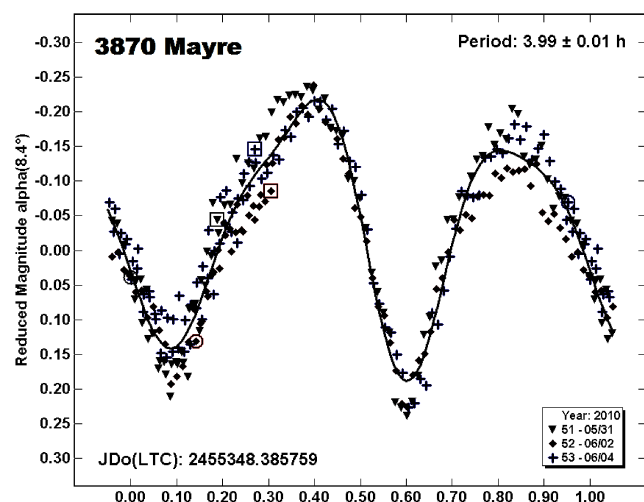
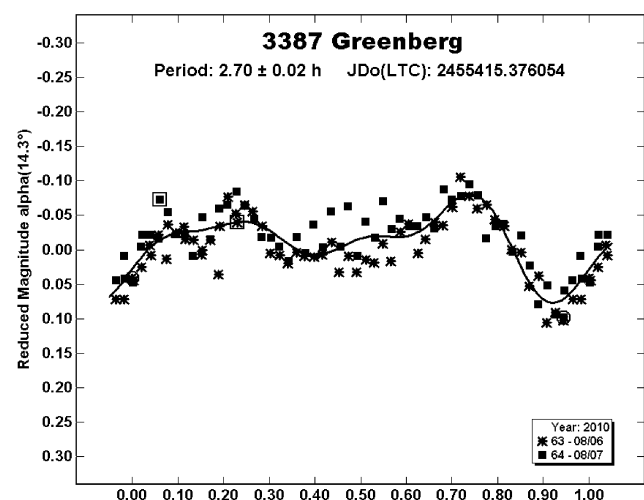
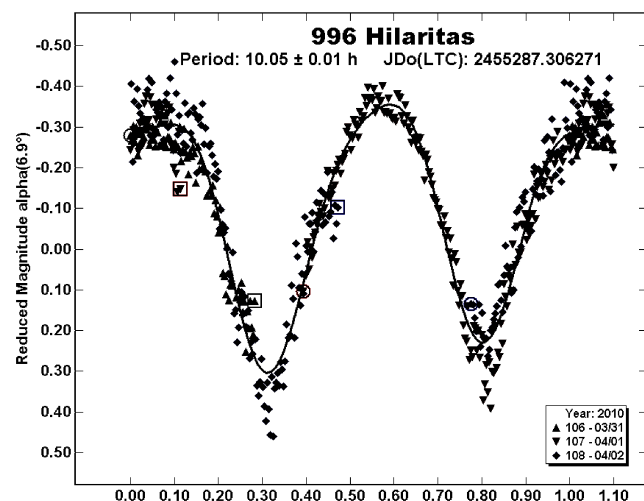




ROTATION PERIOD DETERMINATIONS FOR 27 EUTERPE, 296 PHAETUSA, AND 672 ASTARTE, AND A NOTE ON 65 CYBELE

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Synodic rotation periods and amplitudes have been found for 27 Euterpe 10.407 ± 0.001 h, 0.16 ± 0.02 mag; 65 Cybele no period found, 0.01 ± 0.01 mag; 296 Phaetusa 4.5385 ± 0.0001 h, maximum 0.51 ± 0.03 mag; 672 Astarte 22.572 ± 0.002 h, 0.15 ± 0.02 mag.

Observations of all of these objects were made at the Organ Mesa Observatory with a Meade 35 cm LX200 GPS S-C, SBIG STL-1001E CCD, differential photometry only, unguided exposures, red filter for 27 Euterpe, clear filter for all other objects. *MPO Canopus* software was used to measure the images photometrically and prepare the lightcurves. Due to the large number of data points acquired the lightcurves have been binned in sets of three data points with a maximum of five minutes between points.

27 Euterpe. Chang and Chang (1962) made the first period determination of 8.5 hours, and this value was believed for many years. Stephens et al. (2001) and Stephens (2001) in companion articles found a period of 10.410 hours with an irregular lightcurve. Subsequent determinations have been in close agreement and also show irregular lightcurves which are very different at different longitudes. These are by Gandolfi et al. (2009), 10.377 h, and by Stephens (2010), 10.404 h. New observations on five nights 2010 June 12 – July 15 show a period of 10.407 ± 0.001 hours, amplitude 0.16 ± 0.02 magnitudes, one somewhat irregular maximum and minimum per cycle, with complete phase coverage except for a small part of the rising portion lost to passing clouds. This is compatible with all recent determinations.

65 Cybele. Previous findings of the rotation period have been bivalued. Schober et al. (1980), Weidenschilling et al. (1987), and Pilcher and Stephens (2010) all found periods near 6.07 hours. Weidenschilling et al. (1990), Gil-Hutton (1990), Drummond et al. (1991), De Angelis (1995), Shevchenko et al. (1996), and Behrend (2009) all obtained periods near 4.03 hours. Amplitudes of 0.04 to 0.12 magnitudes have been reported. A new lightcurve was obtained 2010 Sept. 24. It extended more than 6 hours and therefore covered the complete cycle for either of the discordant periods. An amplitude only 0.01 ± 0.01 magnitude was found, much smaller than at any previously observed apparition. This shows that one of the two rotational poles is located within a few degrees of the position on the night of observations, longitude 53 degrees, latitude -4 degrees. But this amplitude is too small to allow a resolution of the period ambiguity. No further observations were made because it was more productive to schedule telescope time on other targets.

296 Phaetusa. Minor planet 296 Phaetusa is the lowest numbered asteroid for which the Asteroid Lightcurve Data File (Harris et al. 2010) shows no previous observations. With a period of revolution $3 \frac{1}{3}$ years and a moderately eccentric orbit, in 2010 Sept. – Oct. it was much more favorably placed for observation than at any time since 2000 or until 2020. The former

circumstance probably explains the absence of previous observations. The latter circumstance is the reason this writer placed high priority on its observation at the current apparition. Observations on 5 nights 2010 Sept. 9 – Oct. 12 show a period 4.5385 ± 0.0001 hours. The amplitude decreased from 0.51 ± 0.03 magnitudes at phase angle 21 degrees Sept. 9 to 0.38 ± 0.03 magnitudes at phase angle 4 degrees Oct. 12.

672 Astarte. Behrend (2010) states a period 19.8 hours based on partial coverage of an assumed symmetric bimodal lightcurve. New observations on 10 nights 2010 Aug. 16 – Sept. 26 rule out this assumption and show a period 22.572 ± 0.002 hours, amplitude 0.15 ± 0.02 magnitudes, with a somewhat irregular lightcurve.

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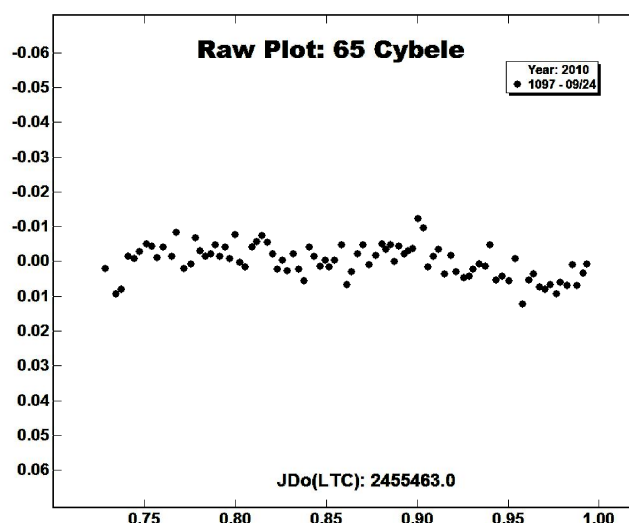
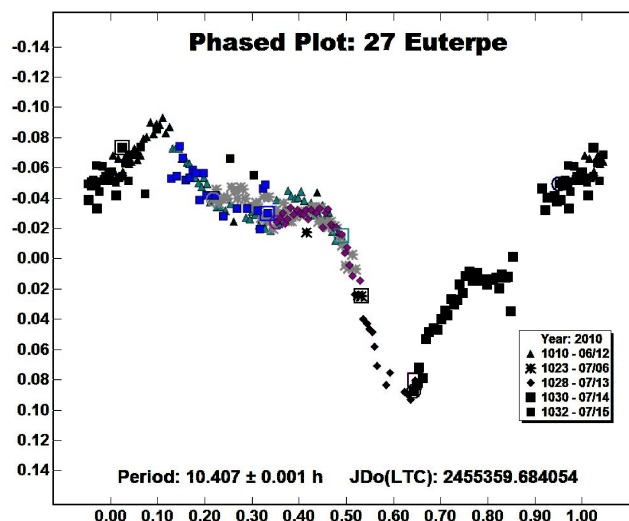
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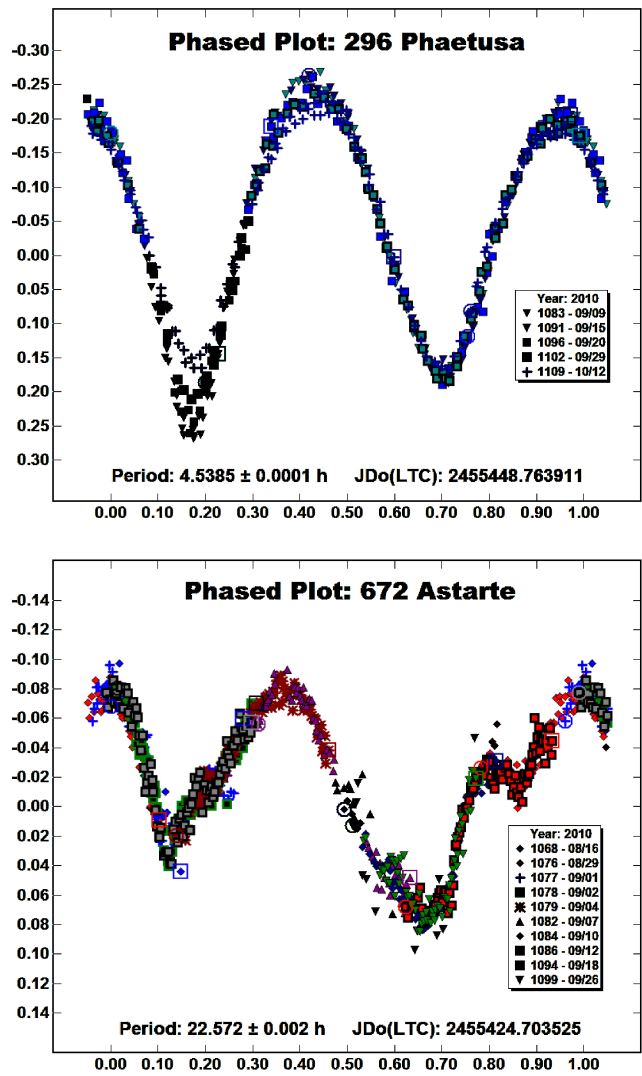
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UPON FURTHER REVIEW: IV. AN EXAMINATION OF PREVIOUS LIGHTCURVE ANALYSIS FROM THE PALMER DIVIDE OBSERVATORY

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Updated results are given for nine asteroids previously reported from the Palmer Divide Observatory (PDO). The original images were remeasured to obtain new data sets using the latest version of MPO Canopus photometry software, analysis tools, and revised techniques for linking multiple observing runs covering several days to several weeks. Results that were previously not reported or were moderately different were found for 573 Recha, 575 Renate, 605 Juvisia, 620 Drakonia, 687 Tinette, 787 Moskva, 983 Gunila, 1282 Utopia, and 1600 Vyssotsky. This is one in a series of papers that examines results obtained during the initial years of the asteroid lightcurve program at PDO.

The availability of improved analysis tools and techniques along with the experience gained over more than a decade of asteroid lightcurve photometry have lead to a program to re-examine the early work and results at the Palmer Divide Observatory (ca 1999-2006). In most cases, any changes in the period and/or amplitude as a result of the new analysis were statistically insignificant. Some, however, fit into a gray area between significant and not but are still worth noting. This paper is one in a series that reports updated results from the initial stage of new analysis, in this case giving updates on six asteroids that fit into that gray area. Subsequent stages will likely produce additional revisions.

For background on the justification and methodology of this project, see the first paper in the series (Warner, 2010).

Presentation of the New Analysis

A brief analysis of the new data set and lightcurve based on that new data set are given below, even if there is no significant difference in the period. The “improvement” may be a revised amplitude or “simply better data” to be used for modeling in the future (e.g., the U code may have a higher rating; see Warner et al., 2009, for information about the U code rating system). The exact observing details will not be given. Instead, Table I lists the original and new results along with a reference to the original

#	Name	Original				Revised				
		Per	Amp	U	Ref	Per	PE	Amp	AE	U
573	Recha	6.53	0.25	0	Warner; MPB 29, 14-15	7.15	0.01	0.20	0.02	2+
575	Renate	3.678	0.20	2	Warner; MPB 27, 4-6	3.676	0.002	0.15	0.01	3-
605	Juvisia	15.855	0.26	2	Warner; MPB 24, 4-6	15.93	0.02	0.25	0.01	2
620	Drakonia	5.485	0.52	3	Warner; MPB 29, 27-28	5.49	0.01	0.56	0.02	3
687	Tinette	7.395	0.33	3	Warner; MPB 27, 4-6	7.40	0.02	0.25	0.01	3
787	Moskva	5.381	0.55	2	Warner; MPB	6.056	0.001	0.62	0.01	3
983	Gunila				Not previously published	Long?				1
1282	Utopia	13.60	0.29	3	Warner; MPB 28, 30-32	13.61	0.01	0.28	0.01	3
1600	Vyssotsky	3.2	0.13	2	Warner; MPB 26, 31-33	3.201	0.001	0.19	0.01	3

Table I. Summary of original and revised results. The period is in hour and the amplitude is in magnitudes. The U code rating is based on the criteria outlined in the Lightcurve Database (Warner et al., 2009c). Unless otherwise stated, the references are from the *Minor Planet Bulletin* for the original results, with only the volume and page numbers given.