

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES DECEMBER 1983 - APRIL 1984

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The table below lists asteroids which come to opposition during the months of December 1983 - April 1984 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. Asteroids which are planned as targets of radar observations are also included in the table (see the article in this issue by Ostro.) The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition B magnitude, (the V magnitude is about 0.8 brighter), the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. PHA indicates observations of the phase curve are desired and RAD indicates the object is a radar target. Question marks are used to denote uncertain or unknown values. Recommended observational procedures are given in MPB 10, No. 1, pages 1-2. Ephemerides for 9 Metis, 30 Urania, 230 Athamantis, and 409 Aspasia are included in this issue. Ephemerides for all other asteroids appeared in the previous issue. Several of these objects will likely be included in finder charts prepared by Dr. J. U. Gunter, 1411 N. Mangum St., Durham, NC 27701, which are free for a self-addressed stamped envelope.

Of particular note for the objects below is 230 Athamantis which appears to have a period of 24.00 hours! This determination may be ambiguous, i.e. the period could really be 12.00 hours. In any case, the commensurate period makes observations of the complete rotational phase impossible from any single observatory. Observers (especially Europeans) who would be interested in a coordinated campaign to observe Athamantis are invited to contact me.

Asteroid	Opp'n Date	Opp'n B Mag	Per	Amp	
74 Galatia	Dec 15	12.4	?	?	PER
60 Echo	Feb 10	11.4	52?	0.2?	PER*
202 Chryseis	Feb 14	12.0	?	?	PER
116 Sirona	Feb 19	11.5	13.7?	0.3	PER
27 Euterpe	Mar 9	10.3	8.50	0.15	PHA*
105 Artemis	Mar 19	11.4	>24	>0.1	PER
9 Metis	Mar 22	10.5	5.04	0.3	RAD*
64 Angelina	Mar 23	11.4	8.75	0.3	PHA
409 Aspasia	Apr 11	11.4	?	>0.05	PER
30 Urania	Apr 11	11.9	13.69	0.45	PHA
230 Athamantis	Apr 25	11.6	24.00	0.25	PER

* = also a radar target

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES

		R. A. (1950.00)			DEC.		MAG	
DATE		HR	MIN	SEC	DEG	' "	B	
Minor Planet		9 Metis						
1984 Feb	25	12	27	36.88	6	34 39.6	10.65	
Mar	6	12	20	14.22	7	33 46.2	10.46	
	16	12	11	8.14	8	32 45.7	10.26	
	26	12	1	27.04	9	23 17.2	10.35	
Apr	5	11	52	24.81	9	58 28.5	10.61	
	15	11	45	5.20	10	14 19.1	10.85	
	25	11	40	8.86	10	9 59.2	11.09	
May	5	11	37	52.71	9	46 50.4	11.33	
Minor Planet		30 Urania						
1984 Feb	25	13	39	55.60	-13	7 48.1	12.86	
Mar	6	13	37	8.12	-13	4 18.5	12.64	
	16	13	31	43.87	-12	44 43.3	12.42	
	26	13	24	7.12	-12	9 49.1	12.19	
Apr	5	13	15	2.51	-11	22 24.5	11.90	
	15	13	5	31.28	-10	27 35.1	11.87	
	25	12	56	38.08	-9	31 50.3	12.18	
May	5	12	49	18.71	-8	41 43.0	12.41	
	15	12	44	11.38	-8	2 28.2	12.64	
	25	12	41	34.03	-7	37 15.9	12.87	
Minor Planet		230 Athamantis						
Mar	6	14	26	51.52	-22	47 50.6	12.43	
	16	14	25	55.71	-22	44 16.9	12.24	
	26	14	22	8.58	-22	21 19.7	12.05	
Apr	5	14	15	47.12	-21	37 41.1	11.87	
	15	14	7	32.08	-20	34 13.5	11.65	
	25	13	58	23.91	-19	14 53.6	11.44	
May	5	13	49	32.82	-17	46 45.5	11.64	
	15	13	42	4.68	-16	18 41.5	11.83	
	25	13	36	46.72	-14	58 59.2	12.01	
Jun	4	13	34	4.33	-13	53 41.0	12.19	
	14	13	34	3.70	-13	5 59.4	12.37	
	24	13	36	37.83	-12	36 33.9	12.54	
Minor Planet		409 Aspasia						
1984 Feb	25	13	17	15.52	-22	20 59.1	12.33	
Mar	6	13	15	15.24	-22	28 51.8	12.09	
	16	13	10	37.69	-22	11 30.3	11.85	
	26	13	3	52.38	-21	27 14.5	11.62	
Apr	5	12	55	51.55	-20	17 33.5	11.42	
	15	12	47	44.10	-18	48 11.2	11.40	
	25	12	40	39.18	-17	8 20.7	11.56	
May	5	12	35	32.14	-15	28 36.8	11.77	
	15	12	32	57.26	-13	58 26.8	11.99	
	25	12	33	6.14	-12	44 15.1	12.22	
Jun	4	12	35	54.37	-11	49 13.6	12.43	

ASTEROID NEWS NOTES

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New Names

Rarely do the newly named asteroids outnumber the newly numbered ones in any given month, but such was the case in September when 26 asteroids received names. Included was (1717) Arlon, the lowest numbered object without a name, until now. The distinction now falls on (1787) 1950 SK. Three objects in the 1800's still lack names. The highest numbered object to be named is (2906) Caltech, named after... you guessed it!

Seventeen Newly Numbered Asteroids

After taking a vacation in August, the September batch of Minor Planet Circulars added another 17 asteroids to the numbered population. The total is now at 2927. At the reduced pace of recent months, it seems unlikely that number 3000 will be added in 1983, but that level should be reached in early 1984. The numbered asteroid population has increased nearly 50 percent in only five years! Man and machine have been very busy!

One Trojan asteroid is among the new 17: (2920) 1981 JR. It is a member of the leading cloud. We now have 38 Trojans among the numbered population.

It's Twins!

1984 will be remembered for the way earth-approaching asteroids are being discovered in pairs. Recall from the last issue, 1983 LB and 1983 LC were discovered on the same plate! After a four-month lull, two more earth-approachers have been found: one by Shoemaker (1983 RB), and one by Dunbar (1983 RD), both at Palomar. Astronomers will have a good chance to study 1983 RD, because its orbit is causing it to pace the earth for several months. At closest approach in mid-September, the object was only 0.08 AU from the earth, when it was measured to be $V=12.6$! 1983 RD will remain brighter than $V=18$ until early January.

Just as this column of News Notes was being wrapped up, another Amor asteroid, 1983 SA was discovered by Wild. The preliminary orbit shows a surprisingly large eccentricity of 0.7, a perihelion distance of 1.2 AU, a semi-major axis of 4.2 AU, and an inclination of 31 degrees! Now the question is, does this mean a second earth-approacher will be discovered in the next few days? For the answer, catch this column in the next issue.

Galileo to Flyby Asteroids?

If current plans for launching the Galileo spacecraft to Jupiter in May 1986 do not fall through, we should have a golden opportunity to study an asteroid close-up. The objects favored for flyby, at the moment, are 1219 Britta and 1972 Yi Xing. Although physical observations had not been obtained for either object prior to the announcement of the flyby opportunity, we can speculate on their nature based on the orbital characteristics. 1219 Britta is located near the inner edge of the main belt and is associated with one of the Flora region families. Virtually all studied objects in this region have S-type spectra (reddish, with a 0.95 micron absorption feature due to a mixture of pyroxene and olivine, and a moderate albedo). At least one D-type has been found in the region, as well as one E-type, so there is a remote possibility that Britta may be a more unusual object.

1972 Yi Xing is also in the inner part of the main belt and is associated with the Nysa asteroid family. Nysa itself is a high albedo E-type asteroid, but the other members of the family have flat to slightly bluish spectra and very low albedos. Yi Xing would appear to have a much better chance for being an unusual object, making it very worthwhile for Galileo to fly by and study at close range.

The uncertain nature of these objects should be vanishing as this issue reaches you, however. Britta came to opposition in October at $B=14.6$, and Yi Xing comes to opposition in January at $B=16.3$. Both are presently being studied intensively from ground-based telescopes.

PHOTOELECTRIC INVESTIGATIONS OF ASTEROIDS: SELECTED OBSERVATIONAL PROGRAMS FOR 1984

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In a preceding paper (Zappala' 1983), the significant contribution that small and/or medium size telescopes can still give in photoelectric observations of asteroids was emphasized. In particular, a program to determine rotational axes by means of complete and accurate V-lightcurves obtained at small phase angles was described.

Now, more generally, we would like to address observers' attention to a set of selected objects that have favorable oppositions in 1984 for which a better knowledge of rotational properties is especially important from a physical and statistical point of view. Almost all the listed asteroids have B magnitudes brighter than 13, so that observations can be performed by means of small telescopes too.

On the basis of considerations outlined in the preceding paper, let us state that in photoelectric observations of asteroids we have now arrived at the point where asteroids should be observed not only because they are "observable", but for their real statistical and/or physical interest. For example, a new period determination for a 100 km asteroid is "statistically" much less important than for an asteroid of 50 km. On the other hand, a complete knowledge of the rotational properties of all asteroids in the range 50-200 km is "physically" highly desirable for investigating the possible existence of triaxial equilibrium ellipsoids (Farinella et al. 1981) or binary systems (Zappala' et al. 1980; Weidenschilling 1981), which from theoretical investigation and observational evidence are thought to be particularly frequent in this size range.

Another problem was recently clearly demonstrated in the case of the large asteroid 52 Europa, whose previously adopted rotational period (thought to be of very high reliability because of the regular appearance of lightcurves obtained during the first observed opposition) is now probably to be rejected in favor of a new value which is shorter by a factor of two. This surprising result was recognized to pertain to some other objects as well, so that a conspicuous