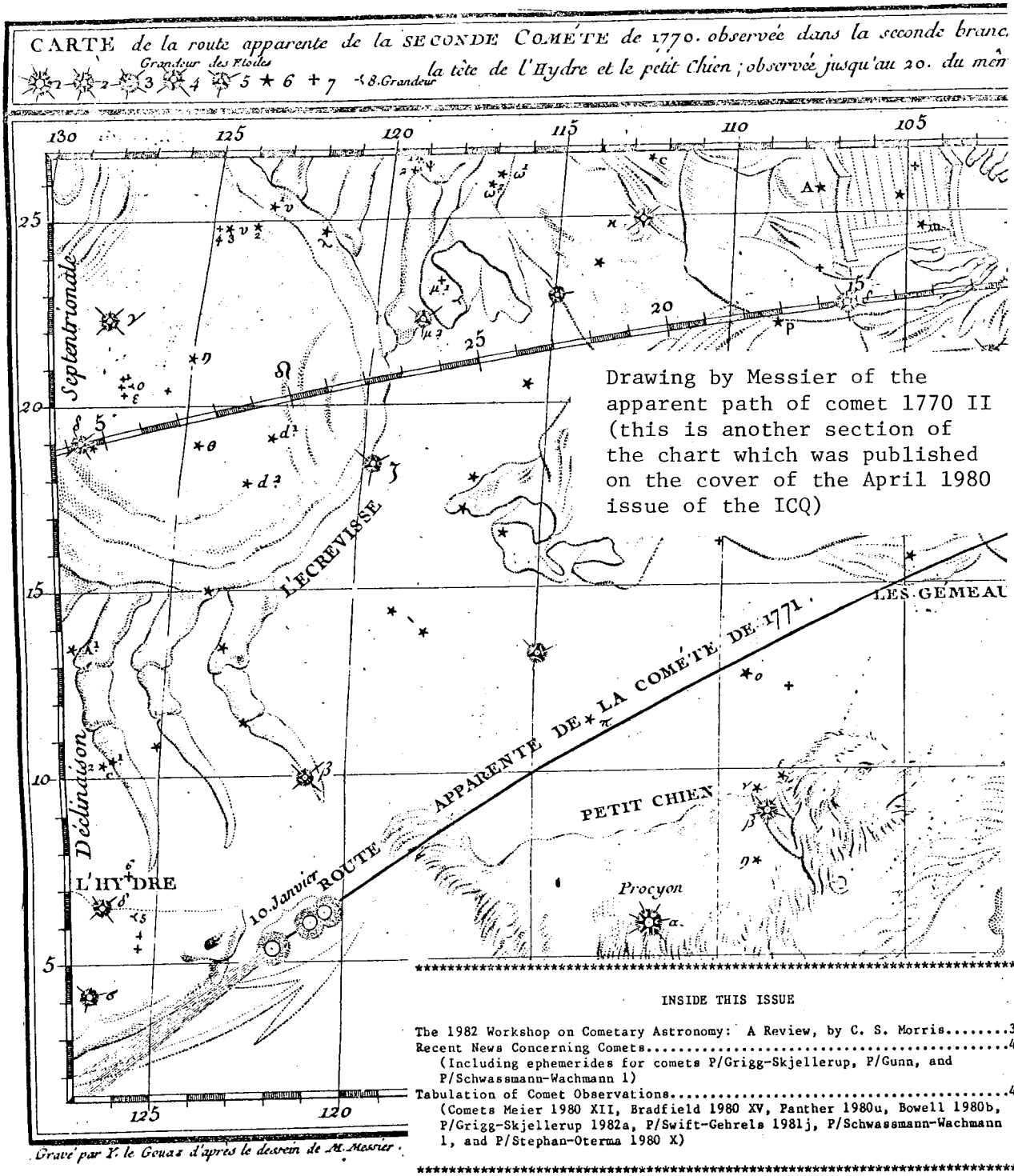
THE INTERNATIONAL COMET QUARTERLY

WHOLE NUMBER 42 APRIL 1982 VOL. 4, NO. 2



Drawing by Messier of the apparent path of comet 1770 II (this is another section of the chart which was published on the cover of the April 1980 issue of the ICQ)

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INSIDE THIS ISSUE

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THE INTERNATIONAL COMET QUARTERLY (ICQ) is a non-profit journal devoted to news and observation of comets. Issues are published 4 times per year (January, April, July, and October). The ICQ is published by the Department of Physics and Astronomy at Appalachian State University and is mailed from Boone, North Carolina, U.S.A.

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All cometary observations should be sent to C. S. Morris; Prospect Hill Rd.; Harvard, MA 01451, U.S.A. Back issues are available from Dr. T. L. Rokoske, Dept. of Physics and Astronomy; A.S.U.; Boone, NC 28608, U.S.A.

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This issue is No. 42 of the publication originally called THE COMET, founded in March 1973, and is Vol. 4, No. 2, of the ICQ.

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FROM THE EDITOR

It was a pleasure to be able to meet and talk with many ICQ readers at the 1982 American Workshop on Cometary Astronomy here in Cambridge on May 1. Interest has already been expressed to hold another workshop in the next year or two in the western U.S. (see review article on page 39). Apologies are extended for the unexpected change in the Workshop location only 2 weeks before the meeting; we hope that nobody was inconvenienced by this last-minute change, but that, instead, more people were able to attend in Cambridge.

Due to the May 1 Workshop meeting, this issue is smaller and somewhat behind schedule.

Subscribers are reminded of the recent increase in ICQ subscription rates (see page 40).

It has been suggested by more than one ICQ reader that the ICQ Staff provide some sort of "alert" service upon the discovery of a new comet. We have been asked to offer anything from special alert circulars to collect telephone calls. The problem is that the ICQ Staff does not have the manpower to handle such a chore, and it is felt furthermore that the Central Bureau for Astronomical Telegrams of the IAU (also here in Cambridge) provides this essential alert service very efficiently, both through the IAU telegrams and the IAU Circulars (see last page of this issue).

--Daniel Green, Cambridge, Mass.
1982 May 13

THE 1982 WORKSHOP ON COMETARY ASTRONOMY: A REVIEW

Charles S. Morris
Prospect Hill Observatory

The 1982 Comet Workshop was held on Saturday, May 1, at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts (see "From the Editor", page 38). Over 60 people attended the one-day meeting, including two observers from overseas. In all, participants heard a total of ten talks by both professional and amateur astronomers. The Workshop was opened with an introductory talk by ICQ Editor Daniel Green, and Richard Lynch of Greenville, RI, served as Master of Ceremonies.

The morning session of the Workshop was devoted to visual observation of comets. John E. Bortle and this author presented a detailed review of visual observing techniques. Methods for making magnitude, coma-diameter, and degree-of-condensation estimates were discussed. Cometary forms, including tail types, were also reviewed. Of particular interest was the discussion of the observation of detail in the near-nucleus region of the coma. Observations of jets, hoods, and multiple nuclei also were discussed by Stephen O'Meara. His drawings of recent comets, such as comet Bradfield 1980t, clearly showed the extensive amount of detail which a skilled observer can detect when using proper instrumentation.

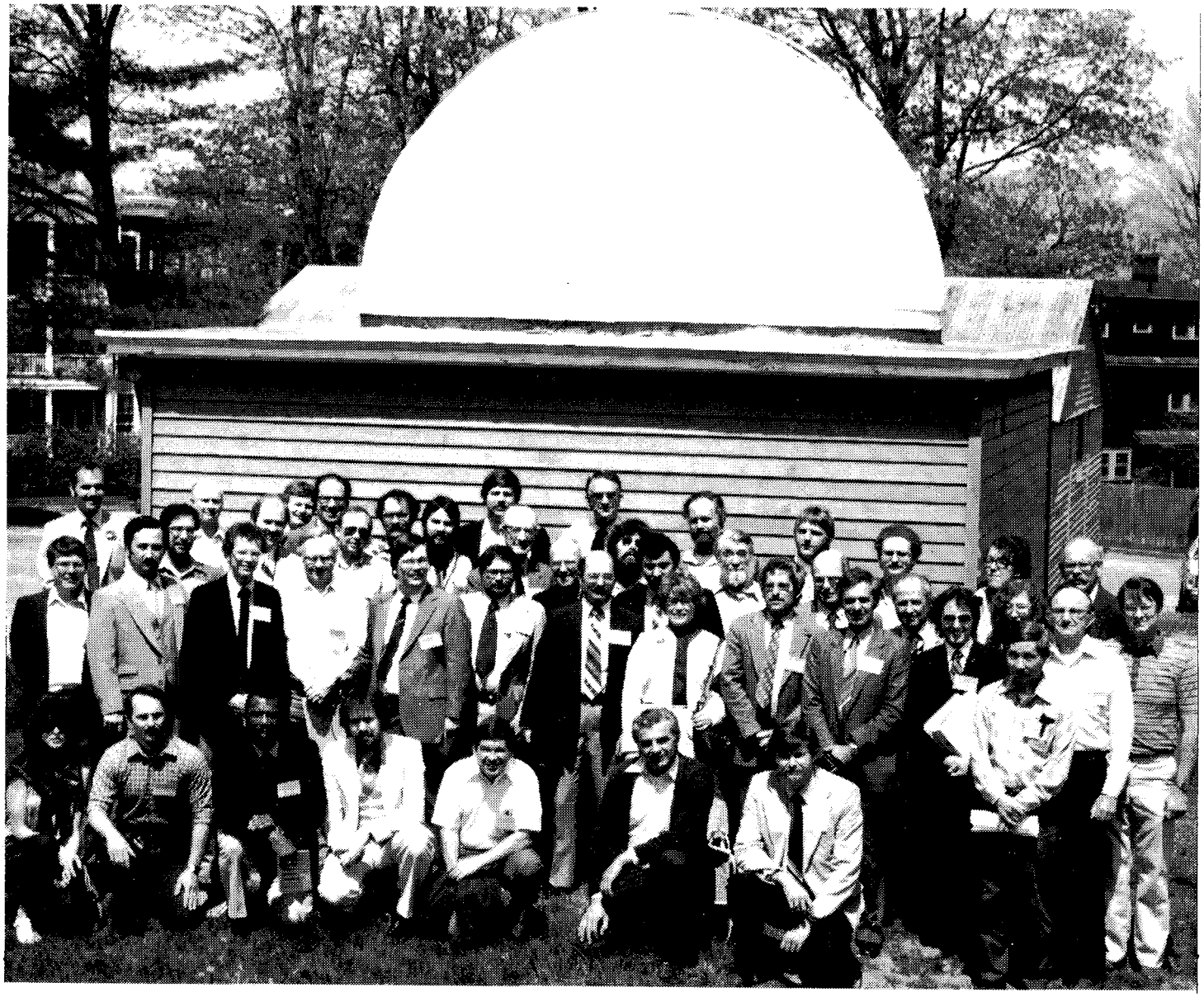
Detail in the inner coma of comets continued as a topic of discussion in the afternoon session. Dr. Fred Whipple reviewed his work on the rotation of cometary nuclei, which in large part has been based on visual observations, particularly those made in the 1800's. Accurate estimates of inner coma detail in the future can provide the basis for continued research in the subject of cometary rotation.

Another area where amateurs can contribute significantly to cometary astronomy is that of astrometric observations. With professional astronomers turning their resources elsewhere, Dr. Brian Marsden believes that well-equipped amateurs can help fill the void of the much-needed astrometric observations. Dr. Marsden provided a description of the techniques for obtaining accurate positions of comets using a measuring engine.

The subject of photoelectric photometry of comets was discussed by Dr. Michael A'Hearn. Rather than using photoelectric equipment to obtain the standard m -estimates, Dr. A'Hearn recommends the use of specially-designed comet interference filters. Use of these filters will allow the determination of molecule production rates and other physical properties of comets. Those people interested in observing comets with photoelectric equipment should contact the International Amateur-Professional Photoelectric Photometry (IAPPP) Association (contact Mr. R.C. Wolpert, Belmont Observatory, 144 Neptune Ave., North Babylon, NY 11704).

The last two papers in the afternoon session dealt with different theories of visual photometry. Joseph Marcus presented his physiologic model of visual comet brightness which explains such things as the well-known aperture-effect and controversial delta-effect in terms of how the human eye perceives a comet's coma. Dr. David Meisel presented a different approach to the problem by presenting preliminary results of a numerical integration of the Haser model for visual comet photometry. The Haser model is the currently-accepted model for cometary photometry and is used by Dr. A'Hearn and others for the calculation of production rates from photoelectric photometry.

The major focus of cometary work during the next five years will be the upcoming apparition of periodic comet



THE 1982 WORKSHOP ON COMETARY ASTRONOMY: A REVIEW

Halley. Stephen Edberg, coordinator of Amateur Observations for the International Halley Watch (IHW), provided a summary of the IHW's organization and goals in a talk given during the evening session of the Comet Workshop. The amateur participation in the IHW will be important, and Mr. Edberg discussed the ways in which the IHW will make use of amateur participants.

The group photograph, taken during the Workshop lunch break, is reproduced on page 40 (key below).

Although not officially part of the 1982 Workshop on Cometary Astronomy, a second meeting was held on May 2 to discuss the organization of the amateur portion of the IHW. About 15 people took part in the lively discussions.

For the benefit of those unable to attend the Comet Workshop, the titles of the papers presented are given below.

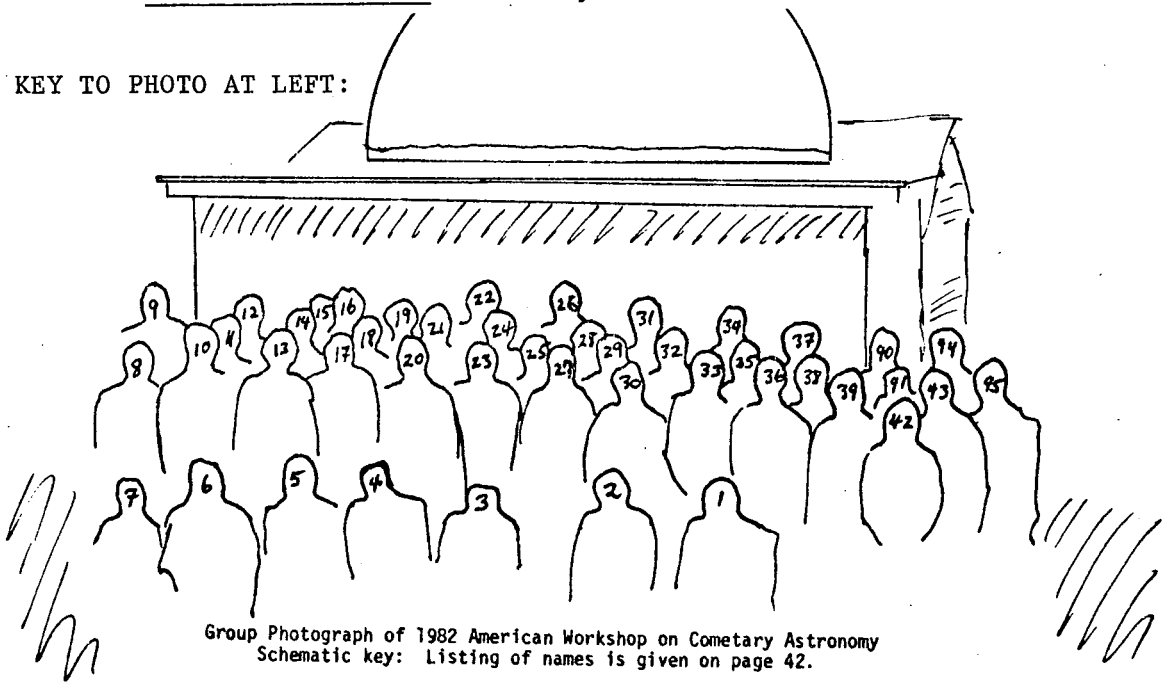
TALKS GIVEN AT THE 1982 COMET WORKSHOP IN CAMBRIDGE, MASSACHUSETTS:

"Introduction to the Workshop", by D. Green
"Techniques for Visual Comet Observing", by J. E. Bortle and C. S. Morris
"Observing Detail in the Inner Coma", by S. J. O'Meara
"How Comets Spin", by F. L. Whipple
"Astrometric Observations of Comets by Amateurs", by B. G. Marsden
"People and Places in Cometary Astronomy (slide presentation)", by C. S. Morris
"Photometry of Comets", by M. F. A'Hearn
"Cometary Photoelectric Photometry and the IAPPP", by R. M. Genet and R. C. Wolpert (read by C. Morris)
"A Physiologic Model of Visual Cometary Brightness", by J. N. Marcus
"Numerical Integration of the Haser Model for Visual Comet Photometry", by D. D. Meisel
"The International Halley Watch and the Amateur's Role in It", by S. Edberg

Two Workshop attendants travelled overseas for the meeting, and Americans attending the meeting had the opportunity to meet comet observers Peter Stanley from England and Jose Campos from South Africa.

A more detailed account of the Workshop by Dr. J. Marcus may be found in Issue No. 82-2 of Comet News Service (1982 May 20).

SCHEMATIC KEY TO PHOTO AT LEFT:



Group Photograph of 1982 American Workshop on Cometary Astronomy
Schematic key: Listing of names is given on page 42.

GROUP PHOTO: KEY TO SCHEMATIC DIAGRAM ON PAGE 41.

1. Jon Cardillo	16. David Meisel	31. Michael A'Hearn
2. Mike Mattei	17. Brian G. Marsden	32. Edwin Weston
3. Ron Cibor	18. ?	33. Paul Maley
4. Richard Lynch	19. Roger Sinnott	34. John Briggs
5. Tal Mentall	20. Charles S. Morris	35. Marc Lavalle
6. Dennis Cassia	21. Bill Bonney	36. Jose Campos
7. Diane Cassia	22. Dave Huestis	37. Steven Hubbard
8. Robert Napier	23. Steve Siok	38. Auray Blaine
9. Steve Edberg	24. Fred Whipple	39. Steve O'Meara
10. John Bortle	25. Rene A. Bolomey	40. Peter Collins
11. Joe Marcus	26. James Rodman	41. Francene Jackson
12. Peter Poetto	27. Robert Stock	42. Jerome Shao
13. Daniel Green	28. Derek Wallentinsen	43. Conrad Bardwell
14. Bob McGwier	29. Pete Stanley	44. Bill Penhallow
15. Jonathan Gradie	30. Barbara Stock	45. Kevin Kelly

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RECENT NEWS CONCERNING COMETS

Periodic comet Schwassmann-Wachmann 1 underwent yet another burst in brightness in April, and visual observers were quick to follow its progress for a couple of weeks. Independent discoveries of the outburst were reported by J. E. Bortle, J.-C. Merlin and A. Hale. Concerning this most recent of this comet's outbursts, Bortle remarks "that it was the first in the many that I have observed where the coma continued to brighten throughout the expansion phase; magnitude is normally established in the near-stellar phase." Indeed, his observations show an increase in coma diameter from 0.2' on Apr. 13 to 1.1' on Apr. 23, with the corresponding total visual magnitudes being 13.1 to 12.2 (see Tabulation of Photometric Comet Observations elsewhere in this issue).

Observers are asked to keep close watch on P/Schwassmann-Wachmann 1, as professional astronomers lack time and funding to follow this object. Continued watching of this comet by amateurs is currently the only scientific data being gathered concerning its outbursts on a regular basis, and over a period of time, these visual observations may contribute significant clues to the physical processes involved in the comet's irregular outbursts. Surely, if ALL outbursts of this comet brighter than total visual magnitude 12 are recorded, the data may prove quite valuable. An extended ephemeris (to that in ICQ 3:92) for this comet is given below to aid observers in following this object.

Comet Bowell has remained an unimpressive object, being much fainter than expected, around magnitude 11-12.

P/Grigg-Skjellerup 1982a has brightened to almost 9th magnitude, but its large size makes it a somewhat difficult object visually. An extended ephemeris to that on page 36 of the last issue is given below.

P/d'Arrest 1982e was recovered recently, following an odd series of attempts at finding this comet by several observers. At total photographic magnitude 19, this object was located on plates taken Apr. 23-May 16 by observers at Oak Ridge, Palomar, and Chamberlin Observatories (cf. IAUC 3697). This comet is expected to brighten considerably by July, and an ephemeris will be given in the July issue of the ICQ.

P/comet Tempel 2 was recovered as comet 1982d by Jim Gibson with the 1.2-m Palomar Schmidt telescope on plates exposed Feb. 3 and Mar. 4 (cf. IAUC 3676). This object will remain faint during this apparition.

P/Churyumov-Gerasimenko was re-

RECENT NEWS CONCERNING COMETS

covered by Jim Gibson on plates exposed May 31 and June 1 at Palomar, and this object was designated comet 1982f (cf. IAUC 3700).

Two visual observations of periodic comet Gunn have been reported by Alan Hale, who, using an 8-inch reflector, estimated approximate total visual magnitude 13.3-13.5 on May 22 and 23.

--D.W.E.G. (6/3/82)

EXTENDED EPHEMERIS FOR P/GRIGG-SKJELLERUP 1982a (see ICQ 4:36)

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Mag.
1982	05 31	10 37.99	+31 58.9	0.335	1.015	80.6	10.2
1982	06 15	12 51.75	+38 50.9				
1982	06 30	14 42.00	+36 14.2	0.445	1.175	99.4	11.4
1982	07 05	15 09.44	+34 16.6				
1982	07 10	15 33.00	+32 05.7	0.519	1.250	104.2	12.0
1982	07 15	15 53.40	+29 48.1				
1982	07 20	16 11.29	+27 28.4	0.605	1.331	107.6	12.6
1982	07 25	16 27.22	+25 09.4				
1982	07 30	16 41.63	+22 53.4	0.702	1.416	109.7	13.2
1982	08 04	16 54.85	+20 41.9				
1982	08 09	17 07.14	+18 35.7	0.811	1.503	110.4	13.8
1982	08 14	17 18.69	+16 35.5				
1982	08 19	17 29.67	+14 41.7	0.933	1.592	109.8	14.4
1982	08 24	17 40.22	+12 54.6				
1982	08 29	17 50.42	+11 14.5	1.066	1.681	108.2	14.9
1982	09 03	18 00.35	+09 41.5				
1982	09 08	18 10.05	+08 15.5	1.210	1.770	105.5	15.4
1982	09 13	18 19.57	+06 56.4				

EPHEMERIS FOR P/GUNN (Elements from Handbook B.A.A. 1982, p. 76; however, ω should be 196°.9829 -- an H.B.A.A. typographical error)
Total magnitude from $m_1 = 7.5 + 5 \log \Delta + 10 \log r$.

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.	Mag.
1982	06 10	13 20.15	-00 59.6	2.004	2.664	120.3	13.3
1982	06 15	13 20.55	-01 30.2				
1982	06 20	13 21.54	-02 03.7	2.094	2.642	111.6	13.3
1982	06 25	13 23.11	-02 39.9				
1982	06 30	13 25.22	-03 18.5	2.192	2.622	103.4	13.4
1982	07 05	13 27.86	-03 59.4				
1982	07 10	13 31.00	-04 42.1	2.294	2.602	95.8	13.5
1982	07 15	13 34.61	-05 26.6				
1982	07 20	13 38.68	-06 12.6	2.400	2.583	88.6	13.5
1982	07 25	13 43.17	-06 59.9				
1982	07 30	13 48.07	-07 48.3	2.505	2.566	81.8	13.6
1982	08 04	13 53.35	-08 37.6				
1982	08 09	13 59.00	-09 27.6	2.609	2.549	75.4	13.6
1982	08 14	14 04.98	-10 18.1				
1982	08 19	14 11.30	-11 09.0	2.710	2.534	69.2	13.7
1982	08 24	14 17.94	-12 00.1				
1982	08 29	14 24.88	-12 51.2	2.808	2.520	63.2	13.8
1982	09 03	14 32.11	-13 42.1				
1982	09 08	14 39.62	-14 32.7	2.901	2.508	57.5	13.8

EPHEMERIS EXTENSION FOR P/SCHWASSMANN-WACHMANN 1 (cf. ICQ 3, 92)

Date	ET	R. A. (1950)	Decl.	Delta	r	Elong.
1982	06 10	11 23.93	-04 12.0	6.156	6.325	95.0
1982	06 15	11 24.99	-04 14.7			
1982	06 20	11 26.26	-04 18.9	6.313	6.325	86.1
1982	06 25	11 27.73	-04 24.6			
1982	06 30	11 29.40	-04 31.6	6.468	6.325	77.4
1982	07 05	11 31.24	-04 40.1			
1982	07 10	11 33.26	-04 49.8	6.618	6.325	69.0
1982	07 15	11 35.45	-05 00.8			
1982	07 20	11 37.78	-05 13.0	6.759	6.325	60.7
1982	07 25	11 40.26	-05 26.4			
1982	07 30	11 42.86	-05 40.9	6.890	6.324	52.6
1982	08 04	11 45.59	-05 56.5			
1982	08 09	11 48.43	-06 13.0	7.006	6.324	44.6
1982	08 14	11 51.36	-06 30.5			
1982	08 19	11 54.39	-06 48.9	7.106	6.324	36.7
1982	08 24	11 57.51	-07 08.0			
1982	08 29	12 00.69	-07 28.0	7.188	6.323	29.0

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TABULATION OF COMET OBSERVATIONS

This issue contains B.A.A. observations made of comets during the past couple of years. We currently have quite a backlog of pre-1980 observations, and we hope to publish all of the 1970s observations in the next few issues, beginning with those of comet West in the July issue. Also, the old Key to References is temporarily still in use.

NEW ADDITIONS TO THE OBSERVER KEY are on page 52.

Comet Meier (1980 XII = 1980q)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 09.90	10.5:P			10.0		4		4				HEN
1980 11 10.81	10.5 P			7.8		4		1				RID
1980 11 11.88	8.3 S			26.0	L		80	5	3			HUR
1980 11 12.79	10.0:P			10.0		4		4		0.03	355	HEN
1980 11 12.79	9.7			31.0	L	5	60					PAN
1980 11 16.76	10.3			20.0	R		40	2	1			SHA02
1980 11 18.75	10.0			20.0	R		40	1.5	1			SHA02
1980 11 19.74	10.6			20.0	R		40	1.5	1			SHA02
1980 11 25.76	9.6			20.0	R		40	3	1			SHA02
1980 11 25.78	9.6			31.0	L	5	60	6	2			PAN
1980 11 26.75	9.7			20.0	R		40	4	1			SHA02
1980 11 26.78	9.6			31.0	L	5	60	4	2			PAN
1980 11 27.74	10.5			20.0	R		40	3	0/			SHA02
1980 11 30.77	9.9			31.0	L	5	60	3	1			PAN
1980 11 30.80	10.5			20.0	R		40	3	0			SHA02
1980 12 06.77	10.4			31.0	L	5	60	3	1			PAN
1980 12 07.79	10.0:S			8.0	R		40	3	1			RID
1980 12 08.80	9.8			20.0	R		40	2	2			SHA02
1980 12 11.73	9.6			26.0	L		80	5	2			HUR
1980 12 11.75	9.8			20.0	R		40	3	1			SHA02

Comet Meier (1980 XII = 1980q) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 12 13.76	10.2			20.0	R		40	6	3			SHA02
1980 12 14.74	9.7			20.0	R		40	6	3/			SHA02
1980 12 15.75	9.7			20.0	R		40	6	2/			SHA02
1980 12 16.74	9.8			20.0	R		40	4	2			SHA02
1980 12 18.27	9.6			32.0	R		95	4	3/			SHA02
1981 01 04.27	9.1			32.0	R		95	2.5	3			SHA02
1981 01 05.24	10.0			32.0	R		95	2	2			SHA02
1981 01 11.26	10.5			32.0	R		95	2	2			SHA02
1981 01 13.25	10.2			32.0	R		95	2.5	3/			SHA02
1981 01 16.23	10.0			32.0	R		95	2	3/			SHA02
1981 01 17.27	10.4			32.0	R		95	2.5	2			SHA02
1981 01 31.22	12.1	V		32.0	R		95	1.9	2			SHA02
1981 02 01.23	12.2	V		32.0	R		95	3.2	3			SHA02
1981 02 02.24	12.4	V		32.0	R		95	2.2	3			SHA02
1981 02 05.22	12.7	V		32.0	R		95	1.9	3			SHA02
1981 02 10.23	12.6	V		32.0	R		95	2.1	3			SHA02
1981 02 13.20	11.8	V		20.0	R		40	3	2/			SHA02
1981 02 13.20	11.5	V		15.0	L		67	2.6	2			SHA02
1981 02 14.22	12.0	V		20.0	R		40	2	2			SHA02
1981 03 12.18	12.6	V		20.0	R		40	3.5	0/			SHA02
1981 03 12.18	13.0	V		32.0	R		95	1	1			SHA02
1981 03 13.08	12.6	V		20.0	R		40	3.5	2/			SHA02
1981 03 17.20	12.6	V		20.0	R		40	3	1			SHA02
1981 03 28.05	13.8:	V		32.0	R		95	0.9	2/			SHA02

Comet Bradfield (1980 XV = 1980t)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 12 21.84	5.3	S		25.0	L	9	50	1.5	6	0.25	180	CLA
1981 01 04.72	4.6			8.0	B		10		9	2.00	20	SHA02
1981 01 10.74	5.7	A	S	5.0	B		10			1.50		MCK
1981 01 10.74	5.7	A	B	5.0	B		7		8	0.33	20	PIC
1981 01 10.74	5.7			8.0	B		10	2	9	1.00	20	SHA02
1981 01 10.75	5.1			6.0	B		13			1.50		HEN
1981 01 10.75	5.1			5.0	B		7			0.50		CAN01
1981 01 10.75	4.9			8.0	B		15	4	7		17	HUR
1981 01 10.76	5.2		S	5.0	B		10			0.75	8	ENT
1981 01 10.76	5.6			8.0	R		40	2	9	2.50		RID
1981 01 10.76	5.0	P		7.8				3		5.00	28	RID
1981 01 11.73	5.7	A	B	40.0	L		60	1.3	6	0.25	25	PIC
1981 01 12.74	6.0		S	7.0	B		15	2.5		0.58	30	TAY
1981 01 12.75				15.0	L		67	2.5	9	0.17	75	SHA02
1981 01 12.75	6.0			8.0	B		10	2	9	2.50	25	SHA02
1981 01 12.76	5.0			8.0	B		15	3	8	1.00	30	HUR
1981 01 12.77	6.0			8.0	B		15	2		2.00	40	PAN
1981 01 14.77	5.3			7.0	B		15					TAY
1981 01 15.76	5.4		B	7.0	B		15	6		0.67	35	TAY
1981 01 15.77	5.0	K		8.0	R		40	5		1.50	34	RID
1981 01 16.73	6.0	S	B	10.0	B	4	25			2.0		ANT
1981 01 16.77	5.2			8.0	B		15	3	7	0.50	39	PAN
1981 01 16.77	5.2			8.0	B		10	5	9	1.50	50	SHA02
1981 01 17.72	6.2	S	B	10.0	B	4	25			2.0		ANT
1981 01 24.75	7.5			20.0	R		40	3.5	8	0.30	30	SHA02

Comet Bradfield (1980 XV = 1980t) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 24.75	7.5			8.0	B		10	4	8	0.75	35	SHA02
1981 01 25.77	7.2	S		8.0	R		40	3	5	0.50	37	RID
1981 01 29.77	8.0	S		8.0	R		40	3	7		40	RID
1981 01 30.75	8.1			8.0	B		10					SHA02
1981 01 30.75	8.5			20.0	R		40	3	7		30	SHA02
1981 01 31.78	8.5	S		8.0	R		40	3	7			RID
1981 02 01.73	9.3	S	B	10.0	B	4	25			0.5		ANT
1981 02 01.76	8.6			15.0	L		67	3		1.00	28	SHA02
1981 02 01.76	8.3			8.0	B		10	4	5			SHA02
1981 02 01.78	8.8	S		8.0	R		40	3	7			RID
1981 02 02.74	9.4	S	B	10.0	B	4	25			0.3		ANT
1981 02 04.76	8.9			15.0	L		67	2	5	0.22	23	SHA02

Comet Panther (1980u)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 26.80	10.3:V			2.8		2						SHA02
1980 12 25.79	10.5:			20.0	L	4	35	5				PAN
1980 12 25.82	9.5:			12.5	R	17	100	1	6			HEN
1980 12 25.85	9.5:P			10.0		4		3	3		45	HEN
1980 12 27.22	10.0			31.0	L	5	60	3				PAN
1980 12 27.74	9.5	S		8.0	R		40	2	5			RID
1980 12 27.75	9.5			20.0	L	4	35	2.5	3			PAN
1980 12 27.75	9.5:P			10.0		4		2.5	6	0.13	10	HEN
1980 12 27.76	9.5	B		22.0	L	8	65	3				MCK
1980 12 27.79	9.5:			12.5	R	17	100	0.9				HEN
1980 12 28.75	9.8	S		8.0	R		40	3	3			RID
1980 12 28.76	9.4	S		26.0	L		80	3.5	5			HUR
1980 12 31.79	9.5			20.0	L	4	35	4	3			PAN
1981 01 03.80	9.2			20.0	L	4	35	1.7	3			PAN
1981 01 04.23	9.2			20.0	L	4	35	1.7	4			PAN
1981 01 04.23				31.0	L	5	60	2.5			5	PAN
1981 01 04.28	9.0	S		20.0	R		40	3	5			SHA02
1981 01 04.75	8.3	S		26.0	L		80	3	6	0.03	360	HUR
1981 01 04.75	8.6	S		8.0	B		10	4	3			SHA02
1981 01 06.26	8.9	S		20.0	R		40	4.5	3			SHA02
1981 01 10.75	9.3	S		20.0	R		40	3.5	3/			SHA02
1981 01 10.77	9.5	S		8.0	R		40	3	2			RID
1981 01 10.81	9.4			20.0	L	4	35	2	3			PAN
1981 01 12.79	8.5	S		8.0	B		10	6.7	2			SHA02
1981 01 12.79	9.4	S		20.0	R		40	3.5	4			SHA02
1981 01 13.21	9.1			20.0	L	4	35	3.5	4			SHA02
1981 01 13.26	8.5	S		8.0	B		10	6	4			SHA02
1981 01 13.26				20.0	R		40	5	5	0.17	360	SHA02
1981 01 13.26				20.0	R		40			0.03	180	SHA02
1981 01 16.21	8.8	S		8.0	B		10	4	6			SHA02
1981 01 16.21	9.0	S		20.0	R		40	4	5	0.13	20	SHA02
1981 01 17.15	9.2	S	B	10.0	B	4	25	2				ANT
1981 01 17.23	8.9			20.0	L	4	35	4				PAN
1981 01 17.24	8.9	S		20.0	R		40	6	5/	0.25	350	SHA02
1981 01 17.24	8.7	S		8.0	B		10	6	5			SHA02
1981 01 18.17	9.3	S	B	10.0	B	4	25	2				ANT
1981 01 19.77	9.3	S		20.0	R		40	3	4/			SHA02
1981 01 24.77	8.3	S		8.0	B		10	6	3			SHA02
1981 01 24.77	8.6	S		20.0	R		40	5.5	4	0.25	360	SHA02

Comet Panther (1980u) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 24.77	8.9			20.0	L	4	35	6		0.15	360	PAN
1981 01 25.80	9.0:			8.0	R		40	5	2			RID
1981 01 29.79	8.8	S		8.0	R		40	5	5			RID
1981 01 30.77	9.2	S		20.0	R		40	2.5	6			SHA02
1981 01 30.80	8.7			20.0	L	4	35	3				PAN
1981 01 31.23	9.1	S		20.0	R		40	3	6/	0.20	340	SHA02
1981 01 31.23	8.5	S		8.0	B		10	3	6			SHA02
1981 01 31.79	9.0	S		8.0	R		40	5	5			RID
1981 02 01.24	9.1	S		20.0	R		40	4	7/		350	SHA02
1981 02 01.24	8.8	S		8.0	B		10	3	6/			SHA02
1981 02 01.27	8.7			20.0	L	4	35	4				PAN
1981 02 01.72	9.0	S	B	10.0	B	4	25	3				ANT
1981 02 01.79	9.0	S		8.0	R		40	5	6			RID
1981 02 01.81	8.9	S		20.0	R		40	3	7	0.12	350	SHA02
1981 02 01.81	9.0	S		8.0	B		10	2.5	6			SHA02
1981 02 02.25	8.6	S		15.0	L		67	3		0.25	355	SHA02
1981 02 02.72	9.0	S	B	10.0	B	4	25					ANT
1981 02 03.83	9.5	S		22.0	L		60	3.5				STU
1981 02 04.77	8.9	S		15.0	L		67	3.5	5		330	SHA02
1981 02 04.77	9.1	S		8.0	B		10	3	5			SHA02
1981 02 04.77	9.2	S		20.0	R		40	3.5	6	0.17	350	SHA02
1981 02 04.80	8.5			20.0	L	4	35	4		0.08	335	PAN
1981 02 05.23	8.8	S		20.0	R		40	3.5	7	0.50	318	SHA02
1981 02 05.23	8.8	S		15.0	L		67	3	7			SHA02
1981 02 05.23	9.2	S		32.0	L		95	1.5	5			SHA02
1981 02 05.23	8.8	S		8.0	B		10	2	7			SHA02
1981 02 09.94	8.9	S	B	10.0	B	4	25					ANT
1981 02 10.23	8.9	S		20.0	L	4	35	6			340	PAN
1981 02 10.24	8.8	S		15.0	L		67	3	7			SHA02
1981 02 10.24	8.9	S		20.0	R		40	3	8	0.28	350	SHA02
1981 02 10.24	8.9	S		8.0	B		10	2	8			SHA02
1981 02 10.81	8.5	S		8.0	R		40	4	5			RID
1981 02 11.90	8.9	S		15.0	L		67	3	6/			SHA02
1981 02 13.22	9.0	S		20.0	R		40	3.5	6/			SHA02
1981 02 13.22	8.9	S		8.0	B		10	2	8			SHA02
1981 02 13.22	8.8	S		15.0	L		67	3.4	7/			SHA02
1981 02 13.25	8.8			20.0	L	4	35	5	5		360	PAN
1981 02 14.13	8.8	S	B	10.0	B	4	25					ANT
1981 02 14.20	9.0	S		20.0	R		40	3	6/			SHA02
1981 02 14.20	8.8	S		8.0	B		10	3	6			SHA02
1981 02 17.15	8.9	S	B	10.0	B	4	25					ANT
1981 02 20.79	9.0	S		20.0	R		40	3.5	6/			SHA02
1981 02 21.24	8.5			20.0	L	4	35	5		0.15	315	PAN
1981 02 21.83	9.4	S		20.0	R		40	3	5			SHA02
1981 02 25.93	8.7	S	B	10.0	B	4	25					ANT
1981 02 26.02	8.7	S	B	10.0	B	4	25					ANT
1981 02 26.94	8.8	S	B	10.0	B	4	25					ANT
1981 02 27.04	8.8	S	B	10.0	B	4	25					ANT
1981 02 28.88	9.4	S		20.0	R		40	5	6/		300	SHA02
1981 02 28.91	8.3			20.0	L	4	35	6			315	PAN
1981 03 07.96	8.9	S	B	10.0	B	4	25					ANT
1981 03 08.04	8.9	S	B	10.0	B	4	25					ANT
1981 03 12.15	8.8	S		8.0	B		10	6	4			SHA02
1981 03 12.15	9.6	S		20.0	R		40	2.5	6/			SHA02
1981 03 12.16	8.2			20.0	L	4	35	3.5		0.10		PAN

Comet Panther (1980u) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 03 12.82	8.7:S			8.0	B		20	6	5			SHA02
1981 03 13.10	9.1 S			20.0	R		40	4	7			SHA02
1981 03 13.10	8.4 S			8.0	B		20	6	5			SHA02
1981 03 17.19	8.7 S			8.0	B		20	5	4			SHA02
1981 03 17.19	9.5 S			20.0	R		40	3	7			SHA02
1981 03 17.86	9.5 S			20.0	R		40	2.5	7			SHA02
1981 03 17.86	9.2 S			8.0	B		20	5	4			SHA02
1981 03 22.83	9.0:S			8.0	B		20	5	4			SHA02
1981 03 22.83	9.6 S			20.0	R		40	2	7			SHA02
1981 03 23.82	8.7 S	B		10.0	B	4	25					ANT
1981 03 26.84	9.1 S			8.0	B		20	4	3			SHA02
1981 03 26.84	9.9 V			20.0	R		40	2	5			SHA02
1981 03 27.99	9.2 S	B		10.0	B	4	25	2.5				ANT
1981 03 28.01	9.2 S	B		10.0	B	4	25	2.5				ANT
1981 03 28.04	9.3 S			15.0	L		67	3	4			SHA02
1981 03 28.04	8.9 S			8.0	B		20	6	3			SHA02
1981 03 28.04	10.1 V			20.0	R		40	2.5	4			SHA02
1981 03 28.04	9.1 S			8.0	B		10	5	5			SHA02
1981 03 28.04	8.7 S			5.0	B		7					SHA02
1981 03 28.86	10.0 V			20.0	R		40	2.5	6			SHA02
1981 03 28.86	8.8 S			8.0	B		20	5	2			SHA02
1981 03 28.87	9.2 S			8.0	R		40	4	4			RID
1981 03 28.93	9.3 S			22.0	L		60	3.4				STU
1981 04 02.84	10.2 V			20.0	R		40	2.5	5/			SHA02
1981 04 02.91	9.5 S	B		10.0	B	4	25					ANT
1981 04 02.94	9.3 S			8.0	R		40	3.5	4			RID
1981 04 03.06	9.5 S	B		10.0	B	4	25					ANT
1981 04 06.89	9.7 S	B		10.0	B	4	25					ANT
1981 04 09.85	10.3 V			20.0	R		40	1.5	6/			SHA02
1981 04 10.12	9.7			20.0	L	4	35	5				PAN
1981 04 14.85	10.9 V			20.0	R		40	2	5/			SHA02
1981 04 20.88	10.7 V			20.0	R		40	2.5	5			SHA02
1981 04 22.82	10.2 S	B		10.0	B	4	25					ANT
1981 04 23.91	11.5:V			20.0	R		40	1				SHA02
1981 04 27.87	9.8 V			8.0	B		20	3	4			SHA02
1981 04 27.87	10.9 V			20.0	R		40	2	5/			SHA02
1981 04 27.89	9.9			20.0	L	4	35	7				PAN
1981 05 01.90	10.0 V			8.0	B		20	2	3/			SHA02
1981 05 02.91	10.6			20.0	L	4	35		2			PAN
1981 05 02.92	10.3 V			8.0	B		20	1.5	4			SHA02
1981 05 04.91	11.2			20.0	L	4	35	7	1			PAN
1981 05 04.95	10.9 V			20.0	R		40	1.5	4			SHA02
1981 05 04.95	11.7 V			32.0	R		95	3.3	4			SHA02
1981 05 04.96	10.9 V			26.0	L		80	2.0	4			HUR
1981 05 06.93	[10.7 S	B		10.0	B	4	25					ANT
1981 05 07.94	11.3 V			20.0	R		40	1.5	3			SHA02
1981 05 09.02	11.5 V			20.0	R		110	1.2	2			SHA02
1981 05 26.98	11.5:V			15.0	L		67	2	2			SHA02
1981 05 28.94	11.4 V			20.0	R		40	2	1/			SHA02
1981 05 31.95	11.7 V			20.0	R		40	1.0	3			SHA02

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Comet Bowell (1980b)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 05 23.97	11.5:			29.8	L	5	89					KEI
1981 05 25.93	11.5:			29.8	L	5	89	1				KEI
1981 05 28.96	11.7	V		20.0	R		40	0.9	2/			SHA02
1981 05 31.97	11.8	V		20.0	R		40	1.0	3			SHA02
1981 06 02.99	12.2	V		20.0	R		40	1.0	4			SHA02
1982 02 26.42	11.7	A	S	32.0	L	6	110	0.5	2			BOR
1982 03 04.41	11.6	A	S	32.0	L	6	110	0.6	2			BOR
1982 04 23.35	11.6	A	S	32.0	L	6	88	0.6	2			BOR

Periodic Comet Grigg-Skjellerup (1982a)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1982 04 20.07	13.0	A	S	25.0	L	7	171	0.6	2			MOR
1982 04 22.05	12.6	A	S	25.0	L	7	103	1.0	3			MOR
1982 04 23.05	12.5	A	S	25.0	L	7	103	1.2	3			MOR
1982 04 23.06	[13.0	A		50.0	L	5	96					BOR
1982 04 24.05	12.6	A	S	25.0	L	7	103	1.0	3			MOR
1982 04 25.05	12.6	A	S	25.0	L	7	103	1.1	3			MOR
1982 04 29.06	[13.0	A		50.0	L	5	96					BOR
1982 05 11.08	9.9	A	S	32.0	L	6	68	2.2	2			BOR
1982 05 12.07	9.6	A	S	32.0	L	6	68	3.0	2			BOR
1982 05 15.09	9.7	A	S	15.0	L	4	36	4	2			MOR
1982 05 16.09	9.3	N	S	15.0	L	4	36	4	3/			MOR
1982 05 18.10	9.5	N	S	15.0	L	4	36	4	3			MOR
1982 05 18.19	9.9	A	S	20.0	L	10	125	2.5	3			SPR
1982 05 20.22	9.8	A	S	20.0	L	10	64	2.75	3			SPR
1982 05 22.09	9.9	A	S	32.0	L	6	68 &	3.0	2			BOR
1982 05 22.09	9.6	A	S	8.0	B		20 &	4	0			BOR
1982 05 22.10	9.6	N	S	15.0	L	4	36	5	2			MOR
1982 05 23.25	10.2	A	S	20.0	L	10	64	2.75	3			SPR
1982 05 26.09	9.6	A	S	32.0	L	6	68	3.0	2			BOR

Periodic Comet Swift-Gehrels (1981j)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 11 17.60	12.5			20.3	L		38	4	2		68	BOE
1981 11 18.58	12.4			20.3	L		38	4	2			BOE
1981 11 20.57	12.3			20.3	L		38	4	2			BOE
1981 11 27.57	11.9			20.3	L		38	5	2			BOE
1981 11 27.85	11.9			20.3	L		38	5	2			BOE
1981 11 29.59	11.6			20.3	L		38	5	2			BOE
1981 11 29.98	10.4	A	S	15.0	R	5	31	4.5				MOR03
1981 12 01.58	12.3			20.3	L		38	4	3			BOE
1981 12 04.65	12.5			20.3	L		38	4	3			BOE
1981 12 29.97	10.7:	A	S	15.0	R	5	31	4				MOR03
1982 01 12.98	11.0:	A	S	32.0	L	6	68	1.6	1			BOR
1982 01 17.98	11.3	A	S	32.0	L	6	68	2.1	1			BOR
1982 01 18.98	11.1	A	S	32.0	L	6	68	2.2	0/			BOR
1982 01 20.99	11.0	A	S	32.0	L	6	68	2.3	0			BOR
1982 01 22.01	11.2	A	S	32.0	L	6	68	2.0	0			BOR
1982 01 25.05	11.2	A	S	32.0	L	6	68	2.0	0			BOR
1982 01 26.99	11.3	A	S	32.0	L	6	68	2.0	0/			BOR

Periodic Comet Schwassmann-Wachmann 1

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 04 23.88	11.2	V	S	29.8	L	5	89	0.8	6			KEI
1981 04 25.96	11.2	V	S	29.8	L	5	89	1.1				KEI
1981 04 27.89	11.8	V	S	29.8	L	5	62	1.1	5/			KEI
1981 04 27.95	11.5	V		26.0	L		120	1.2	4			HUR
1981 05 04.90	11.5	V	S	29.8	L	5	62	1				KEI
1981 05 04.95	11.3	V		26.0	L		80	2				HUR
1982 03 23.09	[12.5			32.0	L	6	170					BOR
1982 03 25.15	[12.5			32.0	L	6	170					BOR
1982 04 13.08	13.1	A	S	32.0	L	6	110	0.2	2/			BOR
1982 04 14.15	13.0	A	S	32.0	L	6	88	0.4	2			BOR
1982 04 14.19	12.8	A	S	25.0	L	7	103	0.75	5			MOR
1982 04 15.13	12.6	A	S	25.0	L	7	103	1.0	6			MOR
1982 04 15.13	12.9	A	S	32.0	L	6	88	0.5	1/			BOR
1982 04 16.13	12.8	A	S	32.0	L	6	88	0.6	0/			BOR
1982 04 16.13	13.0	A	S	25.0	L	7	103	1.0	3/			MOR
1982 04 17.09	12.6	A	S	32.0	L	6	110	0.8	0			BOR
1982 04 17.21	13.0:	A	S	25.0	L	7	103	1				MOR
1982 04 19.14	12.7	A	S	50.0	L	5	96	0.8	2			BOR
1982 04 19.14	12.6	A	S	25.0	L	7	103	0.8	5			MOR
1982 04 19.14	12.5	A	S	32.0	L	6	110	0.8	1			BOR
1982 04 20.08	12.4	A	S	25.0	L	7	103	1.2	3			MOR
1982 04 22.10	12.5	A	S	25.0	L	7	103	1.2	3			MOR
1982 04 23.12	12.3	A	S	25.0	L	7	103	1.6	2			MOR
1982 04 23.13	12.2	A	S	32.0	L	6	110	1.1	0			BOR
1982 04 24.13	12.7	A	S	25.0	L	7	103	1.6	1/			MOR
1982 04 25.12	12.8	A	S	25.0	L	7	103	1.3	1			MOR
1982 05 12.08	[13.0			32.0	L	6	110					BOR

Periodic Comet Stephan-Oterma (1980 X = 1980g)

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 12.95	10.0:	P		10.0		4		1.5	6			HEN
1980 11 18.16	9.7			20.0	R		40	4	5/			SHA02
1980 11 18.6	9.4			8.0	B		10					SHA02
1980 11 18.95	8.7	S		8.0	B		15	4	3			HUR
1980 11 25.25	10.3			20.0	R		40	1.5	2/			SHA02
1980 11 26.94	9.7			20.0	R		40	5	4			SHA02
1980 11 27.91	9.4			31.0	L	5	60	4				PAN
1980 11 27.93	9.6			20.0	R		40	2	5/			SHA02
1980 11 27.93	10.5			32.0	R		95					SHA02
1980 11 27.93	8.9			8.0	B		15					HUR
1980 11 27.93				26.0	L		80	2.5	6		210	HUR
1980 11 28.98	9.7:			7.0	R		60	2.5	3			RID
1980 11 29.93	9.4			12.0	R		22	4	4			PAN
1980 11 29.94	9.7:			7.0	R		60	3	2			RID
1980 11 29.97	10.0:			32.0	R		95	2	6			SHA02

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

Periodic Comet Stephan-Oterma (1980 X = 1980g) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 30.86	8.9	S		26.0	L		80	4	6		170	HUR
1980 11 30.86	9.3			32.0	R		95	2	7	0.05	200	SHA02
1980 11 30.88	9.7			20.0	L	4	35	4				PAN
1980 11 30.96	9.8:			7.0	R		60	3	3			RID
1980 12 02.97	9.5	S		7.0	R		60	3	3			RID
1980 12 03.25	9.0			20.0	R		40	2	7			SHA02
1980 12 05.90	9.5			12.0	R		35	3	3			PAN
1980 12 05.91	8.7			8.0	B		10	2	7			SHA02
1980 12 05.91	9.0			20.0	R		40		8			SHA02
1980 12 06.82	9.8			20.0	L	4	35	2	3			PAN
1980 12 06.89	8.7			8.0	B		10	2	5			SHA02
1980 12 06.89	8.9			20.0	R		40	2.5	8	0.17	190	SHA02
1980 12 07.85	9.1			20.0	R		40	2	7	0.07	280	SHA02
1980 12 07.85	9.2			8.0	B		10					SHA02
1980 12 07.92	9.2			8.0	R		40	3	4			RID
1980 12 08.82	9.9			32.0	R		95	1.5	6	0.07	185	SHA02
1980 12 08.93	9.6			20.0	L	4	35	2	4			PAN
1980 12 11.87	9.5			20.0	R		40	5	6			SHA02
1980 12 11.87	9.1			8.0	B		10					SHA02
1980 12 13.88	10.1			32.0	R		95	4	8/			SHA02
1980 12 13.88	9.6			8.0	B		10	2	7			SHA02
1980 12 13.88	9.5			20.0	L		40	3	6			SHA02
1980 12 13.93	9.8			20.0	L	4	35	3	4			PAN
1980 12 14.84	9.2			20.0	R							SHA02
1980 12 14.84	9.3			32.0	R		95	4.7	7			SHA02
1980 12 14.84	9.0			8.0	B		10					SHA02
1980 12 15.20	9.6			20.0	L	4	35	3	4			PAN
1980 12 15.76	9.8			32.0	R		95	1	8/			SHA02
1980 12 16.16	9.4			20.0	R		40	5	7/			SHA02
1980 12 16.16	8.8			8.0	B		10					SHA02
1980 12 16.76	9.9			32.0	R		95	1	7/			SHA02
1980 12 18.16	8.8			20.0	R		40	6	8			SHA02
1980 12 18.16	8.6			8.0	B		10					SHA02
1980 12 25.75	9.1			26.0	L		80	5	5			HUR
1980 12 25.88	9.3			6.0	R		35	2	7			SHA02
1980 12 27.82	8.5:P			10.0		4		1.5	7			HEN
1980 12 27.88	9.8			8.0	R		40	3.5	4			RID
1980 12 28.79	10.0:			8.0	R		40	3	3			RID
1981 01 03.82	9.1			20.0	R		40	2	7		260	SHA02
1981 01 04.78	10.2			26.0	L		80	2.5	2			HUR
1981 01 04.79	9.7			20.0	R		40	2	7/			SHA02
1981 01 09.91	10.6			20.0	R		40	2.5	5			SHA02
1981 01 10.74	11.0			20.0	R		40	2	4			SHA02
1981 01 10.92	10.0:			8.0	R		40	2	5			RID

NOTICE OF SUBSCRIPTION INCREASE

DUE TO THE INCREASING NUMBER OF PAGES PUBLISHED EACH ISSUE, AND TO THE SUBSEQUENT INCREASE IN PRINTING AND POSTAGE COSTS, THE REGULAR SUBSCRIPTION RATE WAS INCREASED TO $14.00 PER YEAR, EFFECTIVE MAY 1, 1982. AT THE SAME TIME, THE SPECIAL RATE WAS INCREASED TO $8.00 PER YEAR. Equivalently, this breaks down to $3.50 and $2.00 per issue, respectively.

Periodic Comet Stephan-Oterma (1980 X = 1980g) Cont.

DATE (UT)	MAG.	R	MM	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1981 01 12.82	11.1			20.0	R		40	2	3			SHA02
1981 01 16.20	10.4			20.0	R		40	3	3/			SHA02
1981 01 17.22	10.5			20.0	R		40	2	3			SHA02
1981 01 24.79	11.9	V		20.0	R		40	1.5	5			SHA02
1981 01 30.80	12.6	V		32.0	R		95	1.3	3/			SHA02
1981 02 01.22	12.4	V		32.0	R		95	0.7	5			SHA02

NEW ADDITIONS TO THE OBSERVER KEY (cf. ICQ 4, 19)

BEE01 07 D. BEESLEY, NORTHERN IRELAND
BUL 07 J. S. BULLIVANT, ENGLAND
DIX 07 P. J. DIXON, ENGLAND
CAN01 07 A. CANTON, ENGLAND
DRI 07 A. DRISCOLE, ENGLAND
FAI 07 J. C. FAIRWEATHER, ENGLAND
GAR 07 P. J. GARBETT, ENGLAND
HAT 07 M. A. HATHER, ENGLAND
HEN01 07 C. HENSHAW, ENGLAND
JUD 07 P. G. JUDGE, ENGLAND
KEE01 07 D. R. KEEDY, ENGLAND
MCI 07 B. J. MC INNERY, ENGLAND
MAC01 07 R. A. MACKENZIE, ENGLAND
MCK 07 RICHARD MC KIM, ENGLAND
MAD 07 P. J. MADEJ, ENGLAND
MAR 07 G. D. MARSH, ENGLAND
OWE 07 R. M. OWENS, SOUTH WALES
PAL 07 K. J. PALLETT, ENGLAND
PIC 07 R. D. PICKARD, ENGLAND
ROT 07 D. A. ROTHERY, NORTH WALES
SIM02 07 D. A. R. SIMMONS, SCOTLAND

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