Journal of Cuneiform Studies

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RITUALS FOR AN ECLIPSE POSSIBILITY IN THE 8TH YEAR OF CYRUS[1]

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the monthly progress of the shadow relative to the nodes (30;40°) exceeds the interval around the nodes in which eclipses can occur (ca. 22°), lunar eclipses do not occur in successive months. Furthermore, if at full moon preceding the shadow's passage by a node, the shadow's distance from the node is between −11° and −19°, this distance will be between +19° and +11° at the next full moon, and no eclipse will take place at that nodal passage by the shadow. Thus it happens that only one lunar eclipse at most can occur each time the shadow passes by a node, while no eclipse can take place at some nodal passages.

Lunar eclipses occur at full moon whenever the moon is close enough to the sun's path to pass through the earth's shadow. Because the moon's orbit is inclined to the sun's, lunar eclipses only occur when the earth's shadow at full moon is within roughly 11° of one of the intersections of the orbits of the sun and moon.[15] We call these intersections "nodes"; the Babylonians called them *kiṣru*, a term whose meanings included the sense "eclipse possibility".[16]

On average the earth's shadow moves 30;40° per month relative to the nodes and therefore passes by a node every 5.87 months.[17] Since

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15. Specifically, within 11;10° ± 1° of a node, where the variation depends primarily on the moon's distance from the earth and thus is a function of lunar anomaly.

16. Cf. BM 36754, a table of dates of solar eclipse possibilities arranged in 18 year cycles from at least -347 to -258, whose colophon reads *ki-ṣa-ri šá* [...] (Aaboe, Britton, Henderson, Neugebauer and Sachs, 1991, Text D, 25ff.). See also *ACT*, 479.

17. More precisely (-600), every 5.868818.. = 5;52,7,44,45.. months, corresponding to an average motion of the sun and shadow relative to the nodes of 30;40,14,1,..°/month.