

THE SIZES AND SHAPES OF (4) VESTA, (216) KLEOPATRA, AND (381) MYRRHA
FROM OCCULTATIONS OBSERVED DURING JANUARY 1991

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(4) Vesta: On January 4th, Vesta occulted the 7.3-mag. star SAO 93228 as seen from the Great Lakes region. Photoelectric and video recordings were made at 8 sites in Michigan and one in Ohio; at least 11 visual observers obtained additional useful timings as far east as Toronto. Our preliminary analysis shows that the observations are fit well by an ellipse of dimensions 520 km by 482 km. The photoelectric data suggest irregularities departing from the elliptical shape by 15 km or more. If the 1989 August occultation result is considered, the mean diameter of Vesta is probably about 547 km. This value will be refined as lightcurve and pole position data are taken into account.

(381) Myrrha: On January 13th, Myrrha occulted 1.9-mag. Gamma Geminorum, the brightest star yet to be seen covered by an asteroid. The path unexpectedly shifted north, passing directly over the Tokyo region, where the event was monitored photoelectrically at one site, videotaped at two sites, photographed at two more sites, and timed visually at 14 other locations. A preliminary analysis indicates an elliptical outline, 80 km by 120 km, for Myrrha. Those with larger telescopes reported seeing a close companion of Gamma reappear while the bright star was covered. The companion was yellowish and about 8th magnitude; it must have been about 0".04 from the primary. In China, a nationwide campaign was organized, perhaps one of the largest in astronomical history. Over 5000 observers watched the star. The occultation was seen from at least 4 locations in Shandong province.

(216) Kleopatra: On January 19th, Kleopatra occulted 9.1-mag. SAO 115296 across the northern U.S.A. and southwestern Canada. The event was videotaped by Dunham using portable equipment in central New Jersey, and a photoelectric record was obtained with the 1.22-m telescope at the Dominion Astrophysical Observatory in Victoria. Six observers at other locations made visual timings. All of these chords are projected onto the sky plane in the figure below, which shows that Kleopatra's outline was about 55 km wide and about 230 km long! The occultation occurred near the maximum of Kleopatra's large-amplitude lightcurve. Care will be needed to combine this result with the 93 km x 125 km outline obtained during a 1980 October occultation that occurred near minimum light.

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