

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES NOVEMBER-JANUARY

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The table below lists asteroids which come to opposition during the months of November through January that represent useful targets for photoelectric photometry observations. Observations are needed because the asteroid has either an unknown or ambiguous rotational period or because the asteroid will be observable at a very low phase angle. The table also includes asteroids which are candidates for pole determinations (see the article by Di Martino and Zappalà in issue 12, No. 1), are targets for radar observations (see the article by Ostro in *MPB* 10, No. 4), or are subjects for shape modelling (see the article by Davis and Binzel in *MPB* 14, No. 3). The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition V magnitude, the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. AMB implies that previous period determinations have given ambiguous results and these alternate periods are listed in the table. PHA indicates observations of the phase curve are desired because the asteroid will be at an unusually low phase angle. POL indicates the asteroid is a pole position candidate, RAD indicates the asteroid is a planned radar target, and MOD denotes an asteroid at a critical longitude for shape modelling. Question marks are used to denote uncertain or unknown values. An outline of recommended observing procedures is given in *MPB* 11, No. 1, page 7. Also recommended is the book *Solar System Photometry Handbook* (see the review by Tholen in *MPB* 11, No. 4). Ephemerides for all of the asteroids in the table are included in this issue. Finder charts for some of these asteroids may appear in the *Minor Planet Observer*. For information on this publication, contact: Brian D. Warner, 1075 Wagon Wheel Ave., Colorado Springs, CO 80915 USA.

Asteroid	Opp'n Date	Opp'n V Mag	Per	Amp	
409 Aspasia	Nov 21	11.1	9.03	0.1	PHA
121 Hermione	Dec 23	12.0	6.1?	0.1	PER
11 Parthenope	Jan 15	9.9	7.830	0.1	PHA
98 Ianthé	Jan 18	11.9	?	?	PER
34 Circe	Jan 28	11.4	15?	0.2	PER
27 Euterpe	Jan 31	8.7	8.50	0.2	PHA

Photoelectric Photometry Opportunities

		R.A. (1950)		DEC.	MAG	PHASE	
DATE		HR	MIN	DEG	MIN	V	ANGLE
Minor Planet		11 Parthenope					
1990 Dec	10	8	14.71	+17	43.0	10.80	15.2
	20	8	9.76	+18	8.1	10.61	11.8
	30	8	2.21	+18	42.8	10.40	7.7
1991 Jan	9	7	52.74	+19	23.8	10.17	3.3
	19	7	42.40	+20	6.7	10.06	1.5
	29	7	32.40	+20	47.4	10.33	6.0
Feb	8	7	23.94	+21	22.7	10.56	10.2
	18	7	17.86	+21	51.2	10.78	13.8
	28	7	14.64	+22	12.5	10.98	16.7
Minor Planet		27 Euterpe					
1990 Dec	20	9	20.39	+16	31.0	9.87	22.5
	30	9	19.90	+16	48.0	9.63	18.5
1991 Jan	9	9	15.66	+17	22.2	9.39	13.6
	19	9	8.18	+18	9.3	9.14	8.0
Feb	29	8	58.58	+19	1.8	8.86	2.0
	8	8	48.52	+19	50.8	9.04	4.5
	18	8	39.77	+20	29.1	9.37	10.2
Mar	28	8	33.71	+20	52.8	9.67	15.2
	10	8	31.11	+21	1.2	9.96	19.3
	Minor Planet		34 Circe				
1990 Dec	20	9	1.50	+ 9	16.7	12.49	17.5
	30	8	58.88	+ 9	13.1	12.24	14.3
1991 Jan	9	8	53.58	+ 9	26.5	11.96	10.4
	19	8	46.10	+ 9	56.4	11.67	6.2
Feb	29	8	37.36	+10	39.8	11.44	3.1
	8	8	28.55	+11	31.7	11.60	5.5
	18	8	20.92	+12	26.2	11.87	9.8
Mar	28	8	15.48	+13	17.9	12.13	13.9
	10	8	12.85	+14	2.6	12.37	17.4
Minor Planet		98 Ianthe					
1990 Dec	10	8	51.07	+40	34.1	12.63	19.4
	20	8	49.63	+41	26.0	12.40	16.7
	30	8	43.87	+42	14.4	12.18	13.8
1991 Jan	9	8	34.16	+42	48.6	11.99	11.1
	19	8	21.68	+42	57.3	11.88	9.8
	29	8	8.39	+42	32.8	11.91	10.9
Feb	8	7	56.47	+41	34.3	12.04	13.6
	18	7	47.68	+40	7.6	12.22	16.9
	28	7	42.97	+38	21.7	12.41	20.0
Minor Planet		121 Hermione					
1990 Nov	10	6	34.68	+24	56.5	12.84	13.5
	20	6	31.46	+25	20.1	12.68	11.1
	30	6	26.03	+25	45.0	12.52	8.2
Dec	10	6	18.78	+26	9.3	12.33	5.0
	20	6	10.36	+26	31.1	12.13	1.7
	30	6	1.63	+26	48.6	12.19	2.3
1991 Jan	9	5	53.47	+27	1.4	12.43	5.5
	19	5	46.67	+27	9.8	12.64	8.6
	29	5	41.83	+27	15.1	12.84	11.2
Minor Planet		409 Aspasia					
1990 Oct	11	4	16.68	+24	28.4	12.05	16.1
	21	4	13.14	+23	54.1	11.85	13.1
	31	4	6.97	+23	8.1	11.65	9.6
Nov	10	3	58.70	+22	11.1	11.44	5.5
	20	3	49.22	+21	5.6	11.18	1.1
	30	3	39.64	+19	56.1	11.33	3.4
Dec	10	3	31.09	+18	48.4	11.56	7.7
	20	3	24.46	+17	48.4	11.77	11.5
	30	3	20.32	+17	0.2	11.97	14.7

ASTEROID NEWS NOTES

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Fifty-one New Asteroids

Through the August 6 batch of Minor Planet Circulars, 51 asteroids were newly numbered since the last installment of News Notes, bring the numbered total to 4559. Non-main-belt objects include:

(4531)	1985 FC	Hungaria
(4543)	1989 CQ1	Trojan
(4544)	1989 FB	Apollo
(4558)	1988 NF	Mars crosser

New Asteroid Names

The July batch of Minor Planet Circulars contained several new asteroid names. *MPB* readers should recognize (4278) Harvey, named after Roger Harvey of Charlotte, North Carolina, who has visually observed over 2600 different minor planets. Other amateurs honored with asteroid namings include (3722) Urata (codiscoverer of periodic comet Urata-Nijima), and (4282) Endate. Continuing a recent trend, more composers' names appeared among the asteroids, including (4040) Purcell, (4079) Britten, (4081) Tippett, (4087) Part, (4152) Weber, and (4347) Reger. (4457) van Gogh was named to mark the 100th anniversary of the Dutch artist's death.

The highest numbered asteroid with a name is (4460) Bihoro.

New Trojan Asteroid

Ho-hum. What's so special about a new Trojan asteroid? There are over 140 Trojan asteroids with well-established orbits, and many more have been discovered. Ah, but all of these are found in the Lagrangian points of Jupiter's orbit. For the first time, an asteroid has been discovered to occupy a Lagrangian point of some other planet's orbit. Saturn, right? Good guess — after all, it is the second largest planet — but wrong. The planet is Mars, and the new discovery has been assigned the designation 1990 MB. The discoverer of this unique minor planet is David Levy, the same person who found the best comet of the year (so far), Comet Levy (1990c). H. Holt also participated in the observations, which were made with the 0.46-m Schmidt telescope at Palomar. Not much is known about this asteroid yet. Several orbit integrations have been performed to determine the stability of the orbit, and all studies done so far show the orbit to be quite stable. The available observations suggest that the object has a fairly large lightcurve amplitude, so this 2 km-sized object is apparently somewhat elongated. Needless to say, this unique asteroid will be the subject of intense study during its next opposition (late July, 1992).

Planet Crossing Asteroid Update

In addition to 1990 MB, which might have otherwise been called a Mars crosser, three new

Apollo asteroids, one new Amor, and one other deep Mars crosser have been found since the last installment of News Notes.

The first of the new discoveries came on June 23, when R. McNaught identified the streak that became known as 1990 MU on a United Kingdom Schmidt plate taken by M. Hartley. This object is a fairly large Apollo-type asteroid, with an estimated diameter of 4 km.

Just a few days later, E. Helin spied 1990 MF on a Palomar 0.46-m Schmidt film taken on June 26 by herself, B. Roman, K. Lawrence, and J. Michaud. The fact that the designation 1990 MF precedes 1990 MU, even though the discovery date is later, simply reflects the order in which the discovery information reached the Minor Planet Center. 1990 MF is also an Apollo-type asteroid, but it is about half the size of 1990 MU, with an estimated diameter of 2 km.

Helin's Palomar team had a bonanza of a run in July, when they discovered the other three new planet crossers. In a four night span, they picked up 1990 OA (July 19), 1990 OS (July 21), and 1990 OL (July 22), all with the 0.46-m Schmidt telescope. 1990 OA is a kilometer-sized object of the Amor variety, whereas 1990 OL turned out to be a deep Mars crosser of about 2 km diameter, although a preliminary orbit solution had originally suggested that it might be another Amor. The tiniest object of the new crop is the Apollo asteroid 1990 OS, which is probably subkilometer in size. It also came the closest to Earth of the new discoveries; on August 6, 1990 OS passed a scant 0.041 AU from the Earth, prompting another wave of newspaper articles.

In the pair discoveries department, 1990 MF and 1990 MU were found only three days apart, and 1990 OA and 1990 OS were found only two days apart. If one includes 1990 MB and 1990 OL, then we have a pair of triple discoveries, with 1990 MB, 1990 MF, and 1990 MU occurring between June 20 and 26; and 1990 OA, 1990 OL, and 1990 OS occurring between July 19 and 22.